

# Salmon Airshed PM Advance Program

## Path Forward



State of Idaho  
Department of Environmental Quality  
and City of Salmon  
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# 1 Introduction

Fine particulate pollution has long been a concern in the Salmon area of central Idaho, which is impacted by intense smoke events from regional wildfires in the summer and by smoke from home heating and air stagnation events in the winter. The geography of the Salmon valley creates optimal conditions for long periods of high pressure during the winter months, resulting in lengthy air inversions. When air inversion events occur during the winter, pollutants emitted into the lower atmosphere are trapped, exposing residents to unhealthy air, often for weeks at a time.

The area has violated the daily federal health standard for fine particulate matter (PM<sub>2.5</sub>) since 2011. City leaders and citizens decided participation in the PM Advance Program provided a way for the community to develop an acceptable path toward improving local air quality and quality of life while avoiding more stringent regulation in the event of a future nonattainment designation.

EPA launched the Particulate Matter (PM) Advance Program in early 2003. This nonregulatory program encourages collaboration between EPA, states, tribes, and local government to proactively reduce PM<sub>2.5</sub> emissions in areas struggling to meet the national air quality standards for PM<sub>2.5</sub>. The program empowers local communities to develop site-specific solutions to air quality problems that fit local needs and goals. Participating in the voluntary PM Advance Program presents multiple benefits for an area:

- Helps ensure continued health protection over the long term
- Better positions an area to meet air quality standards and avoid a nonattainment designation, which puts in place certain regulatory measures for not meeting standards
- Allows for input on control measures and programs that make the most sense for the area and are cost-effective

This path forward describes the process and outcomes of that effort in the Salmon area and lays out a course of action to implement the measures and programs identified by the community to reduce particulate pollution.

# 2 Background

Fine particulate matter (PM<sub>2.5</sub>) is an air pollutant with particles less than 2.5 micrometers in diameter. It can be directly emitted into the air or formed chemically as other pollutants and chemicals combine in the air. Primary sources of PM<sub>2.5</sub> include vehicles, factories, construction sites, tilled fields, unpaved roads, construction, residential wood burning, agricultural burning, wildfires, prescribed fires, and natural windblown dust. Secondary PM<sub>2.5</sub> forms from chemical reactions between nitrogen oxides, sulfur dioxide, ammonia, and volatile organic compounds. The main sources of nitrogen oxides are vehicles and construction and farm equipment. Sources of ammonia emissions include waste from dairies and other animal operations. In the winter, PM<sub>2.5</sub> pollution is often a problem during inversions. In the summer, particulate matter pollution can increase as a result of wildfire smoke.

Exposure to fine particulate matter is associated with several serious health effects, including premature death. Adverse health effects have been associated with exposure to particulate matter over both short periods (such as a day) and longer periods (a year or more). Breathing fine particulate matter is bad for everyone, although it is most harmful to children, adults who are active outdoors, and people with lung and heart diseases.

The Clean Air Act (CAA) requires EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. In 1997, EPA adopted two standards for fine particulate matter: an annual standard of 15 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) and a daily standard of  $65 \mu\text{g}/\text{m}^3$ . The CAA also requires EPA to review and revise as necessary each standard every 5 years. EPA revised the daily standard in 2006 and the annual standard in 2012 based on reviews of health studies showing adverse impacts at lower concentrations. The annual  $\text{PM}_{2.5}$  standard is currently  $12 \mu\text{g}/\text{m}^3$  and the daily standard is  $35 \mu\text{g}/\text{m}^3$ .

When EPA revises a standard, they agency is required to designate areas violating the new standard as nonattainment. While the Salmon area currently meets the *annual*  $\text{PM}_{2.5}$  standard, the area has recorded exceedances of the *daily* standard since 2011 and is in danger of being classified as a nonattainment area during future reviews of the daily standard.

### 3 Salmon Area Description

Salmon is Lemhi County's largest city, ranking 44th in the state with a population of 3,059 people in 2016 (US Census Bureau 2018). Salmon's history includes strong traditions in mining, timber, and family ranching. Lemhi County has depended on mining for most of its history, and the economic realities of the last decade reflect it. The population has steadily eroded in the last decade. The county's population was 7,743 people in 2016. The median family income in Lemhi County is around \$34,762, with roughly 16.9% of the population below the poverty level (US Census Bureau 2018).

Since hitting 10.3% in peak recession times, the county's unemployment rate has decreased for the fifth consecutive year to 6.3%. The statewide unemployment rate for Idaho in 2016 is 2.9% (Idaho Department of Labor 2018). Government, particularly land management agencies, employs 34% of the county's workers. Trade, transportation, and utilities along with leisure and hospitality are the next two largest economic sectors in the county and account for another 31% of the labor force (US Census Bureau 2018).

The Salmon airshed is in a narrow mountain valley along the Salmon River in Lemhi County. The airshed represents 50% of Lemhi County's total land area and includes about 93% of the total population. An airshed is an area covered by a volume of air that has similar characteristics and is separated from other volumes of air by weather patterns or topography. Air pollution that is emitted in one area will spread out and become distributed across the airshed. For this reason, air pollution levels are generally similar across a given airshed. The boundaries of an airshed can be difficult to determine due to changing conditions. Ridges and mountains prevent air circulation and hold pollution within their boundaries, but weather conditions change on a daily basis. Features that obstruct air movement on some days may present no barrier at all when a weather front pushes through.

The Salmon airshed was outlined based on local watersheds, which represent the land area from which water drains toward a common water body in a natural basin. The Idaho Department of Environmental Quality (DEQ) used watershed units as a starting point and reviewed factors such as terrain, meteorology, and location and distribution of emissions sources that may contribute to particulate matter air quality problems, including wildfires and prescribed burning.

The Salmon airshed includes the communities of Salmon, Carmen, Shoup, North Fork, Elk Bend, Ellis, Lemhi, Tendoy, Gibbonsville, Baker, and Cobalt (Figure 1). The Eastern boundary of the airshed follows the Idaho-Montana border along the Bitterroot Range and the Continental Divide. Population density is low and land use is a mixture of forested mountains, developed land, pasture/hay, grassland, and shrub-covered hills. Salmon sits at the confluence of the north-flowing Salmon River and the northwesterly trending Lemhi River valley. Surface wind patterns are dominated by drainage flows in these directions. The airshed is adjacent to the 2.3 million acre Frank Church River of No Return Wilderness Area, the largest wilderness area in the lower 48 states.



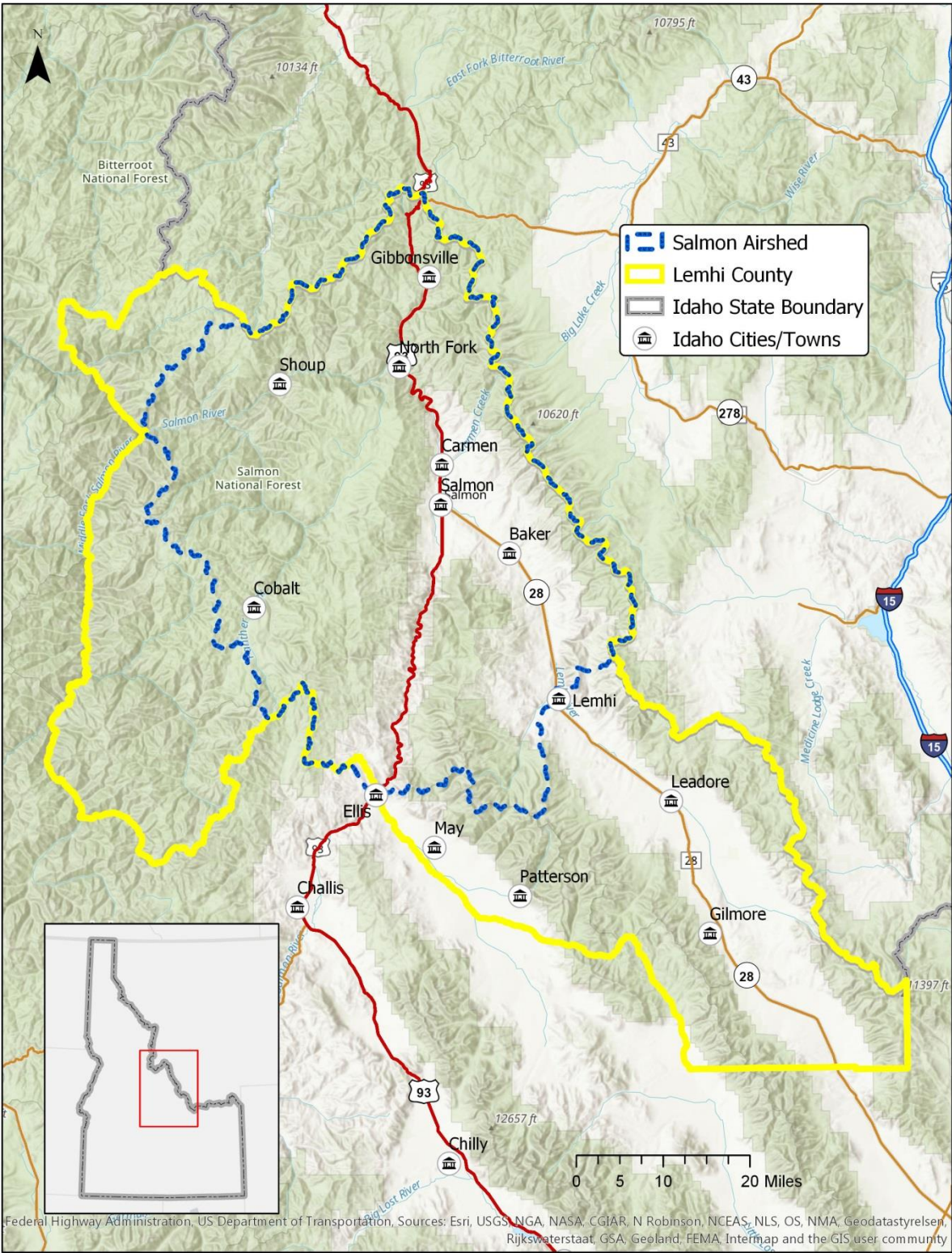


Figure 1. Salmon airshed.



## 4 Air Quality

DEQ has been monitoring air quality in the Salmon area since 2003, with the exception of a brief period from mid-2005 through 2006. DEQ operates a regulatory monitor used assess compliance with standards and a continuous monitor that is used to support air quality forecasting and smoke management programs. The monitors are in Salmon on Charles Street.

The current NAAQS for PM<sub>2.5</sub> are two-fold:

- Annual standard of 12 µg/m<sup>3</sup>: based on 3-year, annual average concentration
- Daily standard of 35 µg/m<sup>3</sup>: based on 3-year average of the 98th percentile of 24-hour PM<sub>2.5</sub> concentrations

Design values are calculated for comparison with both the annual and daily NAAQS to assess compliance. Design values are based on data collected over long periods to ensure that typical pollutant concentrations are represented, rather than isolated spikes. Each year, the annual average and daily average values are calculated and these become the airshed's design values. These design values are used to determine if an area exceeds the standards.

- The design value for the annual PM<sub>2.5</sub> standard is the average of the annual means from 3 consecutive years.
- The design value for the daily PM<sub>2.5</sub> standard is the average of the 98th percentile 24-hour average concentration over 3 consecutive years. The 98th percentile value is the observed concentration below which 98% of observations fall. Only 2% of observed concentrations are higher than this value.

Exceptional events are unusual or naturally occurring events that can affect air quality but are not reasonably controllable (e.g., wildfire smoke or dust storms). The CAA allows DEQ to flag such data and excluded them from the dataset if EPA concurs. This process provides regulatory relief for states and local communities that exceed national air quality standards because of certain sources of pollution, including wildfires and some prescribed fires.

When DEQ identifies PM<sub>2.5</sub> concentrations that have been influenced by an exceptional event, DEQ flags that data before submitting it to EPA. DEQ only requests the exclusion of flagged data when they have the potential to cause a violation of the NAAQS. Therefore, the final PM<sub>2.5</sub> design value concentrations may change depending on how many exceptional events are approved by EPA.

Figure 2 and Figure 3 summarize the annual and daily design value concentrations in Salmon for each year that monitoring data are available. The solid bars include all monitoring data while the clear bars exclude data flagged as exceptional.

Since monitoring began in 2003, the Salmon airshed has met the annual PM<sub>2.5</sub> standard after exceptional events have been excluded (Figure 2).

However, Salmon's daily design value concentrations have been consistently above the standard even when wildfire influences are removed (Figure 3). The daily NAAQS was last revised in 2006, when EPA lowered the standard from 65 µg/m<sup>3</sup> to 35 µg/m<sup>3</sup>. Salmon met the new standard and remained in compliance until 2010. Since then, the daily design value concentrations have

exceeded  $35 \mu\text{g}/\text{m}^3$  (Figure 3). The Salmon airshed is at risk of a nonattainment designation for the daily  $\text{PM}_{2.5}$  standard during the next review period if air quality doesn't improve.

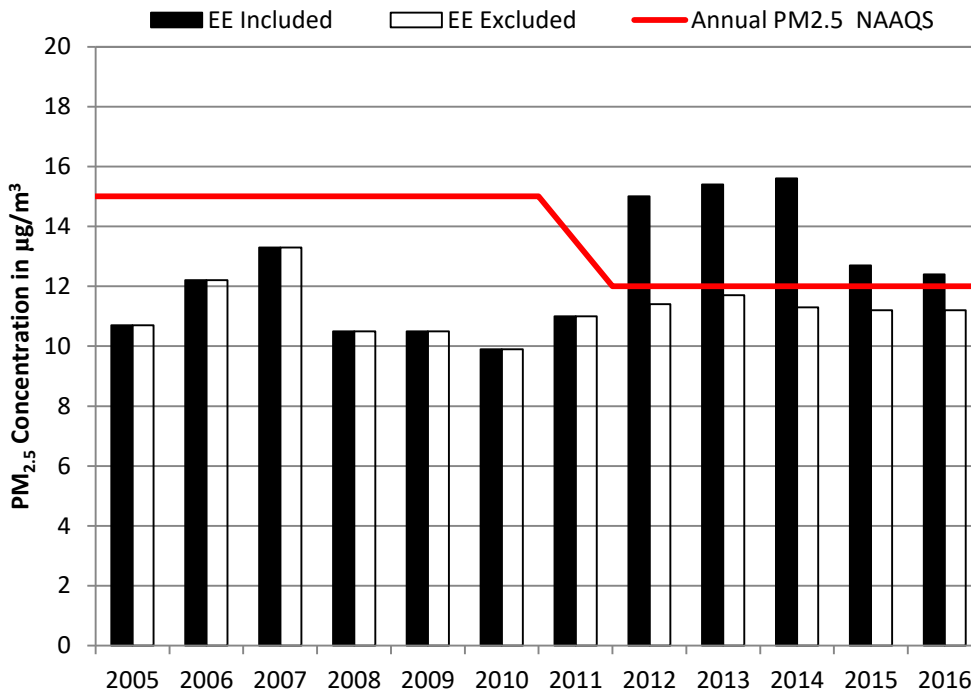


Figure 2. Annual  $\text{PM}_{2.5}$  design value concentrations at the Salmon monitor, 2005–2016. Note: EE is exceptional event.

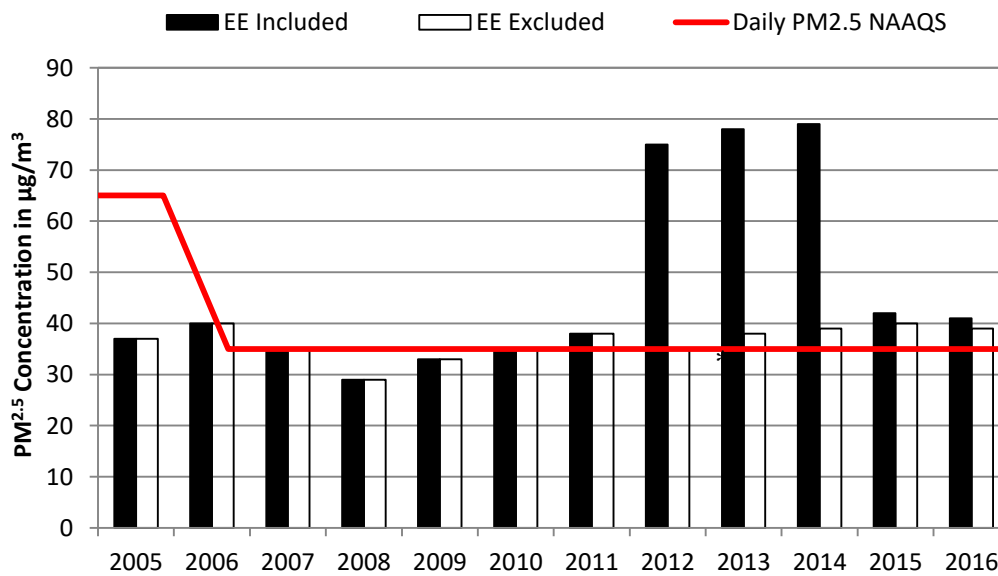
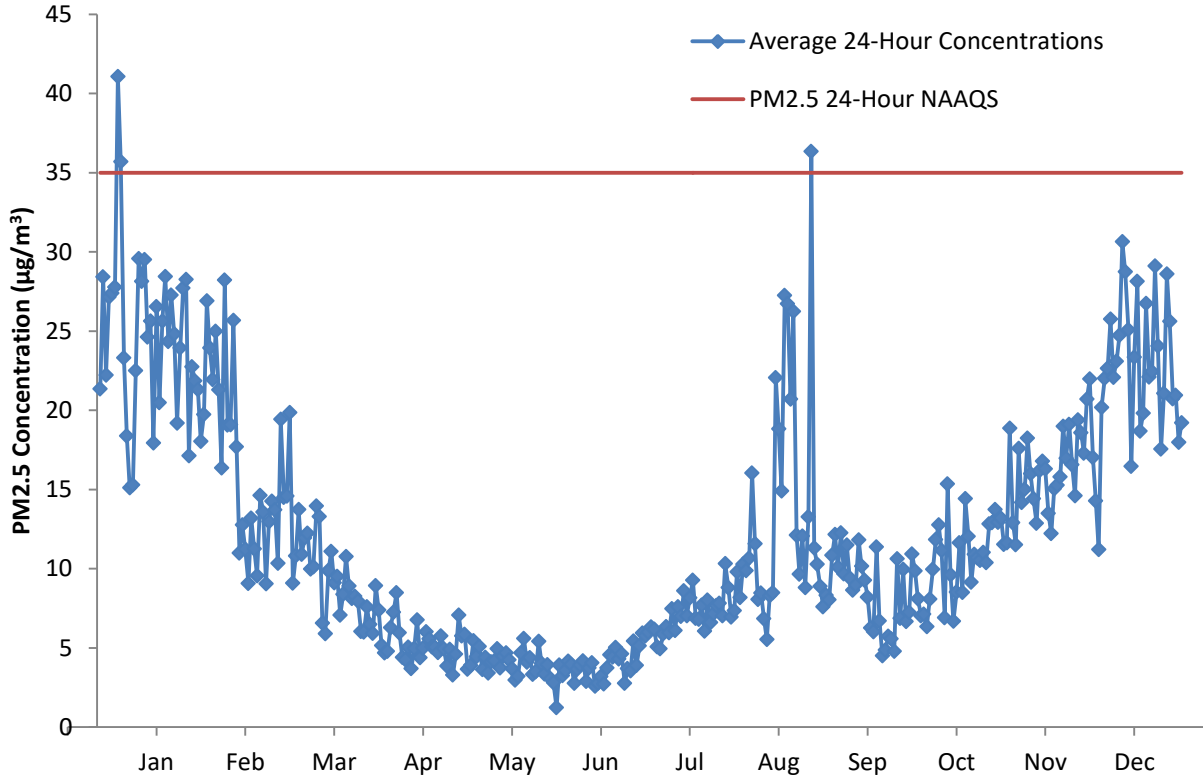


Figure 3. Daily  $\text{PM}_{2.5}$  design value concentrations at the Salmon monitor, 2005–2016. (\*) indicates EPA concurrence with DEQ's exceptional events flags for monitoring days in the third quarter of 2012. Note: EE is exceptional event.

These data clearly show that PM<sub>2.5</sub> issues are a wintertime problem in the area. Figure 4 shows the daily PM<sub>2.5</sub> values in the airshed over the course of a year using data compiled from a 7-year period. This dataset (Figure 4; Table 1) includes flagged data where wildfire smoke influence is suspected but excludes the days impacted by exceptional events as concurred with by EPA. As is the case with many mountain valleys in Idaho, the highest PM<sub>2.5</sub> concentrations occur in the winter months. For the 2010–2016 period, PM<sub>2.5</sub> concentrations are overall more elevated in the first and fourth quarters (October through March) when compared to the summer months, except when concentrations spike in August due to wildfire smoke.



**Figure 4. Average daily PM<sub>2.5</sub> concentrations at the Salmon monitor, 2010–2016, are highest in the winter.**

The Salmon airshed experiences the highest PM<sub>2.5</sub> concentrations in the winter months. Over the last 13 years, 70% of all exceedances (values above the daily standard) occur in the first and fourth quarters, coinciding with the residential wood heating season when temperatures are low and people rely on fireplaces and woodstoves for heating (Table 1).

**Table 1. Seasonal distribution of PM<sub>2.5</sub> daily standard exceedances in the Salmon airshed (2003-2016).**

Quarter	Number of Exceedances of Daily Standard
1 (Jan–Mar)	39
2 (Apr–Jun)	7
3 (Jul–Sept)	22
4 (Oct–Dec)	28
Total	96

## 5 Pollutant Sources

EPA has regulatory and voluntary programs to reduce air pollutants emitted from a wide range of emission sources. To keep track of these emissions, EPA maintains the National Emissions Inventory (NEI), the national database of air pollutant emissions information. The NEI is a comprehensive and detailed estimate of annual total air emissions from all air emissions sources. These sources fall into four main categories:

- Point sources: sources located at a fixed location (i.e., large industrial facilities and electric power plants, airports, and smaller industrial, nonindustrial, and commercial facilities).
- Nonpoint sources: sources that individually are too small in magnitude to report as point sources (e.g., residential heating, commercial combustion, asphalt paving, construction and mining activities, agricultural activities).
- On-road and non-road sources: on-road vehicles and off-road mobile sources (not typically used on roads and highways for transportation purposes) that use gasoline, diesel, and other fuels. On-road sources include light-duty and heavy-duty vehicle emissions from operation on roads, highway ramps, and during idling. The off-road sources include recreational vehicles, construction equipment, lawn and garden equipment, aircraft ground support equipment, locomotives, etc.
- Event sources: include fires such as wildfires and prescribed burns.

The NEI is released every 3 years based primarily on data provided by state, local, and tribal air agencies for sources in their jurisdictions. In accordance with Air Emissions Reporting Requirements (40 CFR part 51, subpart A), DEQ compiled a calendar-year 2014 statewide, county-level PEI. EPA takes state submittals and supplements categories and emissions not calculated by the state to develop the NEI.

The most recent emissions data were published by EPA as 2014 NEI v2 (<https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data>). These data were the starting point for developing this 2014 base year emissions inventory for the Salmon airshed. Since Salmon experiences elevated PM<sub>2.5</sub> concentrations during the winter, this emission inventory summarizes emissions for a typical winter day. Some of the source categories were adjusted or considered insignificant based on local knowledge. Certain sources—such as windblown dust, unpaved road dust, emissions from the agricultural sector (livestock, fertilizer application, and crop residue burning), and wildfires and prescribed fires—do not contribute to

airshed emissions during the winter months due to high relative humidity and high surface moisture conditions or because they simply do not take place during the winter.

To apportion the existing Lemhi County emissions data to the Salmon airshed specifically, DEQ examined 2014 data for the following:

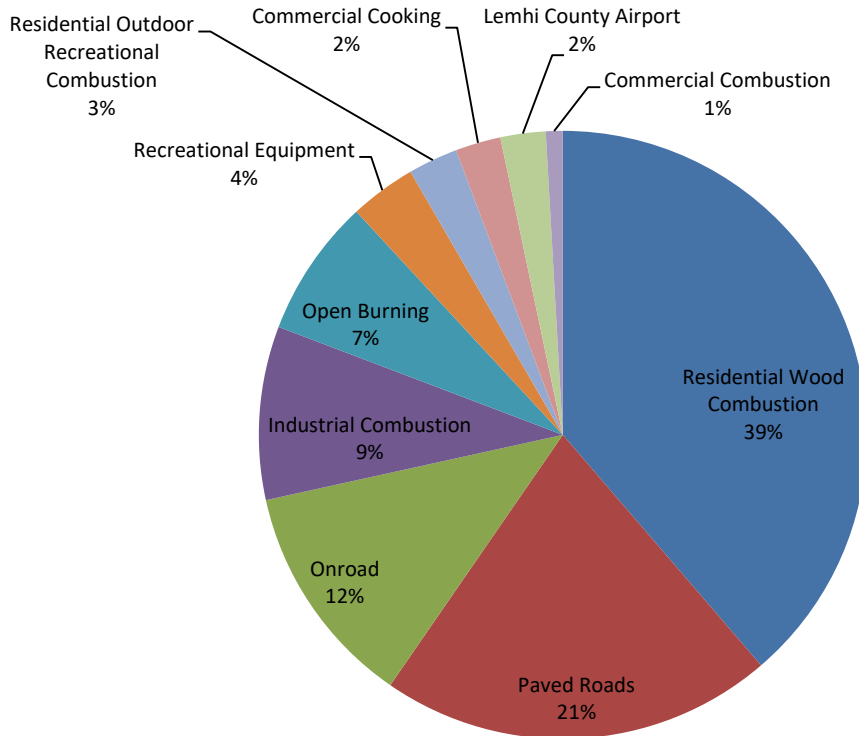
- Demographics (population or occupied household number ratio between the Salmon airshed and Lemhi County)
- Land-use
- Fraction of employees in various types of industry
- Fraction of the road network within the airshed
- Fraction of available acreage for specific activities
- Regional surveys when available
- Local knowledge of the different emissions sectors

Of all the PM<sub>2.5</sub> sources, residential wood combustion was the most important source in the airshed. Residential wood combustion is burning wood to heat residential housing (using woodstoves, pellet stoves, fireplaces, and fireplace inserts) and for outdoor warming fires. The best approach to calculating emissions for residential wood burning is using wood use surveys to determine how many homes burn wood for heat and how much wood is burned. Wood consumption is then multiplied by the emissions factors to calculate emissions. Without airshed-specific information on wood use, DEQ used regional default settings to estimate wood burning appliance emissions. Based on these estimates, over 90% of all woodstoves in Lemhi County are within the airshed boundaries. Of these woodstoves, around 50% are older, non-EPA certified stoves that emit more fine particulates. Older woodstoves are less efficient and burn more wood than newer stoves, which also contributes to increasing particulate pollution.

Table 2 summarizes the contributions from nonpoint, point, non-road, and on-road sources in the Salmon airshed. Residential wood combustion is the largest contributor of fine particulates in the winter, followed by on-road emissions from tailpipes and dust from paved roads (Figure 5).

**Table 2. Salmon airshed emissions summary in pounds per winter day.**

<b>Emissions Categories</b>	<b>PM<sub>2.5</sub> Emission (lb/day)</b>	<b>Description</b>
<i>Non Point Sources</i>		
Residential wood combustion	169.57	Woodstove, pellet stoves, fireplaces, and fireplace inserts
Industrial, residential and commercial combustion	45.14	Fuel combustion emissions for coal, distillate oil, natural gas, liquefied petroleum gas, kerosene, and wood at residential small industrial and commercial/institutional facilities for heating other appliance operation
Open burning	32.46	Household municipal solid waste in burn barrels and open burning of yard waste (leaf, brush, grass/weeds)
Commercial cooking and charcoal grilling	13.14	Commercial food preparation from restaurant level data (deep fat frying, charbroiling, etc.)
Residential outdoor recreational combustion	11.57	Fire pits and any other type of outdoor wood burning appliances
Livestock	3.57	
Mining and quarrying	0.26	Operations associated with sand and gravel pits
Vehicle and structure fires	0.24	
Construction	0.08	Generated from construction activities based on disturbed acreage and permits issued
<i>Non-road Sources</i>		
Recreational equipment	16.80	All-terrain vehicles and off-road motorcycles, snowmobiles
Construction, commercial, and mining equipment	4.59	Graders, back hoes, loaders, forklifts, cranes, tractors, etc.
Lawn and garden, industrial and logging equipment	1.08	Leaf and snow blowers, lawn mowers, forklifts and sweepers, chain saws, etc.
<i>On-road Sources</i>		
Paved roads	91.62	Dust particulates or silt on the roadway surface available for entrainment; increases with wintertime sanding
On-road	52.37	Tail pipe emissions from various categories of vehicles driven on roads; vehicle tires and brakes
<i>Point Sources</i>		
Airports	10.59	Aircraft engine emissions during idling, landing, and takeoffs



**Salmon Airshed Top 10 sources of PM<sub>2.5</sub>**

Figure 5. Top contributors of PM<sub>2.5</sub> in the Salmon airshed—winter emissions inventory.

## 6 Community Partners

On September 26, 2016, the City of Salmon in partnership with DEQ signed up to participate in the PM Advance Program and take voluntary actions to improve air quality in the Salmon airshed (Appendix A). Since then, extensive outreach efforts have taken place in the community to increase awareness of PM<sub>2.5</sub> pollution and its impacts on public health. DEQ has worked closely with the city to promote community participation in selecting successful strategies to reduce particulate pollution and protect public health.

An airshed advisory group was established in 2017 to give local leaders and stakeholders a forum to build consensus around actions to improve PM<sub>2.5</sub>-related air quality issues. The Salmon Clean Air Committee (SCAC) includes concerned city and county residents, local federal land managers, public health officials from the community hospital, local conservation groups, and civic leaders.

Through months of deliberation, the SCAC assessed numerous strategies to reduce PM<sub>2.5</sub> pollution and selected a combination of strategies with the most community support. They focused on residential wood combustion impacts and outreach and education tools to keep the local community informed and empower them to take specific actions on days with high particulate concentrations.



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## 7 Emission Reduction Strategies

The goal of this path forward is to improve year-round air quality in Salmon by engaging the community to help ensure ongoing success. “Strategies for Reducing Residential Wood Smoke” (EPA 2013) recommends that an effective program addressing air quality issues related to residential wood combustion should include several strategies.

- Education and outreach—Areas should start by implementing an education and outreach campaign. This campaign can raise awareness of the air quality issue and let citizens know how they can help improve air quality.
- Voluntary measures—Involves a replacement or retrofit program for wood-burning appliances. Change-out programs replace old stoves with new, cleaner-burning appliances.
- Curtailment program—A wood smoke curtailment program, either voluntary or mandatory, can be followed by additional regulations for other types of burning that may affect air quality within the airshed.

These strategies generally fall into three “buckets”: (1) education and outreach, (2) voluntary measures, and (3) current and possible future regulatory measures.

The emission reduction strategies identified by the SCAC include elements in each of the three areas mentioned above. The strategies focus primarily on public outreach and education about the relationships between wood smoke, air quality, and public health. Education is necessary for the other strategies to be effective. Measures that are currently being implemented and being developed for future implementation are described below.

### 7.1 Outreach and Education

Educating the community and building awareness about air quality issues is the main focus of this plan. Education on the key issues related to PM<sub>2.5</sub> in the area will ease the way for future voluntary and possible regulatory efforts, should they be needed, by developing an understanding of the problem, its sources, and how it can be addressed. DEQ has developed a strategic communication plan based on a detailed situational analysis of the PM concerns in Salmon (Appendix B). This plan will guide all future outreach and education efforts. The SCAC, with assistance from the City of Salmon and DEQ, is already implementing many of the measures described in the communication plan. Other measures will be phased in during the first 5 years of the PM Advance Program. Existing measures will be maintained or expanded over the course of the program’s commitment to PM Advance, as described below.

#### 7.1.1 Public Education

Wood-burning appliances that are operated properly and used with well-seasoned wood produce less PM pollution, thereby reducing PM in the airshed and within the homes of wood burners. Education about how to burn cleanly will help all residents who use woodstoves to heat their home, regardless if they have an EPA-certified stove. The SCAC currently uses printed and online materials from DEQ and the EPA Burn Wise program. Going forward, the SCAC will modify the content to address the Salmon area specifically, expand distribution of these materials, and target homeowners who use woodstoves.

The following public education efforts are already in progress or being evaluated:

- The SCAC is partnering with several local stakeholders to increase distribution of materials:
  - US Forest Service and US Bureau of Land Management to distribute Burn Wise materials with wood harvesting permits
  - Local stove retailers, the City of Salmon, local health clinics, school administrators, and the Salmon Public Library to distribute general informational materials
  - The program is considering mailing Burn Wise materials with local water bills during the winter.
- DEQ has purchased stovepipe thermometers and wood moisture meters and made them available for use through a checkout program at the Salmon Public Library.
- The program has established “no idle zones” by placing signs, with permission, in targeted areas around the city where idling vehicles most commonly aggregate.

DEQ will make available existing resources to interested schools in the community to assist teachers in providing environmental education related to air quality. DEQ currently has an interactive activity called “Inversion in a Cup” that demonstrates the concept of inversions and is appropriate for all age groups. The Salmon School District will be running the EPA Air Quality Index (AQI) flag program at Pioneer Elementary School and the Salmon junior and senior high schools.

No tracking of past outreach efforts exists to inform decisions on the effectiveness of these strategies. Informal feedback over many years has shaped the current direction of outreach. Moving forward, the program will put more effort into measuring the success of such outreach measures (Appendix B, Evaluation). This feedback may take the form of recurring community awareness surveys or other options to be determined by the program.

### **7.1.2 Media and Social Media Engagement**

DEQ will use a variety of forms of media—local radio announcements and interviews, Idaho Public Television, local and regional newspapers, and social media—with the hope of reaching a wide audience and determining the most effective communication channels.

The following targeted media outreach has been completed since the area signed up for the PM Advance Program:

- During the 2017–2018 heating season, members of SCAC participated on four episodes of the locally produced radio program, “Voice of the Valley.”
- The Idaho Public Television program “Idaho Reports” produced a segment during December 2017 on the Salmon PM Advance Program, including interviews with the city council, DEQ, and Salmon residents.
- The SCAC hosted an open house on January 24, 2018, at Salmon City Hall to introduce the PM Advance Program, explain the PM<sub>2.5</sub> problem to the public, and obtain one-on-one feedback from interested citizens.
- The program used and will continue to use the local newspaper as a way to direct residents to DEQ’s and EPA’s air quality forecasting and reporting websites and web applications, which provide timely information on PM<sub>2.5</sub> concentrations. Information on how to access DEQ’s forecasting will be printed in the local weekly paper.

Many of these outreach efforts will recur every year at the onset of the heating season to remind the community of good burning practices and keep air quality at the forefront of pressing community issues.

### **7.1.3 Technology**

The SCAC will promote the use of technology such as electronic signs, smart phone applications, and the DEQ website and social media to communicate accurate near real-time air quality information to the community.

DEQ and the City of Salmon are partnering with Steele Memorial Medical Center in Salmon to upgrade an existing two-sided electronic sign to incorporate the most current programming and graphic features available. The sign will be located on the main street of Salmon, readily visible to citizens and visitors.

The primary purpose of the sign is to provide accurate updates through active real-time feeds of current PM<sub>2.5</sub> levels, associated health messages, and air quality advisories. In a community with limited real-time communication options and media markets, the sign is an effective way to alert the community to changing air quality conditions and burn bans. Such an effort will increase program reach and improve the timeliness of important data.

DEQ is developing a mobile application that provides current and forecasted air quality, information on burn bans, and health messages. The app will allow users, such as a coach or parent concerned about elevated concentrations during sports practice, to access up-to-date information while on the run. It may also benefit mobile phone users who do not have access to a computer or dependable internet connection. The app will include notifications or alerts that can be set up by the user to signal when air quality reaches a predefined level.

## **7.2 Voluntary Measures**

Voluntary measures are not based in regulations but instead encourage specific actions or behavior that may be beneficial to reducing PM<sub>2.5</sub> concentrations. Through citizen input and historical observation, a smaller concentrated area of residential woodstove smoke impact has been identified (Figure 6). The voluntary curtailment measures specified in this document are intended to be initially implemented within the impacted area.

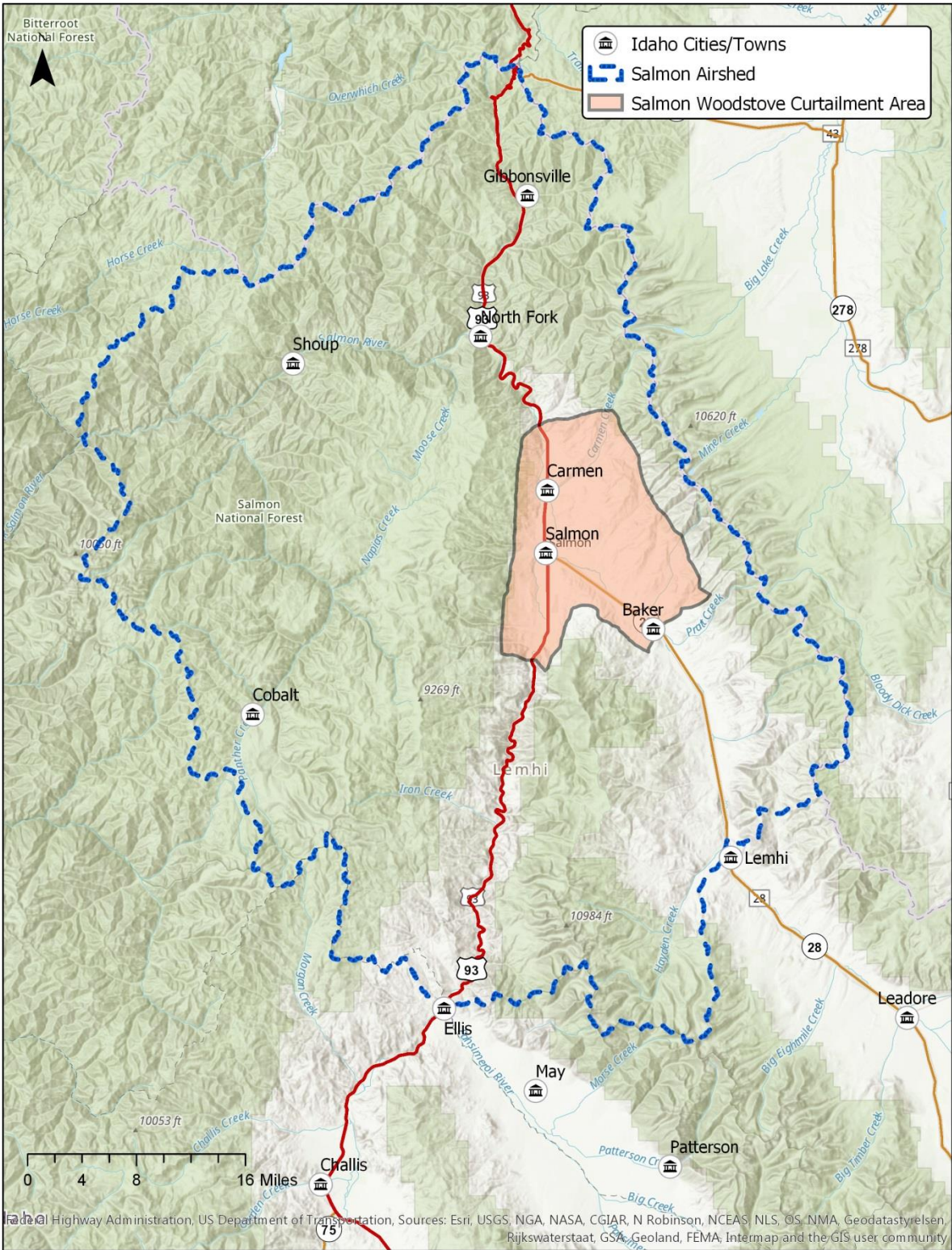


Figure 6. Voluntary curtailment program area.

### 7.2.1 Targeted Woodstove Change-Out

Most of the homes within the Salmon airshed have a woodstove. Over half of these woodstoves are not EPA certified. As these uncertified stoves are replaced with cleaner EPA-certified stoves, emissions will decrease. Old woodstoves are replaced as they break down or a house is sold. However, to see an improvement in air quality, this replacement needs to happen at a quicker rate. Idaho offers a tax deduction for residents who replace an uncertified stove with an EPA-certified stove. Providing full or partial reimbursement for replacing old stoves would help speed the turnover process.

Since 2013, DEQ and the City of Salmon have partnered to change out 80 woodstoves through a rebate program aimed at replacing old, poorly functioning stoves with new EPA-certified woodstoves. Participants received a \$1,000 rebate for the professional installation of a certified stove after recycling the old appliance at an approved DEQ location. Funding for the change-out program has come from a variety of sources but remains inconsistent.

Future change-outs will target the city of Salmon, which is significantly impacted with elevated wintertime PM<sub>2.5</sub> concentrations. Although still in the very early stages of development, the SCAC is hopeful that a large portion of stoves in the area will be replaced if adequate funding becomes available. The SCAC hopes to focus on replacing targeted stoves or groups of stoves with impaired performance that may be identified through a number of means such as complaints or neighbor nominations.

### 7.2.2 Voluntary Woodstove Curtailment

The SCAC identified voluntary woodstove usage limitations as an effective means of reducing elevated levels of PM<sub>2.5</sub> pollution during periods of poor air quality. During air stagnation events with strong temperature inversions, continued use of woodstoves contributes to already poor air quality conditions. Salmon is prone to wintertime inversions due to the steep mountain-valley geography of the airshed that is oriented against the predominant weather systems in the mid-latitudes. The geography enhances any temperature inversions that develop due to the compounding effects of differential heating along the mountain sidewalls (Whiteman 2000). During the winter, the lower sun, coupled with this geography, create a feedback loop that can strengthen inversions (Stull 1988).

Starting with the 2018–2019 heating season, DEQ will implement a voluntary woodstove curtailment program. This program will have 2 levels based on forecasted air quality:

- Level 1—AQI forecasted to reach between 80 and 100
  - Voluntary curtailment and communication focused on homeowners with uncertified woodstoves with other sources of heat.
- Level 2—AQI forecasted to reach 101 or higher
  - Voluntary curtailment and communication will address all homeowners and business owners with woodstoves, both uncertified and certified, with other sources of heat.
  - DEQ will issue a Stage 1 advisory (called a forecast and caution as defined in IDAPA 58.01.01.556) that will prohibit all open burning in the airshed.

To communicate a voluntary curtailment event, DEQ will issue statements and pertinent information through the electronic sign, official DEQ social media outlets and web sites, EPA

AIRNow, and an extensive email distribution list that includes broadcast and print media, law enforcement, public health agencies, other government agencies, schools, and other interested parties.

## **7.3 Current Regulatory Measures**

Several regulatory measures that address PM<sub>2.5</sub> emissions are currently enforced by DEQ. These regulations target open burning—which includes prescribed burning and residential burning—and fugitive dust. While these regulations have been in effect and enforced by DEQ for many years, DEQ is expanding the education and outreach surrounding them to raise awareness and increase compliance. Informational brochures and fact sheets concerning allowable burning practices and prohibited items will be made available at city and county offices as well as provided with each firewood permit issued at Bureau of Land Management and US Forest Service offices located within the airshed.

### **7.3.1 Air Pollution Emergency Rule**

The Air Pollution Emergency Rule (IDAPA 58.01.01.550–562) authorizes DEQ to manage and address pollution levels that may constitute a health emergency. The rule defines four stages or levels of an emergency, from a forecast and caution (Stage 1) to emergency (Stage 4), with each stage addressing a progressively more serious air quality event. Stage 1 is triggered when air quality has reached or is forecasted to reach an AQI of 101. During a Stage 1, all open burning is prohibited.

When issuing a Stage 1, DEQ will notify the public through broadcast media, social media, electronic mail lists, and public signage. In the notification, DEQ will provide information on the time frame of the emergency, time of next update, the area affected, open burning restrictions, health impacts and recommended actions, contacts for more information, and an AQI graphic.

### **7.3.2 Rules for Control of Open Burning**

DEQ regulates all forms of open burning (IDAPA 58.01.01.600–624). The purpose of the open burning rules is to reduce emissions and minimize the impact of open burning to protect human health and the environment. Informational brochures and fact sheets concerning allowable burning practices and prohibited items will be made available at city and county offices as well as provided with each firewood permit issued at Bureau of Land Management and US Forest Service offices in the airshed. DEQ will educate local fire dispatch centers and key personnel to communicate to individuals seeking permission to burn what is illegal and what is allowable or to have them contact DEQ with any concerns.

These rules prohibit burning certain materials and allow the open burning of others within specific guidelines.

Individuals living outside city limits anywhere in Idaho must obtain a fire safety burning permit from the Idaho Department of Lands during the closed fire season (May 10–October 20). It may also be necessary to notify the local fire department prior to burning.



### **7.3.3 Rules for Control of Fugitive Dust**

Periodically under clear, dry weather conditions following a snow event where sand was applied to public roadways such as US Highway 93 that travels through the center of Salmon, significant quantities of dust have been observed becoming suspended by traffic. At locations where materials such as dirt and dust are likely to become airborne, reasonable steps to control the blowing material must be taken. When making a decision to control fugitive or blowing dust, consider the impacts to homes, businesses, schools, and other community areas. Efforts to control blowing dust can include using water or chemicals, such as magnesium chloride where practical, or using equipment such as hoods and filters, covers, and street sweepers.

### **7.3.4 City of Salmon Ordinance**

Since 1974, the City of Salmon has had a local ordinance that bans residents from burning residential solid waste of any kind within the city (Ord. 74-397, 6-3-74). The SCAC will work with local media outlets and social media to inform the public of the existing ordinance through news releases and community announcements.

## **7.4 Possible Future Regulatory Measure**

In many communities affected by seasonal woodstove smoke, local governments have taken steps to develop rules or ordinances aimed at encouraging real estate buyers and sellers to remove old, inefficient, uncertified woodstoves from properties and replace them with new certified woodstoves or other alternative heating technology prior to sale. The SCAC believes such an ordinance would be of benefit to the community. The group will continue to work with the city, county, and DEQ to propose and evaluate conditions for local ordinances to effectively address the need to remove uncertified woodstoves.

The air quality ordinance would also set out requirements for proper operation of solid fuel burning devices including limitations on the materials that may be used as fuel.

## **7.5 Implementation Schedule**

A number of the strategies identified in this plan were initially implemented prior to participation in the PM Advance Program. Over 80 woodstoves have been changed out in three separate efforts in partnership with the City of Salmon. For nearly two decades, DEQ has been issuing public announcements through print, broadcast, and social media in an effort to inform the public of significant air quality issues impacting the community. In addition, the SCAC and DEQ have been making brochures and fact sheets available for distribution at Bureau of Land Management and US Forest Service offices when firewood permits are issued. The SCAC and DEQ have been placing “no idle zone” signs in targeted areas of the community. DEQ has also purchased and distributed woodstove thermometers and made available wood moisture meters to the public. During the latter months of 2017, numerous outreach and education measures were also put into action with mostly positive results within the community.

DEQ expects that during 2018, the SCAC and DEQ will continue leading community outreach and education efforts, with increased engagement as the winter heating season approaches. DEQ



also plans on leveraging communication opportunities during any wildfire events that typically impact the airshed during late summer into fall. Installation of the electronic sign will be completed by August 2018 through a partnership with Steele Memorial Medical Center, the City of Salmon, and DEQ.

Beginning with the heating season of 2018 into 2019, DEQ will begin implementing a voluntary woodstove curtailment program. DEQ will communicate the appropriate messages and actions through the channels identified in section 7.2.2 as degrading air quality conditions become prevalent within the affected area of the airshed.

Should a funding source be identified, a woodstove change-out program will be organized and put into effect that targets replacement of the worst polluting stoves within the area of impact depicted in Figure 6.

Implementation of regulatory measures and monitoring activities within the Salmon airshed will be ongoing throughout the term of the program.

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## Appendix A. Program Participation Letter



STATE OF IDAHO  
DEPARTMENT OF  
ENVIRONMENTAL QUALITY

1410 North Hillon • Boise, Idaho 83706 • (208) 373-0502  
www.deq.idaho.gov

C.L. "Butch" Otter, Governor  
John H. Tippetts, Director

September 20, 2016

Laura Bunte, Senior Policy Advisor  
PM Advance  
U.S. Environmental Protection Agency  
Office of Air Quality Planning and Standards, C304-01  
Research Triangle Park, NC 27711

Dear Ms. Bunte:

The City of Salmon, Idaho in partnership with the Idaho Department of Environmental Quality would like to participate in PM Advance with respect to the Salmon Area of Lemhi County. We wish to join this partnership with EPA to preserve or improve the air quality in the Salmon area, and we meet the program eligibility criteria, i.e.:

1. The Salmon area is not currently a nonattainment area for the 1997 and/or 2012 annual fine particulate matter (PM<sub>2.5</sub>) National Ambient Air Quality Standards (NAAQS) and/or for the 2006 24-hour PM<sub>2.5</sub> NAAQS,
2. The Salmon area consists of the City of Salmon and the surrounding impacted airshed within Lemhi County, Idaho,
3. The following air monitor reflects the air quality in the Salmon area: Salmon-Charles Street Monitor (AQS ID 160590004), and
4. Idaho has met the National Emissions Inventory reporting requirements.

We understand that our efforts under PM Advance may benefit the Salmon area by potentially:

- Reducing air pollution in terms of PM<sub>2.5</sub> as well as other air pollutants
- Continuing to ensure continued healthy PM<sub>2.5</sub> levels
- Maintaining the PM<sub>2.5</sub> NAAQS,
- Helping avoid violations of the PM<sub>2.5</sub> NAAQS that could lead to a future nonattainment designation
- Increasing public awareness about PM<sub>2.5</sub> as an air pollutant
- Targeting limited resources toward actions to address PM<sub>2.5</sub> problems quickly

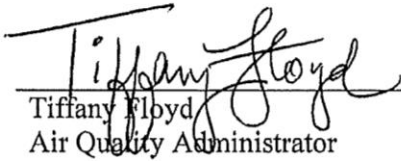
Our goal is to implement measures and programs to reduce PM<sub>2.5</sub> in the Salmon area in the near term. We are also in agreement it is in our best interest to work together and in coordination with stakeholders and the public to proactively pursue this goal.

Thank you for consideration of allowing the Salmon Area to participate in the PM advance program. Should you need further information or have questions regarding our request, please contact Pascale Warren at [pascale.warren@deq.idaho.gov](mailto:pascale.warren@deq.idaho.gov) , (208) 373-0586 or Leo Marshall at (208) 756-3214.

Sincerely,



\_\_\_\_\_  
Leo Marshall, Mayor  
City of Salmon



\_\_\_\_\_  
Tiffany Floyd  
Air Quality Administrator

cc: Jeff Hunt, Region 10 PM Advance, EPA

# **Appendix B. Salmon PM Advance Communication Plan**

# Strategic Communication Plan

## Purpose

To better engage Salmon residents on air quality issues and provide them with the tools to make better decisions about when, how, and what to burn to reduce particulate emissions from wood burning stoves.

## Existing Resources

The Idaho Department of Environmental Quality (DEQ) already forecasts air quality and notifies the public through websites, email alerts, and social media during stage 1 air quality events (forecasts and cautions). Idaho Falls Regional Office (IFRO) staff follows established standard operating procedures to develop and issue a daily Air Quality Index (AQI) forecast for Salmon that summarizes current and future air quality conditions and any actions the public should take to protect itself. However, public notification is weak, and it is currently unknown how widely DEQ’s message is disseminated so that residents can adjust burning practices accordingly. DEQ’s daily AQI forecast is available to people who visit either DEQ’s or AirNow’s website or subscribe to EPA’s EnviroFlash notification system. When DEQ’s Air Pollution Emergency Rule applies, IFRO communicates the stage 1 forecast and caution to the National Weather Service and local fire departments, health districts, school administration, and media contacts and works with the DEQ Communications and Outreach group to include all appropriate social media platforms.

Action	Who is Responsible	Frequency of Action	Method of Action	Audience
AQI Forecast	IFRO	Daily	DEQ website, AirNow	Public
Stage 1 Forecast and Caution	IFRO	As needed, up to daily	Email alerts	Public outlet sources

## Stakeholders and Partners

DEQ has identified the following stakeholders, partners, and audiences whose support and involvement are instrumental in the success of the outreach campaign.

Stakeholder/Partner	Interests
City council	The council has an interest in improving air quality in Salmon to avoid a nonattainment area designation and associated Clean Air Act requirements.
Salmon Clean Air Committee	This group was formed as part of the PM Advance Program and is currently exploring strategies to reduce PM emissions across the airshed. The committee serves as a bridge between DEQ, city council, and the community. This group has a strong desire to see air quality improved and advocate for pollution reduction strategies.

Stakeholder/Partner	Interests
Woodstove users	The number of days woodstoves can be operated without degrading air quality may decrease if users are requested to take AQI into consideration prior to burning. Woodstove users will have to rely on more expensive alternate fuel sources to heat their homes.
Public health district, healthcare professionals	The PM <sub>2.5</sub> problems are a public health issue as the NAAQS exist primarily to protect public health. Public health officials are a trusted source of community health data (risks and impact of PM <sub>2.5</sub> exposure) and a credible voice for the clean air message. They can also help broaden the clean air message to indoor air quality, which also becomes an issue with older/uncertified woodstoves.
Retailers; firewood sellers; Hearth, Patio and Barbeque Association; chimney sweepers	Residential wood combustion is one the main sources of PM <sub>2.5</sub> in the Salmon airshed. Retailers of wood-burning devices, industry trade associations associated with woodstoves, and firewood sellers could all promote using seasoned wood, existing stove/chimney maintenance, and correct stove operation as part of their business and creating savings for consumers.
Chamber of commerce; Local business representatives in tourism, food service, energy, areas requiring air quality permits	A nonattainment designation has important ramifications in economic development while quality of life issues associated with smoke impacts on the airshed can affect tourism. Local businesses have a stake in protecting air quality to minimize the regulatory burden to their operations.
School administrators, youth group leaders	Educators interact daily with one of the most at-risk groups from PM <sub>2.5</sub> pollution. They can have an impact in shaping curriculum or through informal education/community involvement projects.
The Recorder Herald, Idaho Post Register, KSRA Radio	These media outlets can help shape public opinion and spread information on air quality to the community.

## Desired Outcomes

This outreach campaign aims to improve public understanding of particulate pollution and air stagnation events and how woodstoves play a role in increasing particulate pollution. Anecdotal evidence suggests that this lack of awareness is in part due to the worst conditions occurring at nights and being often unseen. Although not unanimously accepted, DEQ's analysis of the air quality is simple but compelling. The majority of daily air quality standard exceedances occurs in the fall and winter and is associated with residential wood combustion during the heating season.

Many misconceptions around the PM Advance Program are spreading in the community. The most important one surrounds burn bans in the airshed; this outreach campaign must make it clear that no mandatory restrictions are being enacted to regulate woodstove usage. In addition to a long tradition of using wood in rural areas, people are extremely hesitant of moving away from solid fuel to heat their homes due to its relative affordability and reliability. Short of switching fuels, the adoption of better burning practices can make great strides in reducing pollution.

Lastly, strategic usage of wood-burning stoves can also help improve air quality. If the community starts connecting the AQI to specific actions, people would still be able to heat with wood on days that allow for good dispersion while minimizing wood heating during inversion periods.

## Themes, Key Messages, and Talking Points

### Key Messages and Talking Points

1. Improper burning practices increase PM<sub>2.5</sub> emissions that become trapped near the ground during wintertime inversions and degrade air quality.
  - a. Burn clean with seasoned, dry wood and build smaller, hotter fires to avoid smoldering.
  - b. Maintain existing stoves to improve efficiency and safety or consider upgrading to EPA-certified appliances.
2. Be strategic and check the AQI before burning.
  - a. Woodstoves are best used on days with good to moderate AQI that allows for pollutant dispersion.
  - b. Whenever possible, consider switching to alternate source of heat to keep warm on days with high AQI.
3. Incomplete combustion of wood emits pollution that can contribute to short-term and long-term health effects, especially in sensitive populations.
  - a. Better burning reduces harmful emissions from wood.
  - b. Good dispersion (low AQI) prevents the buildup of pollution in the airshed.

## Action Plan

### Tactics

Engage in direct contact with those directly affected:

- Speak with residents in the community.
- Send mailers (from utilities/city council listserv).
- Work with the school district. Communicate air quality alerts to students and their families and make them aware of action they can take.

Inform wider city or regional audience:

- Develop media strategy and control measures to reach residents outside of Salmon but who are still part of the airshed.

### Communication Products

- *Advertisements/notices*: Air quality-related information run biweekly over the heating season in the Recorder Herald
- *Media advisories and press releases*: Press release to TV, radio, and newspaper about AQI sign and how the Salmon community can use the information to protect their health
- *Fact sheet*: Salmon-specific fact sheet about woodstoves and wintertime air quality
- *FAQs*
- *Graphics*



- *Backgrounder*: how the woodstove campaign fits into the larger issue of ongoing air quality problems and what's being done to address problems
- *Brochure, postcard, or poster*: Mailers with utility bills about woodstove maintenance/and air quality
- *Webpage*: Frequent updates to the Salmon PM Advance website to showcase everything being done in the airshed
- *Op/ed, letter to the editor, etc.*: SCAC or city council member announce start of the air quality campaign to reduce PM emissions and improve air quality
- *Public service announcements (radio)*
- *Social media*: Frequent update to showcase website content and all activities related to air quality in the airshed
- *Support material*: School district air quality procedures and air quality-related school activities (inversion in a cup, dusting the air, smoke detectives)

### **Communication Activities**

- Public meetings
- Stakeholder briefing/meeting through monthly advisory committee meetings
- Open houses
- Interviews with reporter
- Conference calls
- Attendance at local events
- Advisory committee presentation to civic groups in the airshed

### **Staffing**

- IFRO staff will conduct the day-to-day outreach activities identified in this document, including leading and facilitating advisory committee meetings and interaction with the city council, media, and community.
- The state office and will work with IFRO to develop outreach materials and messaging and identify distribution channels/ avenues of publications appropriate for outreach.

### **Action Matrix**

Phase I actions were implemented during the 2017–2018 heating season. Actions from the Phase II section will be implemented during the 2018–2019 heating season.

Action	Who is Responsible	Date/Time Action is to Occur	Method of Action	Date Action Occurred
Phase I Implementation				
Forecasting	IFRO	Daily by 4 p.m.	Follow appropriate SOP to develop daily forecast	Ongoing
Notification of forecasting	IFRO	Daily	Enviroflash email, electronic sign, websites (DEQ, AirNow), social media, press release, radio, newspaper	Ongoing
Develop Salmon-specific outreach brochure; information on woodstove maintenance, air stagnation events, and PM pollution; and materials for advisory committee members	IFRO works with state office to develop content and materials	2018		
Media advisory in Recorder Herald	IFRO works with state office	2-3 times every heating season	Run air quality related ads about woodstove heating	Ongoing
PSA on heating with woodstoves	IFRO works with state office to develop content	During Stage 1 caution	Radio	
Background story in Recorder Herald	IFRO works with state office	2018		
Phase II Implementation				
Op/ed letter to the editor	IFRO working with state office and advisory committee	2018		
EPA AQI flag program	IFRO	2018	Notify school of flag program and encourage participation	
Air quality-related school activities and outreach materials	IFRO and school	Once during heating season	School presentation with hands-on activities (inversion in a cup, dusting the air, smoke detectives)	
Update Salmon PM Advance webpage and social media	IFRO works with state office	With each new action	Press release, tweet, or Facebook post	

## **Evaluation**

### **Evaluating the Plan**

- Reach out to all stakeholders identified and discuss their roles or their willingness to support the campaign or directly contribute to the campaign by helping to spread messaging or participating/organizing an activity above.
- Analyze news content of media and editorials and sharing on social media platform to determine if our messages are being used and how they are being received.
- Monitor public response via participant surveys.
- Collect statements and sentiment expressed in local meetings and forums.

### **Reevaluating the Plan**

- Use data from evaluation and feedback from advisory committee and city council to adjust the plan as needed.

### **Presenting the Plan**

- IFRO will present the final draft of the plan to the advisory committee and city council to gain support for the outreach/communication activities outlined in the plan.

### **Implementing the Plan**

- Continue monthly meetings with state and regional offices to discuss progress and re-assess approaches.
- Update plan quarterly (twice during the heating season) to correct course if necessary based on monthly meetings assessments.