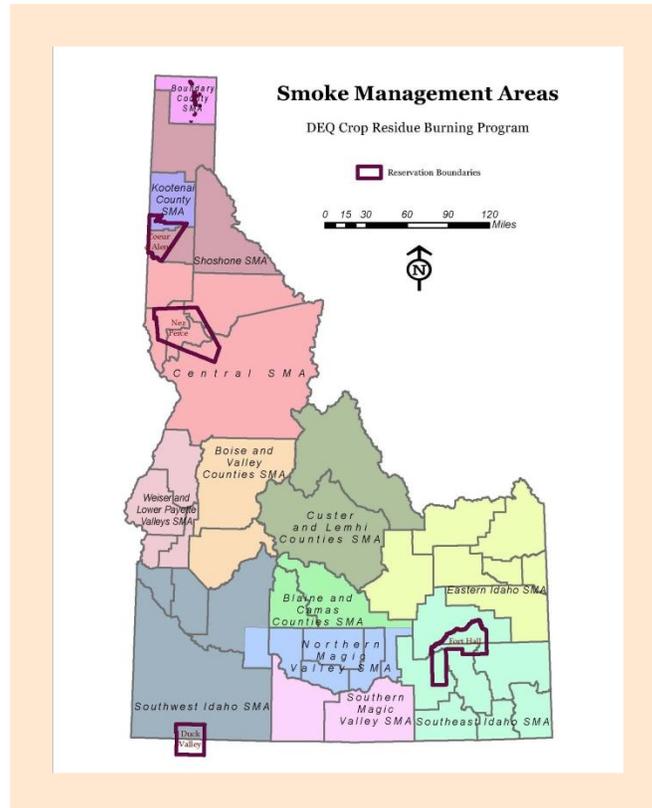


# Crop Residue Burning Program 2011 Annual Report

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**State of Idaho  
Department of Environmental Quality**

**June 2012**



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## **Executive Summary**

The open burning of crop residue (crop residue burning) is a historic practice in Idaho and is considered an important tool for farmers. However, crop residue burning can also produce substantial air emissions and, if not managed properly, can lead to significant smoke effects that endanger human health.

This annual report reviews and analyzes the Idaho Department of Environmental Quality's (DEQ's) crop residue burning (CRB) program for the 2011 burn season. DEQ is required to prepare an annual report that includes, at a minimum, an analysis of the causes of any measured air pollutant levels above the program-defined concentration limits and an assessment of the circumstances associated with any reported endangerment to human health associated with a crop residue burn.

This report also includes a summary of program modifications and planned program improvements, a summary of outreach for the 2011 burn season, and an analysis of the 2011 burn season, including air quality impacts, a discussion of DEQ's system for complaints and compliance, the air quality monitoring network, a meteorological summary, and an assessment of the burn-decision process and acres burned in each smoke management area (SMA). Recommendations for program improvements are provided at the end of the report.

### ***Evaluation of the Burn Season***

The weather of 2011, much like the weather during 2010, presented many difficulties for growers in accomplishing their crop residue-burning goals. Weather conditions throughout the state in the late spring and early summer were cooler and wetter than normal. These conditions hindered burning during the spring and delayed the growing season, which in turn delayed the fall burn season. These factors pushed many of the requests to burn into September and October, when the days became shorter, temperatures became cooler, mixing heights and dispersion decreased, and precipitation became more likely. Despite these difficulties, DEQ was able to approve many burn days and accommodate most requests to burn by the end of the season. Generally, fields that did not get burned were those that were registered just as the season was coming to a close and hampered by rain and snow or requests to burn fields that needed specific, uncommon wind directions due to nearby institutions with sensitive populations (ISPs).

Statewide, 65,362 acres were burned under the CRB program in 2011, similar to the amount burned in 2010. For most of the SMAs across the state, the number of acres burned during 2011 was similar to, or lower than, the number of acres burned in 2010. The most notable difference for 2011 was a substantial increase in acres burned in the Northern Magic Valley and Southern Magic Valley SMAs, which saw increases in acres burned of 39% and 83%, respectively.

DEQ believes that northern Idaho growers were initially more familiar with the CRB program from previous years of operation under the Idaho State Department of Agriculture, whereas southern Idaho growers were less familiar with operating under a regulated CRB program. As a result, the acres burned in the northern Idaho SMAs have remained fairly stable, while acres burned in the southern Idaho SMAs increased dramatically at the start of the program and may continue to increase as a result of improved grower compliance with the CRB program requirements.

During spring 2011, DEQ obtained access to real-time ambient ozone monitoring data from the National Park Service monitors at Craters of the Moon National Monument, City of Rocks National Reserve, and Yellowstone National Park. In combination with ozone monitoring data from Logan, Utah, (Utah DEQ) and ozone forecast models from the National Weather Service and the University of Washington, these data provided sufficient coverage of southern Idaho so that DEQ could forecast ozone concentrations and use those forecasts in the daily burn-decision process beginning on May 10. DEQ forecasted many days during the late spring, summer, and early fall when ozone concentrations were expected to reach or exceed the program-defined concentration limit in locations that had requests to burn. As a result, DEQ issued several no-burn decisions due to forecasted ozone concentrations above the PCL for ozone.

### ***Evaluation of Air Quality***

DEQ operates the CRB program under guidelines and procedures designed to protect public health, avoid causing an adverse impact to ISPs, and avoid causing a public roadway safety hazard. DEQ carefully evaluates the program's effectiveness in meeting these goals. That evaluation process is explained in detail within this report.

A thorough evaluation of the 2011 burn season showed that approved crop residue burning did not cause a measured air pollutant concentration above a program-defined concentration limit, did not cause an adverse impact to an ISP, and did not create a hazard for travel on public roadways.

### ***Recommended Improvements***

Subsequent to the annual CRB program analysis, DEQ concluded that certain improvements will help the program operate more effectively and efficiently without sacrificing the protection of human health. The improvements recommended in this report include the following:

- **Weekend and holiday burning**—Enter into negotiated rulemaking to modify the restriction of burning on weekends and holidays.
- **Ozone program concentration limit**—Enter into negotiated rulemaking to modify the program concentration limit for ozone. This rulemaking would also require amending Section 39-114 of Idaho Code.

The CRB Advisory Committee met on March 13 and April 18, 2012, to discuss these recommended improvements.

DEQ will not proceed with the two recommendations at this time. DEQ will continue to evaluate both recommendations during the 2012 burn seasons and may again present them to the Advisory Committee at the 2013 spring meeting for discussion.

This decision is based on input provided by Advisory Committee members and the current lack of adequate support to proceed. There was a lack of consensus on the need for, and how to implement, these recommendations consistently throughout the state. At this time, implementing weekend burning without moving forward on the ozone recommendation would be costly and provide few additional burn day opportunities for southern Idaho growers during the main burn seasons.

The committee expressed concern for, and had questions about, how the recommendation on the ozone program concentration limit would continue to protect public health. These concerns led to strong opposition by some committee members and tepid support by others.

The input from all committee members was valuable but demonstrates that further discussions and understandings will be necessary before DEQ has adequate support to move forward with the recommendations.

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## 1. Introduction

This report reviews and analyzes the Idaho Department of Environmental Quality's (DEQ's) crop residue burning (CRB) program for the 2011 burn season. DEQ is required by rule (IDAPA 58.01.01.622.02) to prepare an annual report that includes, at a minimum, an analysis of the causes of any exceedance of the program-defined ambient air pollutant concentration limits (hereafter referred to as the program concentration limits, or PCLs) and an assessment of the circumstances associated with any reported endangerment to human health associated with a crop residue burn. This report also summarizes program updates undertaken in 2011, outreach efforts over the past year, a detailed analysis of the 2011 burn season, and planned program improvements necessary to prevent future instances of measured pollutant concentrations above the PCL.

This report only presents information specific to the 2011 burn season. For more in-depth information on the CRB program design, please refer to the 2008 annual report available at <http://www.deq.idaho.gov/air-quality/burning/crop-residue-burning.aspx>.

## 2. Program Updates

DEQ updated the CRB program during 2011 based on recommendations presented in the 2010 annual report. These improvements were reviewed and endorsed by the CRB Advisory Committee and approved by the director. Other than these updates, the CRB program remains unchanged from 2010. This section summarizes the status of the recommended changes.

- ***Evaluate the implications of allowing burning on weekends and holidays.***  
DEQ conducted an evaluation of the implication of allowing burning on weekends and holidays. DEQ has developed a recommendation based on this evaluation (see section 5).
- ***Modify the guidelines in the operating guide for observing burns.***  
DEQ has incorporated this recommendation into the CRB program and the July 2011 *Crop Residue Burning Program Operating Guide* (section 4.5.4), which contains detailed guidance for observing burns. The modified guidance allows DEQ additional flexibility to have staff at those burns with the most potential for smoke management issues by providing exemptions to the mandatory observation requirement for all fields located within 3 miles of an institution with sensitive populations (ISP). Exemptions to the mandatory observation requirement can be issued by regional office staff or the smoke management analyst, depending on the size of the field and distance to the ISP. Exemptions must be based on an assessment of multiple smoke management factors, such as expected wind direction, dispersion and ventilation conditions, crop type, fuel and soil moisture levels, grower proficiency with burning, and compliance history. Whenever DEQ approves a burn within 3 miles of an ISP, the ISP must be contacted prior to ignition and given basic information about the proposed burn and relevant DEQ contact information.
- ***Define what is not considered an adverse impact to an ISP.***  
DEQ has incorporated this recommendation into the CRB program and the July 2011 CRB program operating guide (section 4.6.3), which describes the assessment and review

procedures based on either measured concentrations of particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>) or visibility observations.

- ***Define a procedure to ensure burns do not create a hazard for travel on public roadways.***

DEQ has incorporated this recommendation into the CRB program and the July 2011 CRB program operating guide (Appendix E), which contains a procedure to evaluate whether smoke from an approved burn has created a hazardous condition for travel on a public roadway. DEQ allows growers to obtain and follow an approved traffic control plan from the appropriate state or local highway district. In the absence of such a plan, DEQ observers use visibility estimates and a chart indicating motor vehicle stopping distance as a function of speed to determine whether a hazardous condition existed.

- ***Evaluate the program concentration limit for ozone.***

DEQ conducted an evaluation of the ozone PCL and has developed a recommendation based on this evaluation (see section 5).

- ***Add the history of the CRB program and why Idaho has a CRB program to the DEQ website.***

DEQ updated the CRB program website to include a history of the program.

- ***Evaluate and implement different methods to reach ISPs.***

DEQ has found that a variety of methods are useful to effectively provide outreach to ISPs. However, DEQ has determined that the most effective method for educating the ISPs is personal contact, either by phone or in person. DEQ will be implementing a process of preseason ISP contact during which DEQ staff can explain the program, verify contact information, and answer questions. DEQ will continue to search for additional effective methods to provide outreach to ISPs.

### **3. Outreach for the 2011 Burn Season**

Outreach remains an important component of the CRB program. DEQ's outreach effort has two main objectives: public awareness and grower education. Many of the same outreach methods used in previous years were again used in 2011, including distributing brochures; providing telephone hotlines; maintaining an Internet website with public and grower sections; maintaining an e-mail list service; communicating directly with fire and sheriff departments; attending and providing information at agricultural expos and county fairs; and visiting ISPs (such as schools, hospitals, and assisted-living facilities). DEQ conducted the following new or enhanced methods of outreach in 2011:

- ***Grower education***

On-site field assistance continues to be an effective outreach technique for DEQ as it provides an opportunity to meet growers, develop a positive working relationship, and emphasize good burning strategies and techniques.

At this point, many growers seem familiar with the CRB program and successfully navigate the registration process. However, we continue to invest extra time with growers who are new to the program, have never completed a registration, or do not have Internet

access. A continuing emphasis of our grower education has been reminding growers to obtain all necessary fire safety permits and to consult with the Idaho Transportation Department (ITD) or applicable county road department regarding public roadway safety requirements.

- ***Collaboration with fire departments***

DEQ representatives met with several fire chiefs on an individual basis and in group settings to present information about the CRB program and to help ensure that fire department personnel and DEQ are providing the public with consistent and accurate information about the CRB program.

- ***Public outreach through mass media***

DEQ used radio advertisements and newspaper articles to reach members of the general public and growers who may not have been reached by previous outreach methods. These efforts included radio public service announcements in which DEQ used two advertisements: one intended for the general public and one intended for the grower community.

- ***Outreach to ISPs***

Each offseason, DEQ representatives contact many ISPs, with an emphasis on those ISPs in areas where we have approved burns or anticipate approving burns in the future. This outreach, either in person or by phone, gives DEQ an opportunity to explain the CRB program; confirm the ISP's location, status, and contact person; and provide DEQ contact information to the ISP. During the burn season, as part of DEQ's field observation exemption procedure, ISPs must be contacted prior to the start of any burn within 3 miles of a field that is approved to be burned without DEQ being present. This outreach provides DEQ another opportunity to explain the program and provide contact information, as well as to provide information about the nearby burning that has been approved for that day.

## 4. Analysis of the Burn Season

For management of the CRB program, the state is divided into 13 smoke management areas (SMAs) based on the similarity of meteorological conditions and topography, as well as proximity to DEQ regional offices (Figure 1). This analysis of the burn season includes examining statewide air quality impacts, complaints, compliance and enforcement, the monitoring network, meteorology, and specific summaries for each SMA.

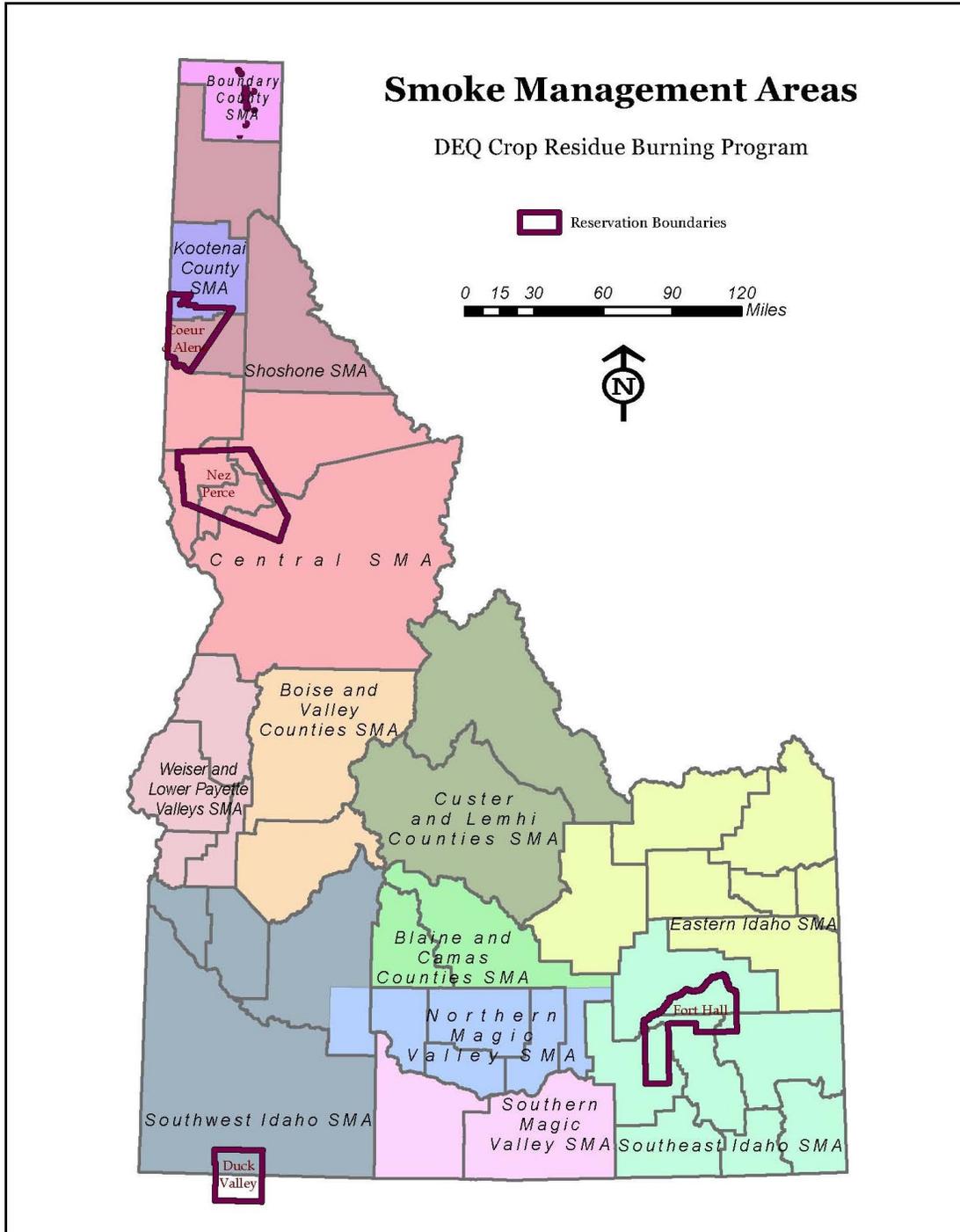


Figure 1. Idaho smoke management areas.

The SMA summaries include area geography descriptions, acres burned, and a summary of daily burn decisions and air quality conditions in 2011. No crop residue burning was conducted in the Custer and Lemhi Counties SMA or the Shoshone SMA during 2011; therefore, these SMAs are not discussed further. Also, the Boise and Valley Counties SMA has not been included in the statewide summaries since negligible burning was conducted in this SMA, with only 36 acres burned during 2011 and similar amounts burned in prior years.

## **4.1 Air Quality Impacts**

This section evaluates CRB program compliance with PCLs, circumstances surrounding approved burning on days when measured pollutant concentrations were above the PCLs, possible adverse impacts to ISPs, and additional burn days. DEQ evaluated additional burn days in two circumstances: 1) when approved burning was conducted and measured PM<sub>2.5</sub> concentrations were above the program-defined 4-hour average preburn or postburn trigger limits or the 24-hour average preburn trigger limits and 2) to evaluate possible public roadway safety visibility impacts.

### **4.1.1 Compliance with Program Concentration Limits**

To approve a request to burn, DEQ must determine that ambient air quality levels meet three criteria: 1) do not exceed 75% of the level of any National Ambient Air Quality Standard (NAAQS) on any day 2) are not projected to exceed such level over the next 24 hours, and 3) have not reached, and are not forecasted to reach and persist at, 80% of the 1-hour action criteria for particulate matter. The PCLs for the pollutants of concern for crop residue burning—given as micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) of PM<sub>2.5</sub> or PM<sub>10</sub> or parts per billion (ppb) of ozone—are defined as follows:

- PM<sub>2.5</sub> 1-hour average (64  $\mu\text{g}/\text{m}^3$ )
- PM<sub>2.5</sub> 24-hour average (26.25  $\mu\text{g}/\text{m}^3$ )
- PM<sub>10</sub> 1-hour average (308  $\mu\text{g}/\text{m}^3$ )
- PM<sub>10</sub> 24-hour average (112  $\mu\text{g}/\text{m}^3$ )
- Ozone 8-hour average (56 ppb)

During 2011, ambient air quality monitors across Idaho recorded values above the PCLs in many instances. However, on most of these days no crop residue burning was approved. For days when measured PM<sub>2.5</sub> or ozone levels were above the PCLs and crop residue burning was approved and conducted, DEQ evaluated the location and time of the burn in relation to the air quality monitoring data. During 2011, there were no measured PM<sub>10</sub> concentrations above the PCL; therefore, PM<sub>10</sub> is not evaluated in this report.

Burning under the CRB program was reasonably suspected to have caused or contributed to a measured concentration above a PCL only when both of the following conditions were true:

- An approved crop residue burn occurred during, or shortly prior to, the recorded concentration.
- Wind direction and proximity of the burn were such that smoke from the burn was transported toward the monitor.

During spring 2011, DEQ obtained access to real-time ambient ozone monitoring data from the National Park Service monitors at Craters of the Moon National Monument, City of Rocks

National Reserve, and Yellowstone National Park. In combination with ozone monitoring data from Logan, Utah, (Utah DEQ) and ozone forecast models from the National Weather Service (NWS) and the University of Washington, this data provided sufficient coverage of southern Idaho so that DEQ could forecast ozone concentrations and use those forecasts in the daily burn-decision process beginning on May 10. DEQ forecasted many days during the late spring, summer, and early fall when ozone concentrations were expected to reach or exceed the PCL in locations that had requests to burn. As a result, DEQ issued several “no-burn” decisions based on the ozone forecasts. An evaluation of possible ozone exceedances is provided in Appendix A.

The days discussed below are those when air quality monitors recorded concentrations above a PCL and crop residue burning was conducted within the same SMA.

### ***Ozone concentrations above the program concentration limit in southern Idaho***

There were many days in southern Idaho SMAs when DEQ forecasted ozone concentrations below the PCL for ozone and crop residue burning was approved and conducted but one or more applicable ozone monitors recorded an 8-hour average ozone concentration above the PCL. Rather than explain each of these days, as is done below for PM<sub>2.5</sub> concentrations above the PCL, a general explanation is provided here and more detailed information is provided in Appendix A. It is important to remember that modeling studies have shown that the amount of smoke that is typical of crop residue burning has negligible effects on maximum daily 8-hour average ozone concentrations.

An analysis of burn days has determined that while there were days when crop residue burning was approved and conducted in SMAs where the ozone concentration was measured above the PCL, DEQ-approved crop residue burning did not cause the concentration to exceed the PCL. Rather, DEQ’s forecast underestimated the ozone concentration for the areas where burning was approved and conducted.

### ***March 31—1-hour average PM<sub>2.5</sub> concentration in the Southwest Idaho SMA***

March 31 was a burn day in the Southwest Idaho SMA, where 9 acres were burned at one field near Grand View in Owyhee County, approximately 50 miles southeast of Nampa. The PM<sub>2.5</sub> monitor in Nampa recorded a 1-hour average concentration of 65.9 µg/m<sup>3</sup> for the hour ending at 9:00 p.m., and the PM<sub>2.5</sub> monitor at St. Luke’s Hospital (Meridian) recorded a 1-hour average concentration of 104.5 µg/m<sup>3</sup> for the hour ending at 12:00 a.m. (midnight). Each of these monitors had been experiencing problems this day, and a significant portion of the data recorded by each of these monitors this day was deemed invalid using standard data evaluation procedures. For each monitor, the readings noted above were the first readings not invalidated following several consecutive hours of invalid data at each monitor. While the data is technically valid, it is still considered suspect, as a pattern has been noted that the monitors generally require a few hours of normal operation to stabilize and begin recording accurate readings. Furthermore, no evidence indicates that the elevated concentrations may have been caused by the approved crop residue burning.

### ***April 1—1-hour average PM<sub>2.5</sub> concentration in the Southwest Idaho SMA***

April 1 was a burn day in the Southwest Idaho SMA, where 1 acre was burned at one field near Grand View in Owyhee County, approximately 50 miles southeast of Nampa, and 2 acres were burned at one field near Middleton in Canyon County, approximately 15 miles northwest of Nampa. The PM<sub>2.5</sub> monitor in Nampa recorded a 1-hour average concentration of 64.4 µg/m<sup>3</sup> for

the hour ending at 9:00 p.m. Similar to the day before, this monitor experienced problems this day and a significant portion of the data recorded by it was deemed invalid using standard data evaluation procedures. The reading noted above was the first reading not invalidated following several consecutive hours of invalid data at the monitor. While the data is technically valid, it is still considered suspect, as a pattern has been noted that the monitors generally require a few hours of normal operation to stabilize and begin recording accurate readings. Furthermore, no evidence indicates that the elevated concentration may have been caused by the approved crop residue burning.

***April 15—1-hour average PM<sub>2.5</sub> concentrations in the Southwest Idaho SMA***

April 15 was a burn day in the Southwest Idaho SMA, where 10 acres were burned at one field southeast of Grand View in Owyhee County, approximately 40 miles southeast of Nampa. The PM<sub>2.5</sub> monitor in Nampa recorded a 1-hour average concentration of 66.5 µg/m<sup>3</sup> for the hour ending at 5:00 p.m. The field was burned between 12:00 p.m. and 4:00 p.m., while winds were generally from the south at 5–15 miles per hour (mph). The wind that day would not have carried the smoke toward the Nampa monitor. The source of the elevated concentrations is unknown, but it was not the approved crop residue burning.

***April 27—1-hour average PM<sub>2.5</sub> concentration in the Southwest Idaho SMA***

April 27 was a burn day in the Southwest Idaho SMA, where 4 acres were burned at one field near Meridian (about 5 miles west-southwest of St. Luke's Hospital, Meridian). The PM<sub>2.5</sub> monitor at St. Luke's Hospital recorded a 1-hour average concentration of 78.9 µg/m<sup>3</sup> for the hour ending at 8:00 p.m. DEQ staff were on site to observe this burn and noted that winds were from the southeast through south-southeast at 5–10 mph. The burn began around noon and was complete by 1:15 p.m. The wind that day did not carry the smoke toward the monitor, and the moderate wind speed fully dispersed the smoke very quickly. The source of the elevated concentrations that night are unknown, but it was not the approved crop residue burn.

***August 30—1-hour average PM<sub>2.5</sub> concentration in the Central SMA***

August 30 was a burn day in the Central SMA, where 40 acres were burned at one field about 1 mile northeast of Cottonwood. Additionally, other open burning authorized by other agencies occurred in the area on this day. DEQ staff observed the burn, noting that the wind carried the smoke in a southerly direction toward the Snake River canyon. The field was ignited at 1:33 p.m., and based on lift, ventilation, and dispersion that was poorer than forecasted, no additional burning was approved by DEQ. The Grangeville monitor (about 13 miles southeast of the field) recorded hourly values of 66.7 µg/m<sup>3</sup> for the hour ending at 3:00 p.m. and 77.0 µg/m<sup>3</sup> for the hour ending at 4:00 p.m. (both above the PCL). Based on these concentrations and staff observations, enhanced documentation was completed. During the evaluation, DEQ determined that the elevated concentrations were not caused by DEQ-approved crop residue burning but were likely caused by the other burning in the airshed.

***October 19—24-hour average PM<sub>2.5</sub> concentration in the Central SMA***

October 19 was a burn day in the Central SMA, where 31.5 acres were burned at two fields located approximately 2 miles west of Potlatch. The PM<sub>2.5</sub> monitor in Potlatch recorded a 24-hour average concentration of 29.6 µg/m<sup>3</sup>, above the PCL. DEQ staff observed both burns, noting that the wind direction was appropriate for these burns and smoke was moving away from

Potlatch. As documented in the field notes and associated photos, smoke from these burns was very light, and both transport and surface dispersion were good. DEQ staff also documented that other burning was being conducted in the Potlatch area. Based on observations, DEQ-approved burning was not the source of the elevated concentration. Enhanced documentation was completed.

#### **4.1.2 Institutions with Sensitive Populations**

DEQ is prohibited from approving a request to burn if conditions are such that ISPs will be adversely impacted or when the plume is predicted to impact such institutions. To safeguard these populations, DEQ uses many procedures, including maintaining a current database of all known ISPs that includes the name, type of institution, and location; reviewing all registrations for field location relative to the location of ISPs; attaching restrictive permit conditions for all fields within 3 miles of an ISP; and requiring that DEQ personnel be on site and provide final approval to burn for fields within 3 miles of an ISP (with some exceptions, see section 2). DEQ field coordinators frequently conduct an in-person examination of ISPs that are near proposed crop residue burns prior to ignition to ensure that the location and operational status of the ISP are understood.

DEQ uses the following procedure to evaluate whether an adverse impact at an ISP occurred.

- When a monitor is present and the maximum hourly  $PM_{2.5}$  concentration is below  $20 \mu\text{g}/\text{m}^3$  (or visibility is at least 10 miles if no monitor is available):
  - Conclude that no adverse impact occurred
  - No additional documentation needed unless DEQ receives a complaint from an ISP
    - If a complaint was received from an ISP, full evaluation and enhanced documentation will be completed.
- When a monitor is present and the maximum hourly  $PM_{2.5}$  concentration is between 20 and  $26.25 \mu\text{g}/\text{m}^3$ :
  - Conclude adverse impact unlikely
  - Brief evaluation needed to determine whether an adverse impact occurred. The following items will be reviewed for the evaluation:
    - Monitoring data
    - Weather data
    - Field notes
  - If a complaint was received from an ISP, full enhanced documentation and evaluation will be completed.
- When a monitor is present and the maximum hourly  $PM_{2.5}$  concentration is greater than  $26.25 \mu\text{g}/\text{m}^3$  (or visibility is less than 10 miles if no monitor is available):
  - Adverse impact possibly occurred
  - Full enhanced documentation and evaluation will be completed to determine whether an adverse impact occurred. The full evaluation will include reviewing the following:
    - Monitoring data
    - Weather data

- Field notes
- Contact with the ISP—questions identified on the enhanced documentation form will be asked to the ISP and responses documented

During the 2011 burn season, there were no documented cases of adverse impacts to ISPs from approved burns. Enhanced documentation was completed for one burn day, discussed below, to evaluate whether an adverse impact to an ISP occurred. Also discussed below are days when approved crop residue burning was conducted and an ambient air quality monitor located at an ISP (such as St. Luke's Hospital in Meridian) recorded a 1-hour average PM<sub>2.5</sub> concentration of 26 µg/m<sup>3</sup> or more.

***March 30—St. Luke's Hospital (Meridian) in Southwest Idaho SMA***

March 30 was a burn day in the Southwest Idaho SMA, where 15 acres were burned at one field southeast of Grand View in Owyhee County, about 50 miles southeast of Meridian. The PM<sub>2.5</sub> monitor at the hospital recorded a 1-hour average concentration of 58.8 µg/m<sup>3</sup> for the hour ending at 9:00 p.m. The field was burned between 12:00 p.m. and 4:00 p.m. Winds that day were from the northwest at 5–10 mph. The winds would have carried the smoke away from the monitor. The source of the elevated PM<sub>2.5</sub> concentration is unknown, but it was not the approved crop residue burn. The hospital was not contacted because DEQ determined that the elevated concentration was not caused by the approved crop residue burning.

***April 11—Paul Elementary School in the Northern Magic Valley SMA***

April 11 was a burn day in the Northern Magic Valley SMA, where 58 acres were burned at one field about 10 miles north of Paul. The PM<sub>2.5</sub> monitor at the Paul Elementary School recorded a 1-hour average concentration of 39.6 µg/m<sup>3</sup> for the hour ending at 10:00 p.m. The first elevated PM<sub>2.5</sub> concentration recorded at the monitor was at 9:00 p.m. The field was burned between 11:00 a.m. and 4:00 p.m. Winds that day were from the southwest through northwest at 10–20 mph. The strong winds would have dispersed the smoke quickly and the smoke would have been gone from the area by the time the elevated values were recorded. The source of the elevated PM<sub>2.5</sub> concentration is unknown, but it was not the approved crop residue burn. The school was not contacted because DEQ determined that the elevated concentration was not caused by the approved crop residue burning.

***August 11—St. Luke's Hospital (Meridian) in the Southwest Idaho SMA***

August 11 was a burn day in the Southwest Idaho SMA, where 61 acres were burned at three fields in the Treasure Valley: two fields (29 acres total) approximately 30 miles west of Meridian (near Homedale) and one field (32 acres) 1 mile southeast of the St. Luke's Hospital (Meridian). The PM<sub>2.5</sub> monitor at St. Luke's Hospital recorded a 1-hour average concentration of 47.5 µg/m<sup>3</sup> for the hour ending at 12:00 a.m. (midnight) on August 12. DEQ staff were on site to observe the Meridian burn and observed winds from the northwest during the afternoon (when the field was burned) and smoke dispersing to the southeast (away from the hospital) without affecting any ISPs. The Meridian burn was completed by 1:00 p.m., and the smoke was observed to have fully dispersed from the area shortly thereafter. Based on distance from the monitor and observed wind direction, the Homedale burns were not considered as a potential cause of the elevated concentration. The source of the elevated PM<sub>2.5</sub> concentrations is unknown, but it was not the approved crop residue burning. The hospital was not contacted because DEQ determined that the elevated concentration was not caused by the approved crop residue burning.

**August 12—St. Luke’s Hospital (Meridian) in the Southwest Idaho SMA**

August 12 was a burn day in the Southwest Idaho SMA, where 79 acres were burned at three fields approximately 25 miles west of Meridian (near Marsing). The PM<sub>2.5</sub> monitor at St. Luke’s Hospital recorded a 1-hour average concentration of 29.7 µg/m<sup>3</sup> for the hour ending at 10:00 p.m. Winds were from the northwest through northeast during the afternoon (when the fields were burned), and smoke from the crop residue burns would not have been carried toward Meridian. The source of the elevated PM<sub>2.5</sub> concentrations is unknown, but it was not the approved crop residue burning. The hospital was not contacted because DEQ determined that the elevated concentration was not caused by the approved crop residue burning.

**September 28—Midway Elementary School and Jefferson Alternative School in the Eastern Idaho SMA**

September 28 was a burn day in the Eastern Idaho SMA, where 561 acres were burned at ten fields. A DEQ seasonal smoke coordinator was on site with one grower who burned two adjacent fields (a total of 111 acres) in the Lewisville area. The fields were 2.3 miles south of Midway Elementary School and 1.5 miles south of Jefferson Alternative School. The DEQ coordinator observed winds from the west-southwest prior to ignition and during the burns. As the second field burn was nearly complete, generating only a small amount of smoke from smoldering spots in the field, the wind shifted briefly from west-southwest to south and then shifted back to a west wind. While the wind was from the south (for a duration of approximately 3 minutes) smoke was observed drifting near ground level toward the two schools. The DEQ coordinator immediately drove to each of the schools and was unable to see any smoke at the schools.

Enhanced documentation was conducted for this incident. The DEQ coordinator contacted Midway Elementary School (the representative from Midway Elementary contacted Jefferson Alternative School for the coordinator) and no issues were reported at either of the schools. It appears that the small amount of smoke that drifted toward the schools either fully dispersed or lifted above ground level prior to reaching the schools.

**October 19—Potlatch School in the Central SMA**

October 19 was a burn day in the Central SMA, where 31.5 acres were burned at two fields approximately 2 miles west of Potlatch. The PM<sub>2.5</sub> monitor in Potlatch (located at the Potlatch School) recorded 1-hour average concentrations of 27.9 µg/m<sup>3</sup> and 59.0 µg/m<sup>3</sup> for the hours ending at 3:00 p.m. and 4:00 p.m., respectively. DEQ staff observed both burns, noting that the wind direction was appropriate for these burns and smoke was moving away from Potlatch. As documented in the field notes and associated photos, smoke from these burns was very light, and both transport and surface dispersion were good. DEQ staff also documented that other burning was being conducted in the Potlatch area. Based on observations, DEQ-approved burning was not the source of the elevated concentrations. The school was not contacted because DEQ determined that the elevated concentrations were not caused by the approved crop residue burning.

**4.1.3 Evaluation of Possible Public Roadway Safety Impacts**

**September 28—Public Roadway Safety in the Eastern Idaho SMA**

September 28 was a burn day in the Eastern Idaho SMA, where 441 acres were burned at nine fields in the Idaho Falls–Rexburg area. On this day, DEQ received a complaint of smoke on a

roadway. However, the complainant was unable to say which road or to provide a location. Two DEQ staff were in the field observing burns and neither observed smoke on a roadway. After receiving the complaint, the two DEQ staff each canvassed the area and still observed no smoke on a roadway. Enhanced documentation was conducted and DEQ determined approved crop residue burns did not create a hazard for travel on any public roadways.

#### **4.1.4 Evaluation of Additional Burn Days**

In addition to the PCLs described in section 4.1.1 and the possible impacts to ISPs, DEQ further evaluated the effectiveness of the CRB program by using the PM<sub>2.5</sub> 4-hour average concentration preburn and postburn triggers of 22 µg/m<sup>3</sup> and 32 µg/m<sup>3</sup>, respectively; the PM<sub>2.5</sub> 24-hour average concentration preburn trigger of 16 µg/m<sup>3</sup>; and possible visibility hazards on public roadways. The 4-hour average concentrations can help to identify potential particulate sources that have a duration lasting longer than 1 hour but less than 24 hours, which is a typical time frame for a crop residue burn. DEQ used the same process as described in section 4.1.1 to determine whether smoke from crop residue burning was reasonably suspected of having caused an impact. The following days are discussed because approved crop residue burning was conducted and monitoring values were recorded at concentrations above the PM<sub>2.5</sub> trigger levels or smoke was observed on a public roadway.

##### ***April 27—4-hour average PM<sub>2.5</sub> concentration in the Southwest Idaho SMA***

The PM<sub>2.5</sub> monitor at St. Luke's Hospital in Meridian recorded a 4-hour average concentration of 56.7 µg/m<sup>3</sup> for the 4 hours ending at 10:00 p.m.

Please refer to section 4.1.1, "Compliance with Program Concentration Limits," for a summary of burning on April 27 in the Southwest Idaho SMA.

##### ***August 19—4-hour average PM<sub>2.5</sub> concentration in the Southwest Idaho SMA***

August 19 was a burn day in the Southwest Idaho SMA, where 54 acres were burned at three fields in the Treasure Valley located 20 to 30 miles west and west-northwest of Meridian. The PM<sub>2.5</sub> monitor at St. Luke's Hospital in Meridian recorded a 4-hour average concentration of 23.3 µg/m<sup>3</sup> for the 4 hours ending at 8:00 a.m. The cause of the elevated concentrations at the Meridian monitor is not known, but the concentrations were trending lower during the hours leading up to the burn decision/burn approval process. Crop residue burning was approved because the PM<sub>2.5</sub> concentrations had returned to acceptable levels and were expected to remain at acceptable levels. Preburn enhanced documentation should have been conducted but was not.

##### ***September 6—4-hour average PM<sub>2.5</sub> concentration in the Blaine and Camas Counties SMA***

September 6 was a burn day in the Blaine and Camas Counties SMA, where 30 acres were burned at one field near Carey. The PM<sub>2.5</sub> monitor in Ketchum recorded a 4-hour average of 45.2 µg/m<sup>3</sup> for the 4 hours ending at 11:00 a.m. The readings from the Ketchum monitor were affected by wildfire smoke and were not representative of conditions in southern Blaine County where the crop residue burn was to be conducted, and the wind conditions that day were not expected to transport the crop residue smoke toward Ketchum. Preburn enhanced documentation is not applicable in this instance as the burn location is separated from Ketchum by over 30 miles of mountainous terrain, making the burn location a distinct airshed.

**September 13—4-hour average  $PM_{2.5}$  concentration in the Southwest Idaho SMA**

September 13 was a burn day in the Southwest Idaho SMA, where 27 acres were burned at two fields approximately 20 to 30 miles west of Meridian (near Homedale). The  $PM_{2.5}$  monitor in Meridian recorded 4-hour averages of  $26.2 \mu\text{g}/\text{m}^3$  and  $25.3 \mu\text{g}/\text{m}^3$  for the 4 hours ending at 9:00 a.m. and 10:00 a.m., respectively. The cause of the elevated concentrations at the Meridian monitor is not known, but the concentrations were trending lower during the hours leading up to the burn decision/burn approval process. Crop residue burning was approved because the  $PM_{2.5}$  concentrations had returned to acceptable levels and were expected to remain at acceptable levels. Preburn enhanced documentation should have been conducted but was not.

**September 29—4-hour average  $PM_{2.5}$  concentration in the Central SMA**

September 29 was a burn day in the Central SMA, where 70 acres were burned at two fields approximately 5 miles north of Moscow, 163 acres were burned at three fields approximately 20 miles north of Moscow, and 157 acres were burned at four fields approximately 20 miles southeast of Moscow. The  $PM_{2.5}$  monitor in Moscow recorded 4-hour rolling averages above the postburn trigger for the hours of 5:00 p.m.–8:00 p.m., with the highest reading being  $38.6 \mu\text{g}/\text{m}^3$ . The two fields closest to Moscow were approved to burn because they required an easterly component to the wind direction, which was forecasted for this day. DEQ staff were in the field observing these burns and observed the smoke dispersing in a northeasterly direction away from Moscow. There were no DEQ staff observing the burns located to the southeast of Moscow, but based on observed wind direction and possible poor dispersion, it is believed that these burns were responsible for the elevated monitor readings in Moscow. The burns north of Moscow did not likely contribute to the elevated concentration, although two burns north of Moscow were not allowed to proceed due to elevated monitor readings. Enhanced documentation was conducted.

**September 30—4-hour and 24-hour average  $PM_{2.5}$  concentrations in the Central SMA**

September 30 was a burn day in the Central SMA, where 264 acres were burned at five fields approximately 20 miles north of Moscow, 60 acres were burned at one field approximately 15 miles northeast of Moscow, and 22 acres were burned at three fields ranging from approximately 12 to 25 miles southeast of Moscow. The  $PM_{2.5}$  monitor in Moscow recorded a 4-hour rolling average of  $33.5 \mu\text{g}/\text{m}^3$  for the 4 hours ending at 5:00 p.m. DEQ staff were in the field observing the burn located northeast of Moscow and observed the smoke dispersing in a northeasterly direction. DEQ did not have an observer at the burns located to the southeast of Moscow, although the grower burning a 19-acre field in that area reported that the burn was complete by 1:00 p.m. There was an escaped ditch bank burn in Moscow on this day that could have contributed to the elevated readings at the monitor. Based on observed wind directions, it was determined that DEQ-approved burning did not contribute to the elevated readings at the Moscow monitor. Postburn enhanced documentation should have been conducted but was not. The Moscow monitor also recorded 24-hour average  $PM_{2.5}$  concentrations that were above the preburn enhanced documentation trigger; however, all planned burning was located a sufficient distance from Moscow and it was determined these burns would not have contributed to the readings at the Moscow monitor. Preburn enhanced documentation should have been conducted but was not.

**October 3—4-hour average  $PM_{2.5}$  concentration in the Southwest Idaho SMA**

October 3 was a burn day in the Southwest Idaho SMA, where 35 acres were burned at two fields just south of Nampa. The  $PM_{2.5}$  monitor in Nampa recorded a 4-hour average of  $24.7 \mu\text{g}/\text{m}^3$  for the 4 hours ending at 9:00 a.m. The cause of the elevated concentration at the Nampa monitor is not known, but the concentrations were trending lower during the hours leading up to the burn decision/burn approval process. Crop residue burning was approved because the  $PM_{2.5}$  concentrations had returned to acceptable levels and were expected to remain at acceptable levels. Preburn enhanced documentation should have been conducted but was not.

**October 19—4-hour average  $PM_{2.5}$  concentration in the Central SMA**

October 19 was a burn day in the Central SMA, where 31.5 acres were burned at two fields approximately 2 miles west of Potlatch. The  $PM_{2.5}$  monitor in Potlatch recorded a 4-hour average concentration of  $47.4 \mu\text{g}/\text{m}^3$  for the 4 hours ending at 4:00 a.m. Due to the time of year, there had been a recent observed trend of nighttime elevated  $PM_{2.5}$  concentrations from woodstove usage, with lower concentrations observed during daytime hours. Preburn enhanced documentation was conducted. For additional information about this burn day, please refer to section 4.1.1, “Compliance with Program Concentration Limits.”

**October 20—4-hour average  $PM_{2.5}$  concentration in the Central SMA**

October 20 was a burn day in the Central SMA, where 255 acres were approved to burn at four fields located 3–5 miles northwest of Potlatch. The  $PM_{2.5}$  monitor in Potlatch recorded 4-hour average concentrations above the preburn enhanced documentation trigger level with a concentration of  $22.4 \mu\text{g}/\text{m}^3$  for the 4 hours ending at 2:00 a.m. The measured concentrations trended lower all morning and had been below the preburn enhanced documentation threshold for several hours by the time the burn decision and burn approval process was undertaken. Preburn enhanced documentation was conducted.

**October 27—24-hour average  $PM_{2.5}$  concentration in the Central SMA**

October 27 was a burn day in the Central SMA, where 222 acres were approved to burn at three fields approximately 2 miles west of Potlatch and one field approximately 5 miles southwest of Potlatch. The  $PM_{2.5}$  monitor in Potlatch recorded rolling 24-hour average concentrations above the preburn enhanced documentation trigger level during the early morning hours. Preburn enhanced documentation was completed and burning was approved after it was determined that the source of the elevated concentrations was nighttime woodstove use and the concentrations were trending lower during the morning hours and were expected to continue to trend lower during the day.

## **4.2 Complaints**

Complaint response remains a critical part of DEQ’s crop residue burning program. Like information from ambient monitoring or meteorological data, complaints provide smoke managers with information that can help them understand how the public perceives burning, air quality, and smoke behavior. DEQ focused on the location, content, and circumstances of the complaints and used the information to improve future burn decisions. Some of the complaints involved smoke from crop residue burning conducted within the CRB program. Other complaints involved crop residue burning conducted outside DEQ’s CRB program, such as the

burning of an unregistered field, burning on a no-burn day, or crop residue burning conducted on tribal land.

DEQ used a familiar toll-free hotline number for the public to submit questions, comments, and complaints. This number was previously used by the Idaho State Department of Agriculture when it operated the CRB program. DEQ, in cooperation with the Nez Perce and Coeur d'Alene Tribes, used a contractor to answer the calls. Information from each call was immediately e-mailed to CRB program staff. Complaints received through the hotline included complaints about burning conducted within and outside the CRB program. The following information was collected from the callers:

- Name
- Phone number
- Is a call back requested?
- City, state, and county of caller's location
- Is smoke visible from caller's location?
- Is smoke at ground level?
- Brief description of the problem

In addition to the complaint hotline, DEQ also directly received questions, comments, and complaints in the regional offices, and some complaints were received by other methods, such as by DEQ field coordinators. In all cases, crop residue burning complaints were entered into DEQ's Complaint Tracking System by regional office staff. Table 1 summarizes the number of calls received on the hotline for 2011. Table 2 shows the total number of crop residue burning complaints received by SMA, including those that were related to DEQ's CRB program and those from non-DEQ crop residue burning.

**Table 1. Summary of calls to the crop residue burning hotline in 2011.**

Month	Number of callers who listened to the message <sup>a</sup>	Number of callers who hung up after the message	Number of callers who selected "Speak with an operator" <sup>b</sup>	Number of callers who selected "Nez Perce tribe burn decision"	Number of callers who selected "North Idaho burn decision"	Number of callers who selected "South Idaho burn decision"
January	0	0	0	0	0	0
February	0	0	0	0	0	0
March	0	0	0	0	0	0
April	0	0	0	0	0	0
May	0	0	0	0	0	0
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	162	7	23	45	41	46
September	154	16	39	29	30	40
October	103	16	6	27	22	32
November	44	14	0	4	12	14
December	2	0	0	0	0	2
Total	465	53	68	105	105	134

a. To be included in this category, the caller had to listen to the entire message before selecting another option.

b. Callers who chose to speak with an operator could register a complaint, ask a question, or make a comment, which was then immediately communicated by e-mail to DEQ staff.

**Table 2. Summary of crop residue burning complaints received in 2011.**

Smoke management area <sup>a</sup>	Total crop residue burning related complaints	Complaints likely associated with DEQ-approved burning	Complaints associated with other smoke sources <sup>b</sup>
Central	21	6	15
Kootenai County	11	2	9
Boundary County	19	13	6
Southern Magic Valley	1	1	0
Eastern Idaho	1	0	1

a. Smoke management areas with no related complaints during 2011 are not included.

b. Complaints from other sources include crop residue burning on reservations and illegal crop residue burning off reservation.

### **4.3 Compliance and Enforcement**

DEQ's existing Air Quality Division Compliance and Enforcement Program is used for the CRB program. DEQ continued to focus on compliance assistance during 2011, with the goal of educating growers about their permits and requirements and helping them comply with those requirements. In those instances where an enforcement action was appropriate, DEQ continued to use both informal and formal enforcement tools. This process is considered a proactive approach to help avoid future issues that could result from poor smoke management. DEQ

believes this approach will preempt future emissions and is not solely an after-the-fact enforcement stance.

The CRB program forwarded three potential violations of the CRB rule to the enforcement coordinator in the Air Quality Division. Of those, one case was issued a consent order with penalty and two cases remain under development. To date, DEQ has collected \$692 in penalties for CRB violations in 2011. In addition to the three violations above, DEQ issued three notices to comply for minor violations of the CRB rule.

#### **4.4 Crop Residue Burning Ambient Air Quality Monitoring Network**

DEQ continued to operate the existing air quality monitors and seasonal CRB PM<sub>2.5</sub> monitors (nephelometers) during 2011. Figures 2, 3 and 4 show the locations of monitors in northern, central, and southern Idaho SMAs, respectively.

In spring 2011, DEQ also obtained access to real-time ambient ozone monitoring data from three National Park Service monitors (Craters of the Moon, City of Rocks, and Yellowstone). DEQ also used data from monitors operated by the Utah Department of Environmental Quality.

During the fall burn season, DEQ experienced some issues with some of the PM<sub>2.5</sub> monitors that are used in the burn decision process. The Porthill seasonal PM<sub>2.5</sub> monitor in the Boundary County SMA was plagued by wireless modem communication issues as well as data logger issues regarding storage and programming. Multiple attempts were made to rectify both issues, but the monitor would only transmit data for very short durations before communications would again fail. Attempts to download recorded data from the data logger resulted in corrupt or unavailable data. Therefore, the Porthill monitor was not used in the burn decision process during 2011. Future deployment of this monitor may be to a different location in order to solve the wireless modem communication issues.

The PM<sub>2.5</sub> monitor in Grangeville in the Central SMA failed to meet airflow specifications during a flow check conducted on September 28, 2011. Because of this failure, all data from this monitor dating back to the last successful flow check (August 21, 2011) were deemed invalid. Prior to September 28, DEQ believed the data from this monitor to be valid, and DEQ used these data in the burn decision process. Enhanced documentation was conducted for burning on August 30 based on data from this monitor.

The PM<sub>2.5</sub> monitors in Kendrick and Potlatch were each plagued by frequent communication issues throughout the fall burn season. Both monitors continued to operate, but access to real-time data was limited, and poor access to the data also resulted in a couple short periods of missing data.

The British Columbia Ministry of Environment operates PM<sub>2.5</sub> and PM<sub>10</sub> monitors at a school in Creston, British Columbia, approximately 7 miles north of the Canadian border, and approximately 10 miles north of the closest registered field in Idaho. The Ministry of Environment uses a method of providing monitoring data to the public that is similar to what DEQ uses. Therefore, the Creston data were compared to data from DEQ's monitor at Copeland (Mt. Hall School) in Boundary County. DEQ does not know the Ministry of Environment's calibration or quality assurance methods. However, the Creston data matched up well with the Copeland data for time frames when smoke was observed within the vicinity of both Copeland

and Creston (verified by on-location DEQ personnel). The Creston monitor was determined to be useful as an additional analysis tool.

On several occasions during the month of September, the Creston monitor recorded elevated readings. Three of these readings occurred on days when DEQ-approved burning was conducted; however, other elevated readings occurred around the same time frame that did not coincide with DEQ-approved burning. None of the elevated readings reached any DEQ PCL, and DEQ does not have enough information regarding other potential contributing emissions in the Creston area to draw any conclusions about these elevated readings.

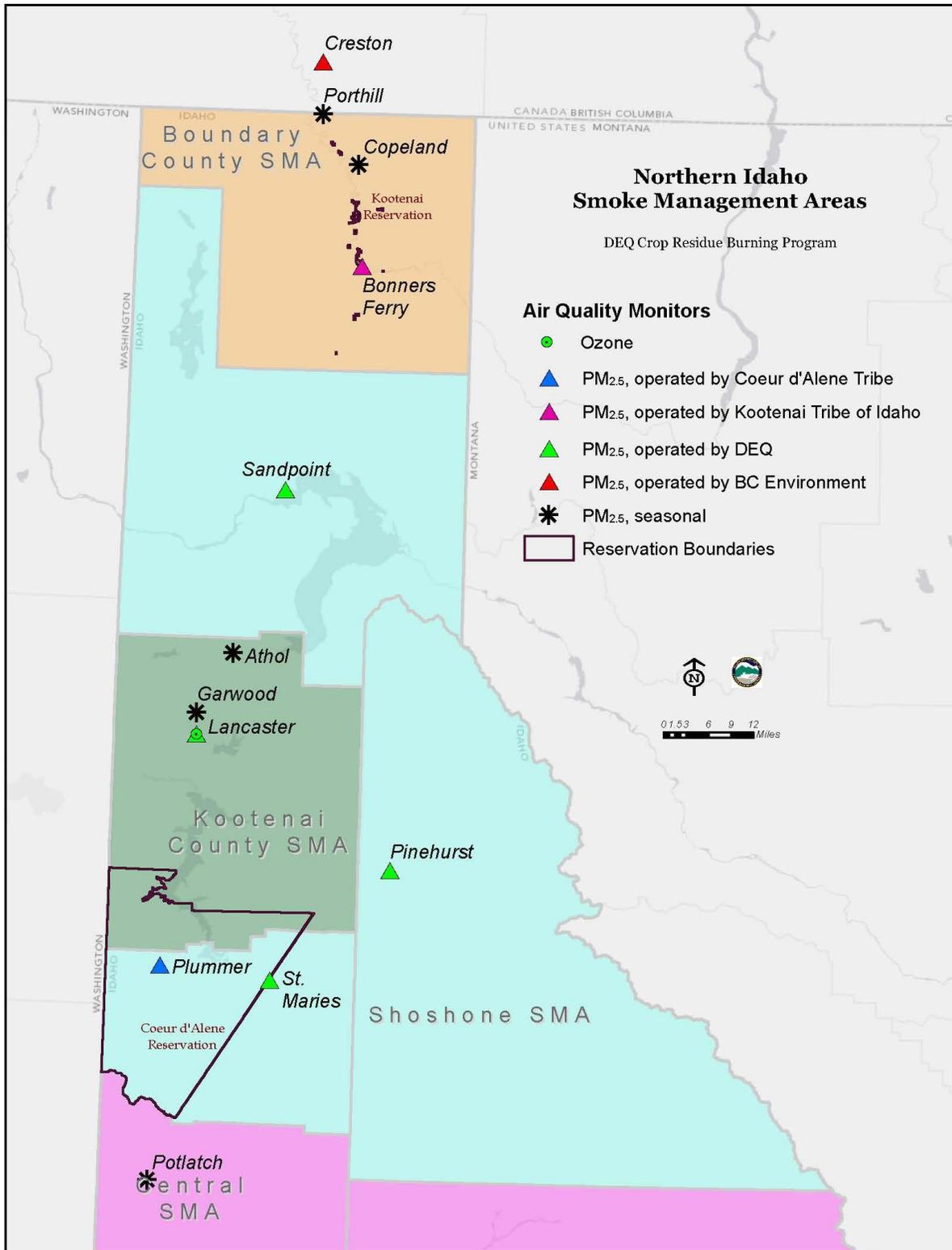


Figure 2. Air quality monitor locations for northern Idaho smoke management areas.

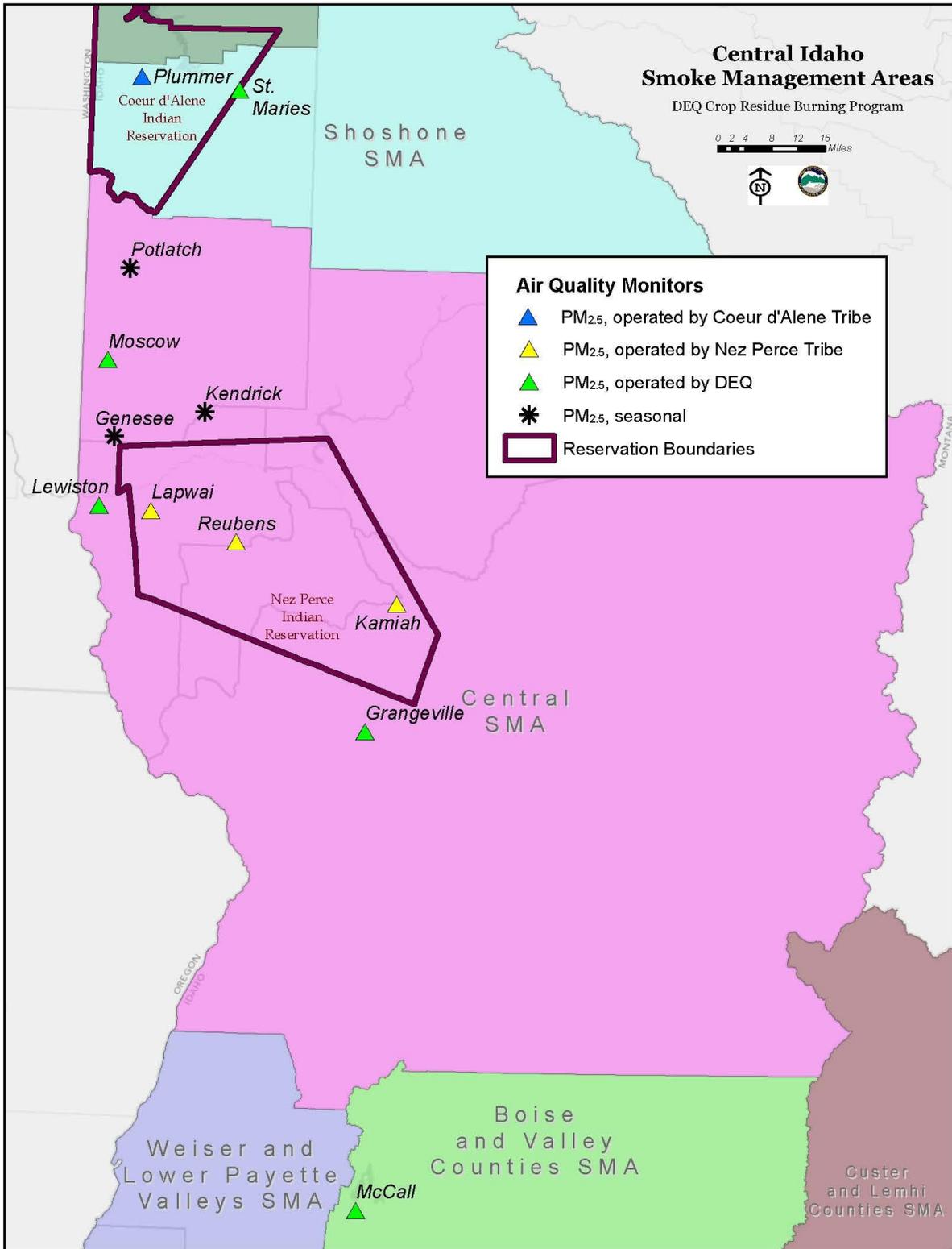


Figure 3. Air quality monitor locations for the Central Smoke Management Area.

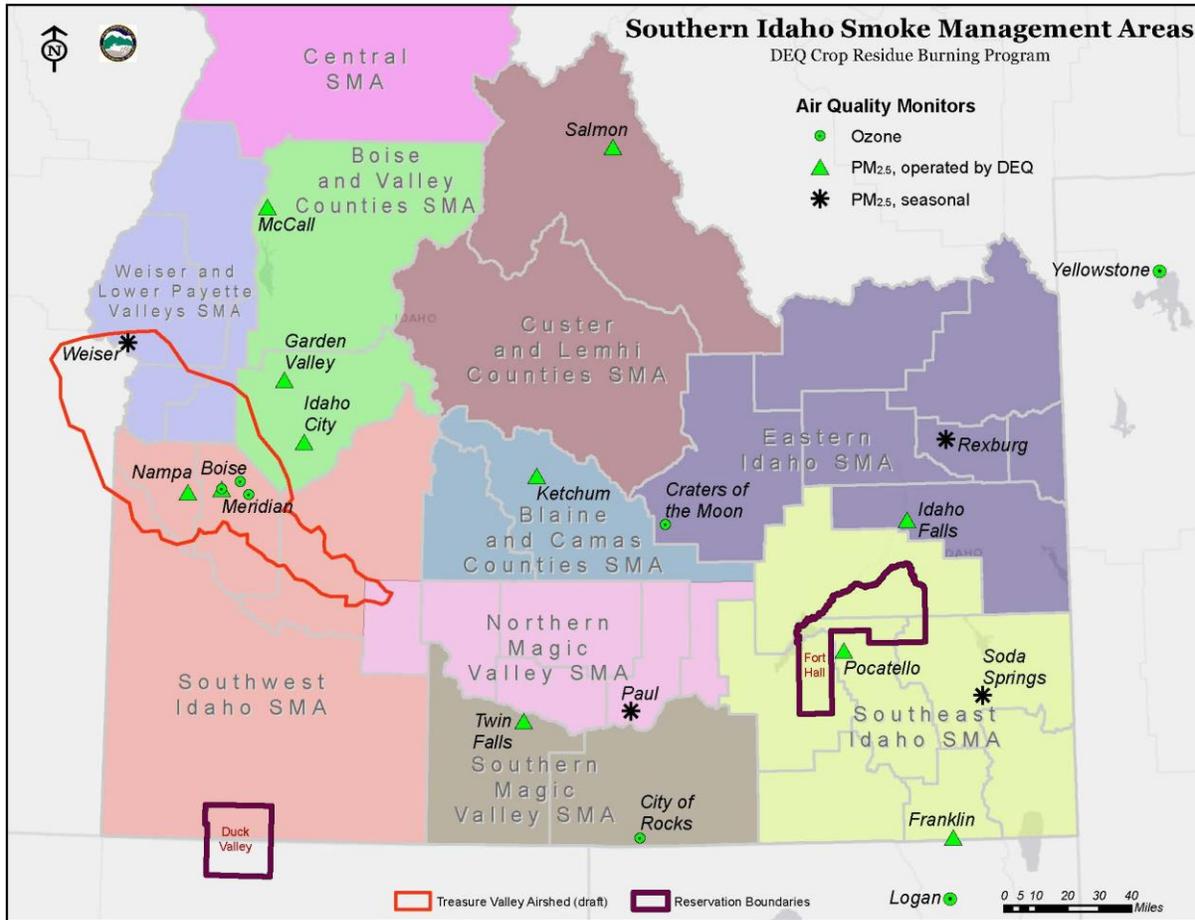


Figure 4. Air quality monitor locations for southern Idaho smoke management areas.

### 4.5 Meteorology

Meteorological conditions play an important part in DEQ’s burn decision process. DEQ contracted with Bennett Fire Weather Services to provide fire weather forecasting services during the fall burn season. Bennett Fire Weather Services provided DEQ with region-specific meteorological forecasts each morning and afternoon, with an emphasis on parameters related to smoke dispersion and ventilation. Appendix B contains a detailed summary of the meteorological conditions throughout the state during the fall burn season.

DEQ analysts and coordinators use a variety of weather forecasting tools to study many parameters during the burn decision process, including wind speed and direction, atmospheric mixing height, transport wind speed and direction, temperature, relative humidity, and probability of precipitation. In addition to weather forecasting, DEQ field coordinators conduct “in-the-field” observations of meteorological conditions and launch and observe pilot balloons to further understand the expected smoke dispersion.

### 4.6 Smoke Management Area Summaries

During 2011, 65,362 acres were burned statewide under the CRB program, a small increase from the 64,165 acres burned in 2010. As in prior years, a majority of the burning occurred during the fall burn season: for 2011, the fall burn season accounted for 87% of the acres burned.

Detailed summaries of each SMA follow. Acres burned under the CRB program are broken down by burn season and crop type. Crop types include turf grass, cereal grain, other crops, and Conservation Reserve Program (CRP) lands. Each SMA summary includes the total number of burn days and the justification for no-burn days.

The burn decision methodologies are slightly different between northern Idaho and southern Idaho. In northern Idaho, multiple reasons are sometimes listed for a no-burn decision, while in southern Idaho, there is typically only one reason listed for a no-burn decision. In northern Idaho, the no-burn due to no requests decision justification only occurs when there are no burns appearing on the ready-to-burn list. In southern Idaho, this justification may be used if there are burns on the ready-to-burn list but the growers are not available or ready to burn.

Figure 5 shows the number of acres burned under the CRB program for the last 3 years in the northern Idaho SMAs. The data show that the acres burned in these SMAs have remained fairly stable since 2009.

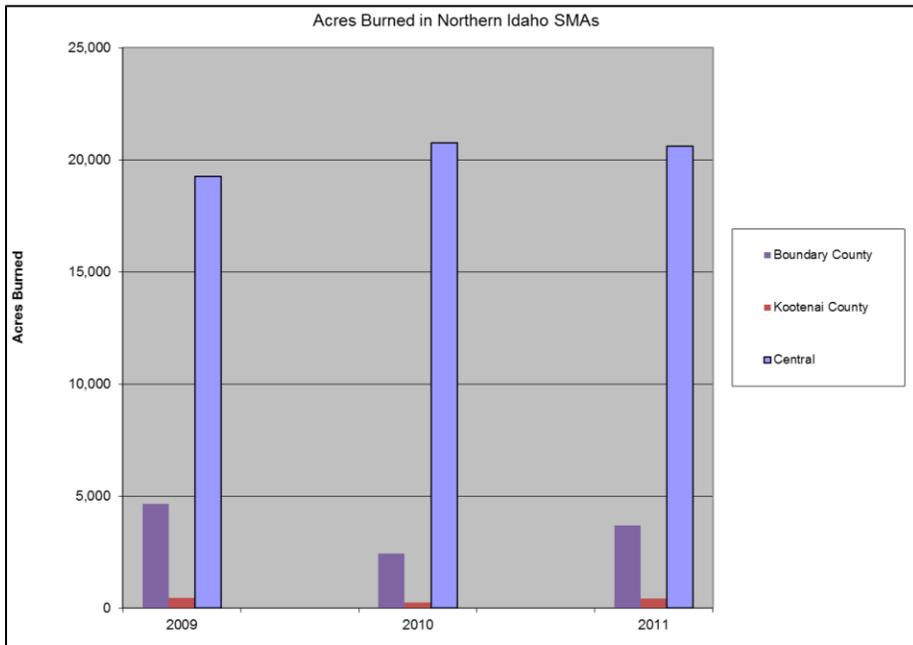


Figure 5. Acres burned in northern Idaho smoke management areas.

Figure 6 shows the number of acres burned under the CRB program in the southern Idaho SMAs for the last 3 years. The data generally show that in most of these SMAs the acres burned has been similar from year to year. However, the data do show substantial increases in acres burned in the Northern Magic Valley and Southern Magic Valley SMAs, especially from 2010 to 2011.

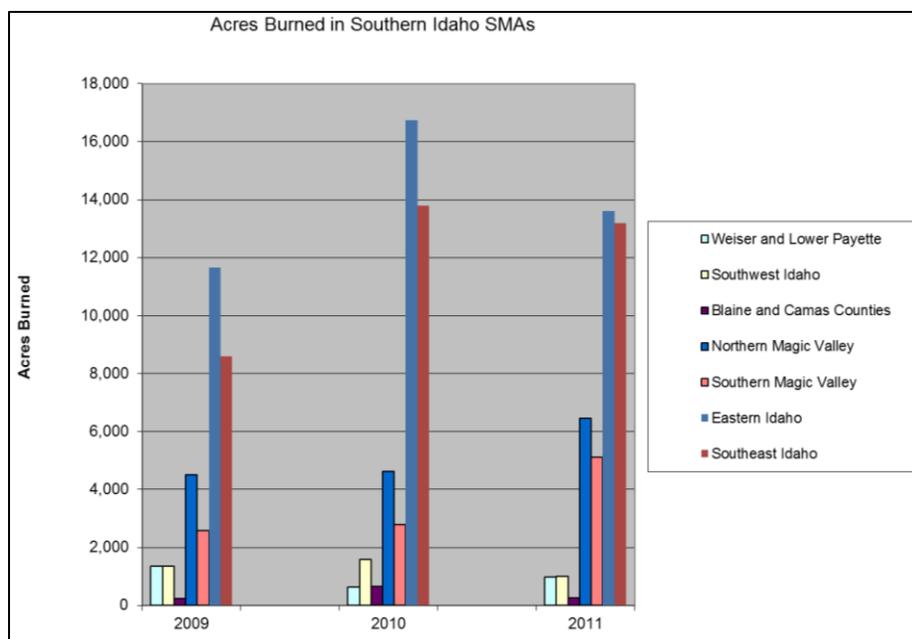


Figure 6. Acres burned in the southern Idaho smoke management areas.

#### 4.6.1 Boundary County Smoke Management Area

The Boundary County SMA covers 1,278 square miles and encompasses all of Boundary County (Figure 1). The majority of the crop residue burning in Boundary County occurs in the Kootenai River valley along the river and adjacent benches.

The only crop residue burned in the Boundary County SMA in 2011 was cereal grain stubble; however, residue from other crops, such as turf grass, legumes, and hops, has historically been burned as well. Typical burn seasons for this SMA are a spring season (April through June) and a fall season (late August through mid-October). High relative humidity and high fuel moisture often limit burning in the early spring and late fall. Seasonal ambient air quality monitors that measure PM<sub>2.5</sub> are located in Porthill and Copeland. A monitor in Creston, British Columbia, operated by BC Environment and a monitor in Bonners Ferry operated by the Kootenai Tribe of Idaho provide additional data for program decisions and evaluations. As described in section 4.4 of this report, the Porthill monitor experienced numerous communication and data logger problems such that the Porthill monitor was not used in the burn decision process during the fall 2011 burn season.

##### 4.6.1.1 Acres Burned

Table 3 shows the acres burned during the spring and fall burn seasons for each crop type during the 2009–2011 burn seasons. A total of 3,706 acres were burned in the Boundary County SMA during 2011, with the majority burned during the fall burn season. The number of acres burned in the Boundary County SMA in 2011 was greater than 2010 but still less than 2009. Nearly 4,636 acres were eligible (paid) for burning during 2011, but some growers removed fields from DEQ's burn consideration and other growers never notified DEQ they were ready to burn. This difference in the number of acres paid and the number of acres actually burned was likely the combined result of a late growing season, where some fields never dried sufficiently to be

successfully burned, and weather constraints that led growers to consider other options to meet their crop residue disposal goals for the season.

Figure 7 shows the locations of the fields burned during 2011: 30 fields totaling 3,706 acres were burned in the SMA, and 13 fields (43%) amounting to 1,233 acres (33%) were located within 3 miles of an ISP. In 2011, 13 growers burned fields within the CRB program in the SMA.

**Table 3. Summary of acres burned in the Boundary County Smoke Management Area.**

Burn season and crop type	Acres burned		
	2009	2010	2011
<b>Spring<sup>a</sup></b>			
Cereal grain	440	396	575
Turf grass	215	0	0
Other crops	270	0	0
Subtotal	925	396	575
<b>Fall<sup>b</sup></b>			
Cereal grain	3,400	1,999	3,131
Turf grass	215	0	0
Other crops	120	44	0
Subtotal	3,735	2,043	3,131
<b>Total</b>	<b>4,660</b>	<b>2,439</b>	<b>3,706</b>

a. Spring season is March 1–June 30.

b. Fall season is July 1–November 6.

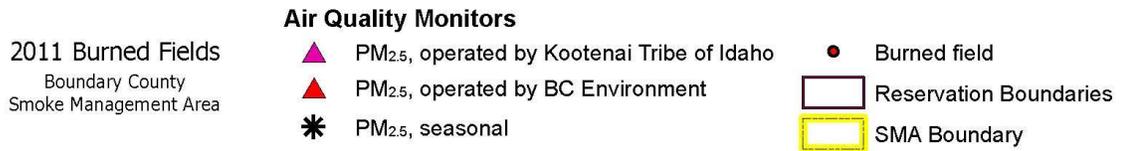
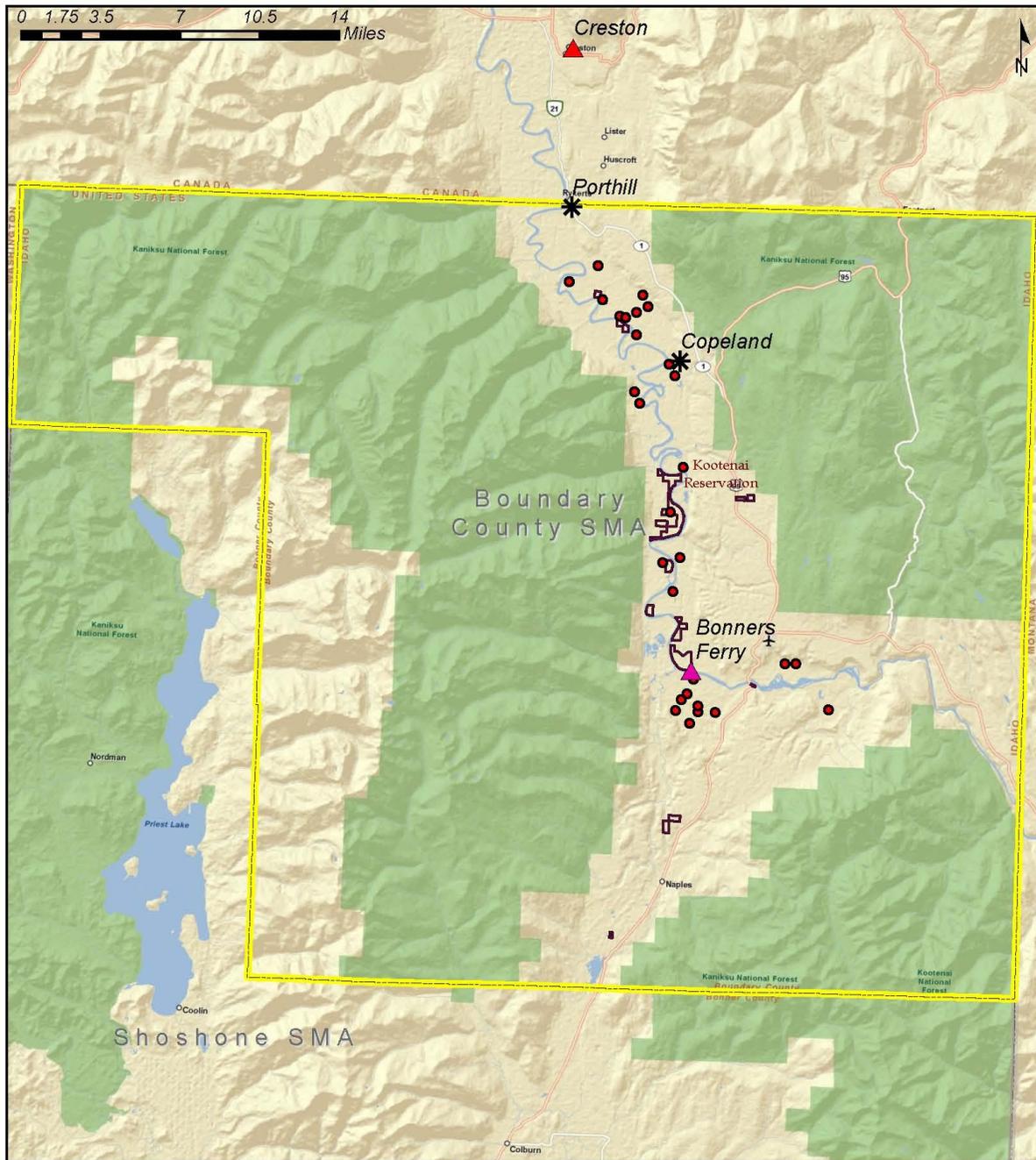


Figure 7. Location of 2011 burns in the Boundary County Smoke Management Area.

#### 4.6.1.2 Daily Burn Decisions and Air Quality

Due to a wet spring and delayed harvest, burning started later than usual this year, and throughout September and into October the weather conditions were not conducive to crop residue burning. Rain events, high winds, and stagnant conditions inhibited burning. DEQ field coordinators were on site in this SMA on several burn days or conditional burn days during August, September, and October to evaluate the suitability of the field and weather conditions for potential burning. DEQ authorized a total of eight burn days when burning was conducted. On many of these days, conditions were marginal and only limited burning could be approved.

Table 4 shows the summary of burn decisions for the Boundary County SMA for 2011. The most common reason for a no-burn decision was that no requests to burn were received. High fuel moisture was also a frequent reason for no-burn days in this SMA during 2011.

Poor air quality was the reason behind a no-burn decision two times in the SMA. DEQ made no-burn decisions based on poor air quality on September 13 and 14 as a result of a wildfire in Boundary County. This same wildfire caused the Idaho Department of Lands to issue a burn ban on all permits from September 12–19. Burn permits were reviewed daily on a conference call with the Idaho Department of Lands and approved on a case-by-case basis over this period.

**Table 4. Summary of burn decisions for the Boundary County Smoke Management Area.**

County	Approved burn days	Days with no requests to burn <sup>a</sup>	No-burn days due to air quality	No-burn days due to meteorological conditions			Days with no burning for other reasons
				Fuel moisture	Wind	Ventilation	
Boundary	16	180	2	26	6	8	0

a. This summary includes all burn decisions issued for 2011. The majority of the no-burn decisions due to no requests occurred outside the typical burn seasons (i.e., summer and winter).

Appendix C contains a comparison of the acres burned versus the 1-hour, 4-hour, and 24-hour average PM<sub>2.5</sub> concentrations recorded and collected by DEQ monitors for the Boundary County SMA. Only those weeks when burning occurred are included in Appendix C.

#### 4.6.2 Kootenai County Smoke Management Area

The Kootenai County SMA covers 1,316 square miles, encompasses all of Kootenai County, and includes the Rathdrum Prairie and Rose Lake areas (Figure 1). The Rathdrum Prairie is a mix of irrigated and nonirrigated agricultural fields and other rural land. The Rose Lake area is on the eastern edge of Kootenai County and includes the Chain Lakes area that follows the Coeur d'Alene River as it flows into Coeur d'Alene Lake.

The primary crop burned in the Kootenai County SMA is turf grass; however, there is one grower who has registered a cereal grain stubble field in the past. This SMA typically only has a fall burn season (August through October). Ambient air quality monitors that measure PM<sub>2.5</sub> and are used to make burn decisions in this SMA are located at Athol and on the Rathdrum Prairie (Lancaster and the Garwood School). A monitor in Spokane (administered by the Washington Department of Ecology) and DEQ monitors in Sandpoint and Pinehurst also provide additional data, although they are located outside the SMA. The Lancaster monitor also measures ozone.

Crop residue burning in the Kootenai County SMA has been greatly limited by urban development. The Rathdrum Prairie is bordered to the north by the city of Rathdrum, to the east by the city of Hayden, and to the south by the cities of Post Falls and Coeur d'Alene. The turf grass fields located on the prairie are nearly surrounded by urbanized cities and growing rural residential communities. Proximity to ISPs and urban centers has led to increasingly restrictive conditions for burning in Kootenai County by severely limiting an acceptable wind direction for approval.

#### 4.6.2.1 Acres Burned

Table 5 shows the acres burned during the fall burn season for each crop type during the 2009–2011 burn seasons. A total of 420 acres were burned in the SMA during the 2011 burn season.

Figure 8 shows the locations of the fields burned during 2011: four fields totaling 420 acres were burned in this SMA, and two fields (50%) amounting to 370 acres (88%) were located within 3 miles of an ISP. In 2011, three growers burned fields within the CRB program in the SMA.

**Table 5. Summary of acres burned in the Kootenai County Smoke Management Area.**

Burn season and crop type	Acres burned		
	2009	2010	2011
<b>Fall<sup>a</sup></b>			
Turf grass	452	180	420
Other	8	0	0
<b>Total</b>	<b>460</b>	<b>180</b>	<b>420</b>

a. Fall season is July 1–November 6.

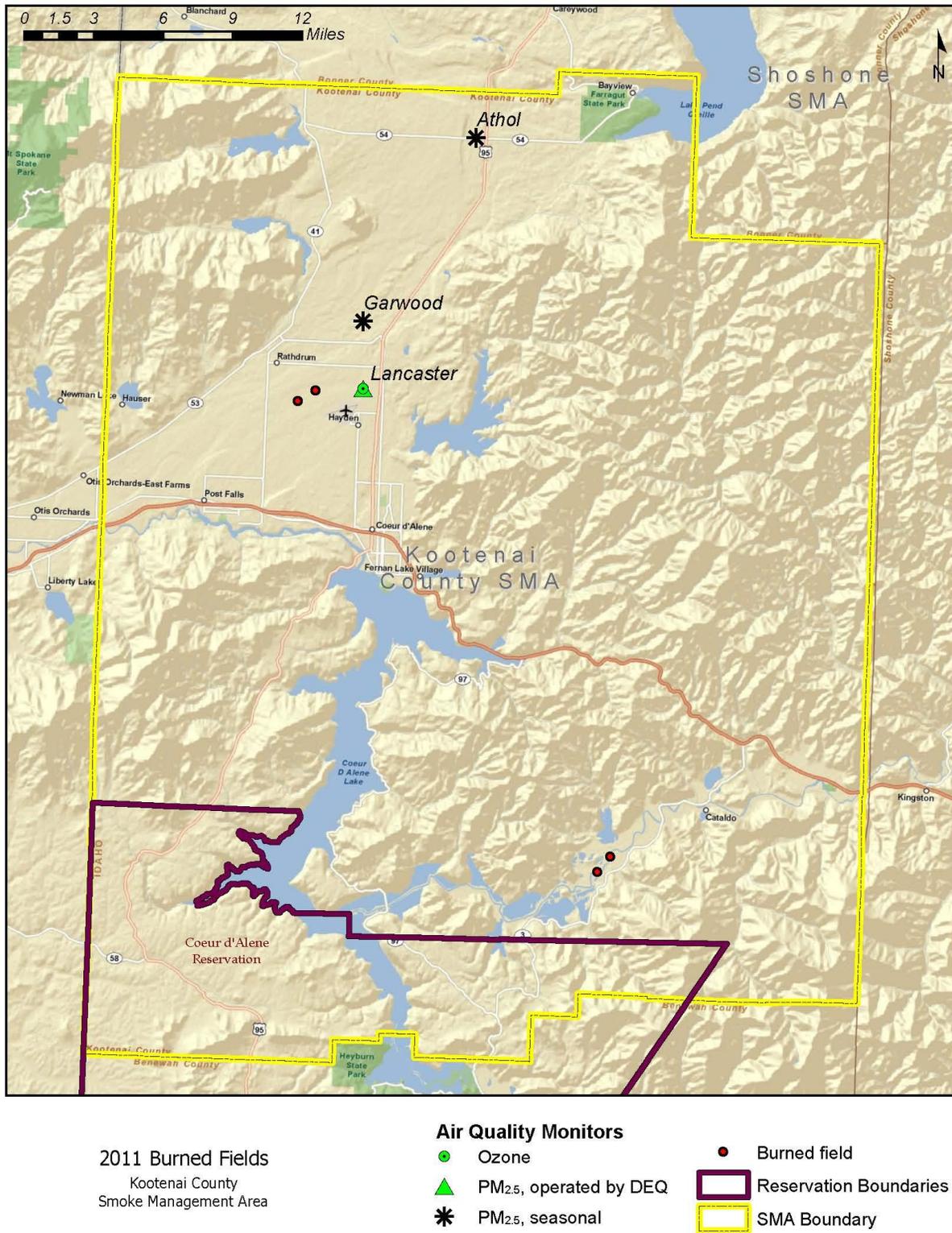


Figure 8. Location of 2011 burns in the Kootenai County Smoke Management Area.

#### 4.6.2.2 Daily Burn Decisions and Air Quality

Table 6 shows the summary of burn decisions for the Kootenai County SMA for 2011. The most common reason for a no-burn decision was that no requests to burn were received. All burning in this SMA was conducted on three burn days, and unlike last year, the burning was conducted very shortly after DEQ was notified that the fields were ready. There were only three no-burn days. Although these fields can usually only be burned under very limited wind directions, it was other meteorological factors that limited burning on these days in 2011.

**Table 6. Summary of burn decisions for the Kootenai County Smoke Management Area.**

County	Approved burn days	Days with no requests to burn <sup>a</sup>	No-burn days due to air quality	No-burn days due to meteorological conditions			Days with no burning for other reasons
				Fuel moisture	Wind	Ventilation	
Kootenai	3	222	0	1	0	2	0

a. This summary includes all burn decisions issued for 2011. The majority of the no-burn decisions due to no requests occurred outside the typical burn seasons (i.e., summer and winter).

Appendix D contains a comparison of the acres burned versus the 1-hour, 4-hour, and 24-hour average PM<sub>2.5</sub> concentrations and the 8-hour average ozone concentrations recorded and collected by DEQ monitors for the Kootenai County SMA. Only those weeks when burning occurred are included in Appendix D.

#### 4.6.3 Central Smoke Management Area

The Central SMA, also known as the Clearwater Airshed, covers 13,403 square miles and includes Latah, Nez Perce, Lewis, Idaho, and Clearwater Counties. Additionally, the Nez Perce Indian Reservation is located entirely within this SMA and also contains portions of each of these counties (Figure 1). All burning within the reservation boundary is managed by the Nez Perce Tribe.

The primary crop burned in the Central SMA is cereal grain stubble; however, turf grass also makes up a significant percentage of the acres burned. Typical burn seasons for this SMA are a winter season (mid-November through February), a spring season (March through June), and a fall season (July through early November).

Ambient air quality monitors that measure PM<sub>2.5</sub> are located in Potlatch, Moscow, Kendrick, Genesee, Lewiston, and Grangeville. DEQ also uses data from air quality monitors in Kamiah and Lapwai operated by the Nez Perce Tribe. As described in section 4.4, the Grangeville monitor experienced an air flow problem that resulted in the data from this monitor being deemed invalid for a period of time during the fall burn season, and the Kendrick and Potlatch monitors each experienced frequent communication problems during the fall burn season.

For evaluation purposes, this SMA has been separated into three topographically distinct regions that have each been assigned the air quality monitoring data most relevant to that area: for the Idaho County region, monitoring data from Grangeville; for the Nez Perce County region, monitoring data from Lewiston and Kendrick; and for the Latah County region, data from Genesee, Moscow, and Potlatch.

The Central SMA is topographically diverse with many subairsheds. High mountains characterize Latah, Clearwater, and Idaho Counties; valleys and steep canyons or drainages dominate Nez Perce County; and a centrally located highland agricultural area intersects all counties except Latah. Sophisticated smoke management is required to address the challenges created by localized weather conditions; the proximity of burning in relation to ISPs and small towns; and the necessary coordination with the Nez Perce Tribe, Washington Department of Ecology, Coeur d'Alene Tribe, and regional prescribed burners.

#### **4.6.3.1 Acres Burned**

Table 7 shows the acres burned during the winter, spring, and fall burn seasons for each crop type during the 2009–2011 burn seasons. A total of 20,606 acres were burned in the SMA during 2011, with the majority occurring during the fall burn season.

The only real significant change in crop composition from past years is the increase in acres of CRP that were burned. Much of this increase is the result of CRP lands going into production due to the expiration of CRP contracts; however, current high wheat prices have also caused some farmers to buy back CRP leases. DEQ saw a small increase in turf grass acres burned this year compared to last, which is primarily the result of the successful burning of several fields that were not accomplished last year due to weather constraints. Market decline has caused grass acres in the region to decrease considerably over the past few years, and at this point, turf grass is likely to remain fairly constant and is not likely to increase until the market improves.

Figure 9 shows the locations of fields burned during 2011: 272 fields totaling 20,606 acres were burned in this SMA during 2011, and 68 fields (25%) amounting to 5,426 acres (26%) were located within 3 miles of an ISP. In 2011, 74 growers burned fields within the CRB program in the SMA.

**Table 7. Summary of acres burned in the Central Smoke Management Area.**

Burn season and crop type	Acres burned		
	2009	2010	2011
<b>Winter<sup>a</sup></b>			
CRP	10	0	6
Cereal grain	0	290	0
Turf grass	0	0	0
Other crops	22	57	100
Subtotal	32	347	106
<b>Spring<sup>b</sup></b>			
CRP	113	171	99
Cereal grain	1,516	1,224	1,854
Turf grass	0	25	0
Other crops	67	48	31
Subtotal	1,696	1,468	1,984
<b>Fall<sup>c</sup></b>			
CRP	693	372	1,762
Cereal grain	11,876	14,632	12,026
Turf grass	4,457	3,776	4,164
Other crops	547	166	564
Subtotal	17,573	18,946	18,516
<b>Total</b>	<b>19,301</b>	<b>20,761</b>	<b>20,606</b>

a. Winter season included January 1–February 28 and November 7–December 31.

b. Spring season is March 1–June 30.

c. Fall season is July 1–November 6.

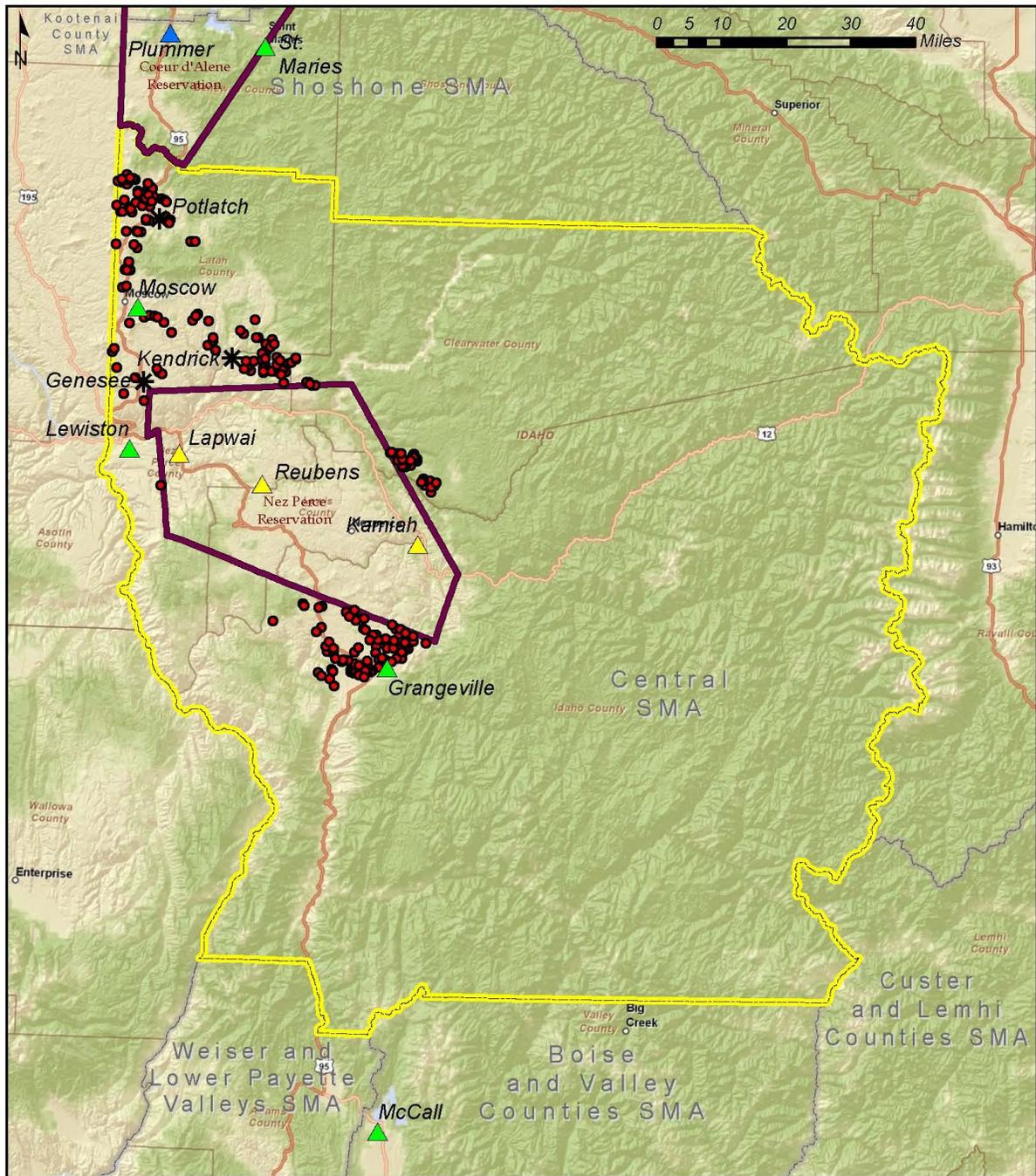


Figure 9. Location of 2011 burns in the Central Smoke Management Area.

#### 4.6.3.2 Daily Burn Decisions and Air Quality

Table 8 shows the summary of burn decisions for each county in the Central SMA for 2011. The most common reason for a no-burn decision was that no requests to burn were received. High fuel moisture was also a frequent reason for a no-burn decision in Latah and Idaho Counties, which is likely a result of La Niña weather patterns and associated periods of higher than normal precipitation. This same trend was not as apparent in Clearwater and Nez Perce Counties because these counties burn primarily turf grass, and the growers tend to attempt fewer burns on the early or late ends of the season when the risk of precipitation is higher.

Poor air quality was the reason behind a no-burn decision on four to seven different days in the Central SMA, depending on the county and the current requests to burn in each of those counties. These no-burn decisions due to air quality occurred during the end of August and beginning of September as the result of smoke impacts from regional wildfires burning in the Selway-Bitterroot Wilderness.

DEQ issued 51 burn days in at least one county in the Central SMA during 2011. Crop residue burning in 2011 was limited by a late start to the growing season, persistent poor atmospheric dispersion during the fall burn season, and frequent precipitation events. Nonetheless, DEQ was still able to issue enough burn days to allow growers to complete most or all of their desired burning.

**Table 8. Summary of burn decisions for the Central Smoke Management Area.**

County	Approved burn days	Days with no requests to burn <sup>a</sup>	No-burn days due to air quality	No-burn days due to meteorological conditions			Days with no burning for other reasons <sup>b</sup>
				Fuel moisture	Wind	Ventilation	
Latah	51	122	6	44	8	13	1
Clearwater	11	202	4	6	2	8	0
Lewis	0	228	0	0	0	1	0
Nez Perce	22	183	5	8	2	12	6
Idaho	41	115	7	55	11	10	6

a. This summary includes all burn decisions issued for 2011. The majority of the no-burn decisions due to no requests occurred outside the typical burn seasons (i.e., summer and winter).

b. Other reasons include a nearby funeral and waiting for a scheduled no school day.

Appendices E, F, and G contain a comparison of the acres burned versus the 1-hour, 4-hour, and 24-hour average PM<sub>2.5</sub> concentrations recorded and collected by DEQ monitors for the three subsections of the Central SMA. Only those weeks when burning occurred are included in the appendices.

#### 4.6.4 Southwest Idaho Smoke Management Area

The Southwest Idaho SMA includes all of Canyon, Ada, and Owyhee Counties and most of Elmore County (Figure 1). (The southeast portion of Elmore County is included in the Northern Magic Valley SMA.) Most of the crop residue burning activity occurred throughout Canyon County, northwest Owyhee County, and western Ada County, with lesser amounts in eastern Owyhee County. The primary crop burned was cereal grain stubble. Burning may occur year-

round, but the typical burn seasons in this SMA are spring (March through April) and fall (July through October). Two ambient air quality monitors that measure PM<sub>2.5</sub> are located in Nampa and Boise, and three ambient air quality monitors that measure ozone are located in Boise and Meridian.

The Southwest Idaho SMA covers 12,462 square miles and includes complex terrain in the northern foothills of Ada County and the uplands of southwestern Owyhee County. Most of the crop residue burning in the SMA is in the Snake River valley. The cooling effect of water in the Snake River and in several reservoirs has the potential to influence smoke dispersion and transport.

#### 4.6.4.1 Acres Burned

Table 9 shows the acres burned during the winter, spring, and fall burn seasons for each crop type during the 2009–2011 burn seasons. Figure 10 shows the locations of fields burned during 2011: 54 fields totaling 1,009 acres were burned in this SMA, and 33 fields (61%) amounting to 537 acres (53%) were located within 3 miles of an ISP. In 2011, 29 growers burned fields within the CRB program in the SMA.

**Table 9. Summary of acres burned in the Southwest Idaho Smoke Management Area.**

Burn season and crop type	Acres burned		
	2009	2010	2011
<b>Winter<sup>a</sup></b>			
Cereal grain	0	0	0
Other crops	10	20	0
Subtotal	10	20	0
<b>Spring<sup>b</sup></b>			
Cereal grain	41	22	72
Other crops	0	49	76
Subtotal	41	71	148
<b>Fall<sup>c</sup></b>			
Cereal grain	567	889	614
Other crops	743	611	247
Subtotal	1,310	1,500	861
<b>Total</b>	<b>1,361</b>	<b>1,591</b>	<b>1,009</b>

a. Winter season included January 1–February 28 and November 7–December 31.

b. Spring season is March 1–June 30.

c. Fall season is July 1–November 6.

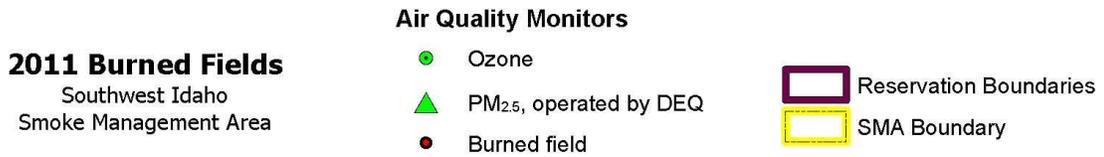
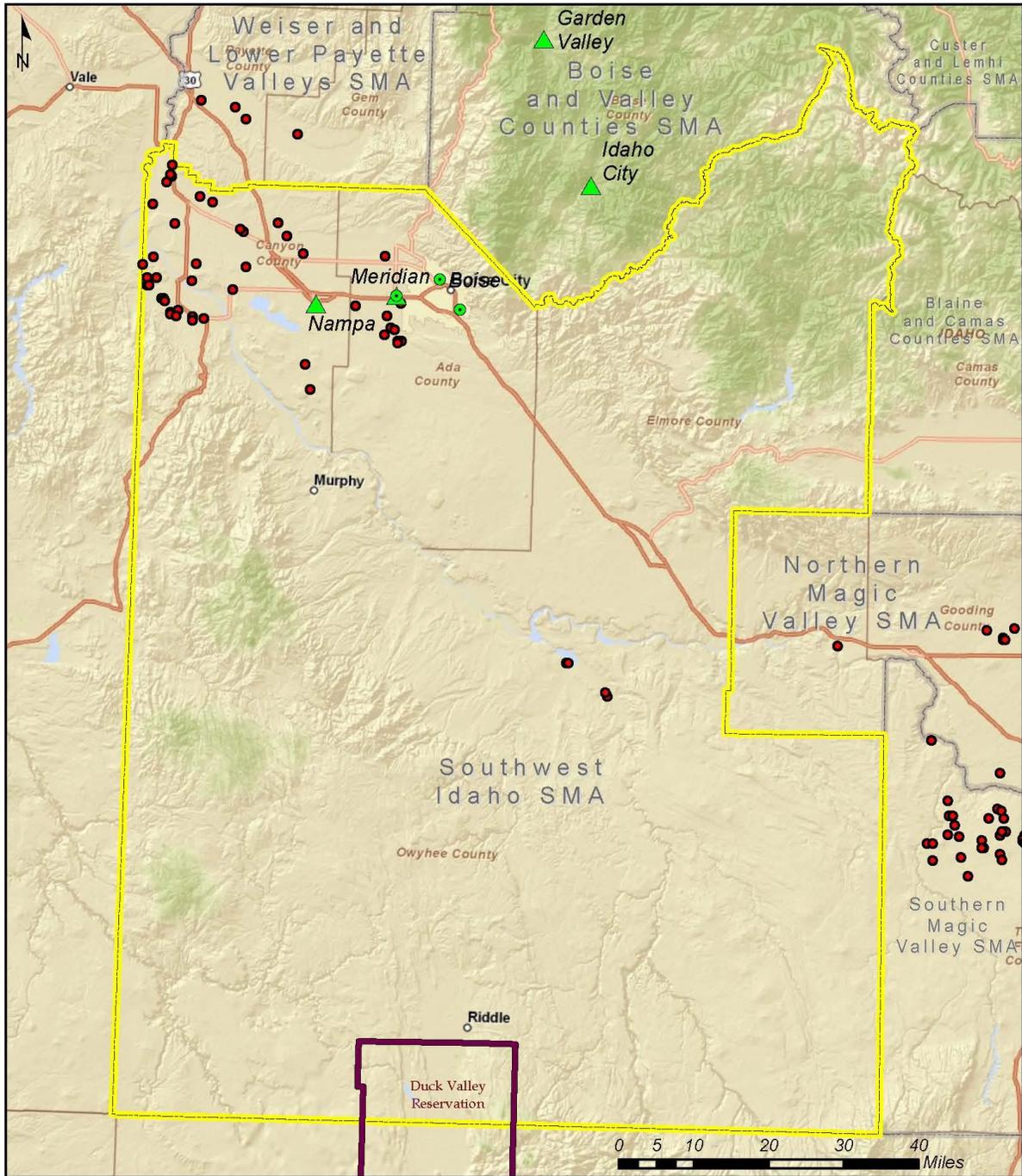


Figure 10. Location of 2011 burns in the Southwest Idaho Smoke Management Area.

#### 4.6.4.2 Daily Burn Decisions and Air Quality

Table 10 shows the summary of burn decisions for each county in the Southwest Idaho SMA for 2011. The most common reason for a no-burn decision was that no requests to burn were received. Poor air quality, fuel moisture, and unsuitable meteorological conditions were occasional reasons for a no-burn decision. On August 4, the no-burn decision was a result of a NWS-issued red-flag warning for lightning.

The growing season in this SMA was affected by unusually wet and cool weather during the late spring and early summer, which resulted in some growers being ready to burn later in the summer or fall than normal. Because of reduced atmospheric mixing and dispersion in the fall compared to summer, it was a challenge to find suitable burn days for all grower requests to burn. Nonetheless, DEQ accommodated most of the requests to burn. Most of the denied requests were those for August and early September when ozone concentrations were frequently above the PCL. Some of the growers who had been denied burn days remained in the program and were approved to burn at a later date. However, many growers who had been denied burn days used other means of crop residue disposal to meet their planting schedules.

**Table 10. Summary of burn decisions for the Southwest Idaho Smoke Management Area.**

County	Approved burn days	Days with no requests to burn <sup>a</sup>	No-burn days due to air quality	No-burn days due to meteorological conditions			Days with no burning for other reasons <sup>b</sup>
				Fuel moisture	Wind	Ventilation	
Ada	10	196	14	9	1	1	1
Canyon	14	181	28	2	3	0	1
Elmore	1	228	0	0	0	0	1
Owyhee	21	199	7	7	1	0	1

a. This summary includes all burn decisions issued for 2011. The majority of the no-burn decisions due to no requests occurred outside the typical burn seasons (i.e., summer and winter).

b. Other reasons include a NWS-issued red-flag warning.

Appendix H contains a comparison of the acres burned versus the 1-hour, 4-hour, and 24-hour average PM<sub>2.5</sub> concentrations and 8-hour ozone concentrations recorded and collected by DEQ monitors for the Southwest Idaho SMA. Only those weeks when burning occurred are included in Appendix H.

#### 4.6.5 Weiser and Lower Payette Valleys Smoke Management Area

The Weiser and Lower Payette Valleys SMA includes Adams, Washington, Payette, and Gem Counties (Figure 1). While a minimal amount of burning was conducted in Adams, Payette, and Gem counties, Washington County accounted for the majority of acres burned. The primary crop burned in the SMA was cereal grain stubble. Burning may occur year-round, but the typical burn seasons in the SMA are spring (March through April) and fall (July through October). An ambient air quality monitor that measures PM<sub>2.5</sub> is located in Weiser. The closest ambient ozone monitor is located in Meridian in the Southwest Idaho SMA.

The Weiser and Lower Payette Valleys SMA covers 3,820 square miles and includes a mixture of complex mountainous terrain and lowlands of the Snake River valley. The cooling effect of water in the Snake River has the potential to influence smoke dispersion and transport.

**4.6.5.1 Acres Burned**

Table 11 shows the acres burned during the winter, spring, and fall burn seasons for each crop type during the 2009–2011 burn seasons. Figure 11 shows the locations of fields burned during 2011: 41 fields totaling 973 acres were burned in this SMA, and 21 fields (51%) amounting to 461 acres (47%) were located within 3 miles of an ISP. In 2011, 15 growers burned fields within the CRB program in the SMA.

**Table 11. Summary of acres burned in the Weiser and Lower Payette Valleys Smoke Management Area.**

Burn season and crop type	Acres burned		
	2009	2010	2011
<b>Winter<sup>a</sup></b>			
Cereal grain	0	0	0
Other crops	23	0	0
Subtotal	23	0	0
<b>Spring<sup>b</sup></b>			
Cereal grain	383	93	143
Other crops	186	30	102
Subtotal	569	123	245
<b>Fall<sup>c</sup></b>			
Cereal grain	718	357	568
Other crops	44	124	160
Subtotal	762	481	728
<b>Total</b>	<b>1,354</b>	<b>604</b>	<b>973</b>

a. Winter season included January 1–February 28 and November 7–December 31.

b. Spring season is March 1–June 30.

c. Fall season is July 1–November 6.



#### 4.6.5.2 Daily Burn Decisions and Air Quality

Table 12 shows the summary of burn decisions for each county in the Weiser and Lower Payette Valleys SMA for 2011. The most common reason for a no-burn decision was that no requests to burn were received. Poor air quality was a reason for a no-burn decision on 14 days in Washington County.

The growing season in this SMA was affected by unusually wet and cool weather during the late spring and early summer, which resulted in some growers being ready to burn later in the summer or fall than normal. Because of reduced atmospheric mixing and dispersion in the fall compared to summer, it was a challenge to find suitable burn days for all grower requests to burn. Nonetheless, DEQ accommodated most of the requests to burn. Most of the denied requests were those for August and early September when ozone concentrations were frequently above the PCL. Some of the growers who had been denied burn days remained in the program and were approved to burn at a later date. However, many growers who had been denied burn days used other means of crop residue disposal to meet their planting schedules.

**Table 12. Summary of burn decisions for the Weiser and Lower Payette Valleys Smoke Management Area.**

County	Approved burn days	Days with no requests to burn <sup>a</sup>	No-burn days due to air quality	No-burn days due to meteorological conditions			Days with no burning for other reasons
				Fuel moisture	Wind	Ventilation	
Adams	0	229	0	0	0	0	0
Gem	1	228	0	0	0	0	0
Payette	5	224	0	0	0	0	0
Washington	21	194	14	1	0	0	0

a. This summary includes all burn decisions issued for 2011. The majority of the no-burn decisions due to requests occurred outside the typical burn seasons (i.e., summer and winter).

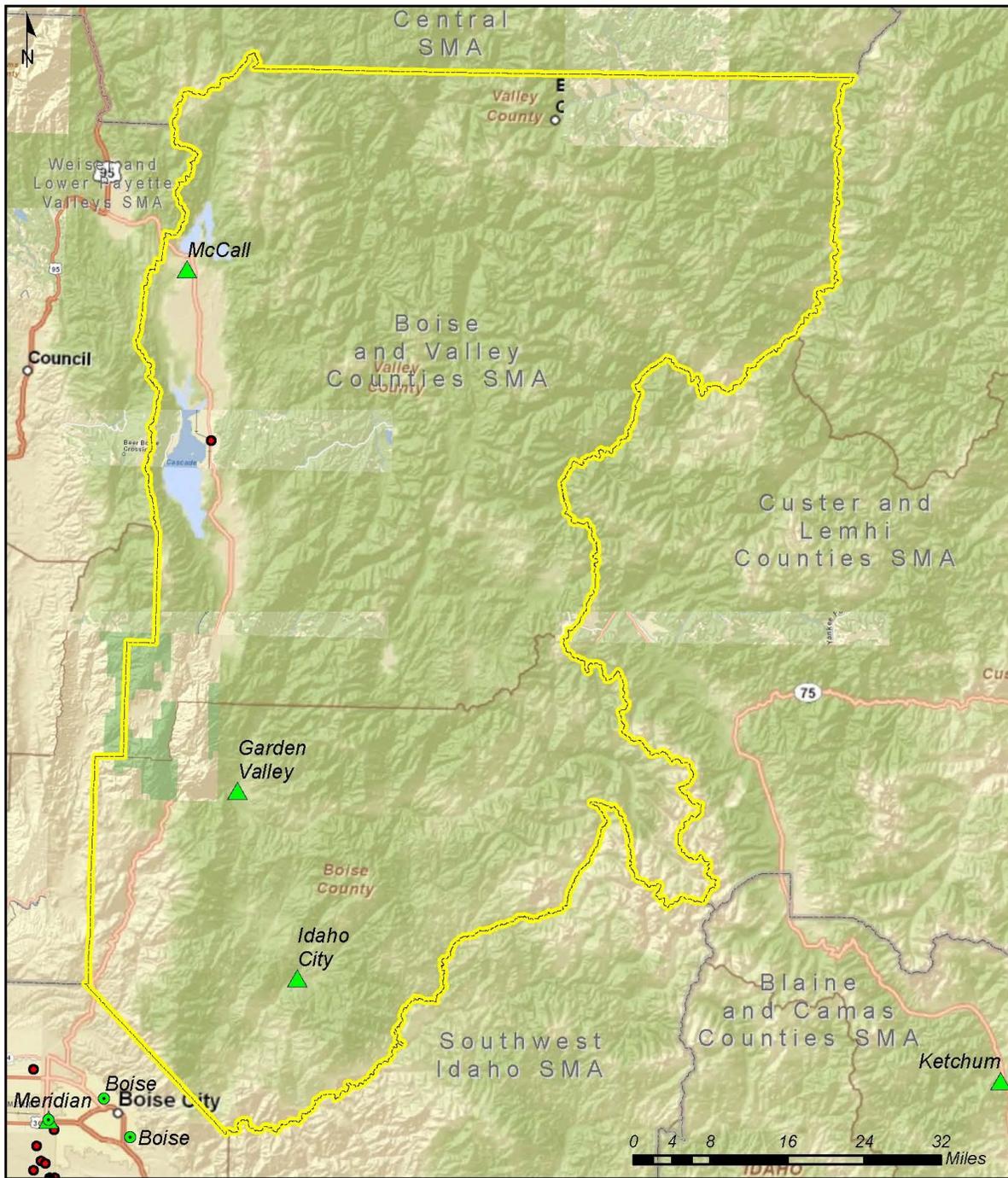
Appendix I contains a comparison of the acres burned versus the 1-hour, 4-hour, and 24-hour average PM<sub>2.5</sub> concentrations and 8-hour ozone concentrations recorded and collected by DEQ monitors for the Weiser and Lower Payette Valleys SMA (ozone monitoring data is from DEQ monitors in the Treasure Valley). Only those weeks when burning occurred are included in Appendix I.

#### 4.6.6 Boise and Valley Counties Smoke Management Area

The Boise and Valley Counties SMA consists of Boise and Valley Counties (Figure 1). The SMA covers 5,641 square miles and consists of mountain and valley terrain. Lake Cascade and Lake Payette are central features of the region and have the potential to affect smoke dispersion and transport due to the cooling effect of the water. The agricultural activity in the area is mainly pasture cultivation. Ambient air quality monitors that measure PM<sub>2.5</sub> are located in Idaho City, Garden Valley, and McCall. The nearest ozone monitors are in the Treasure Valley.

##### 4.6.6.1 Acres Burned

For the 2011 burn season, 36 acres (one field) were burned in this SMA (Figure 12). The field was not within 3 miles of an ISP. Just 5 acres of crop residue burning occurred in this SMA from 2008 through 2009. As a result of the minimal amount of burning, there is no analysis of crop composition trends or summary of burn decisions for this SMA.



**2011 Burned Fields**

Boise and Valley Counties  
Smoke Management Area

**Air Quality Monitors**

- Ozone
- ▲ PM<sub>2.5</sub>, operated by DEQ

- Burned field
- SMA Boundary

**Figure 12. Location of 2011 burns in the Boise and Valley Counties Smoke Management Area.**

#### **4.6.6.2 Daily Burn Decisions and Air Quality**

This SMA contains little agricultural land, and requests to burn crop residue are infrequent. The most common reason for a no-burn decision was that no requests to burn were received.

Appendix J contains a comparison of the acres burned versus the 1-hour, 4-hour, and 24-hour average PM<sub>2.5</sub> concentrations recorded and collected by DEQ monitors for the Boise and Valley Counties SMA. Only those weeks when burning occurred are included in Appendix J.

#### **4.6.7 Blaine and Camas Counties Smoke Management Area**

The Blaine and Camas Counties SMA consists of Blaine and Camas Counties with the exception of the southern panhandle of Blaine County, which is included in the Northern Magic Valley SMA (Figure 1). During 2011, crop residue burning was conducted at four fields near Carey. Burning may occur year-round, but the typical burn season is fall. One PM<sub>2.5</sub> air quality monitor is located in Ketchum, and an ozone monitor operated by the National Park Service is located at Craters of the Moon National Monument.

The Blaine and Camas Counties SMA covers 3,740 square miles. The SMA includes high-elevation prairie, foothills, and mountains. The climate of this area tends to be cooler and moister than some of the surrounding areas, creating the potential for more frequent unsuitable burning conditions. Several lakes and reservoirs have the potential to affect smoke dispersion due to the cooling effect of the water.

##### **4.6.7.1 Acres Burned**

Table 13 shows the acres burned during the winter, spring, and fall burn seasons for each crop type during the 2009–2011 burn seasons. Figure 13 shows the locations of fields burned during 2011: four fields totaling 257 acres were burned in this SMA, and 3 fields (75%) amounting to 227 acres (88%) were located within 3 miles of an ISP. In 2011, two growers burned fields within the CRB program in the SMA.

**Table 13. Summary of acres burned in the Blaine and Camas Counties Smoke Management Area.**

Burn season and crop type	Acres burned		
	2009	2010	2011
<b>Winter<sup>a</sup></b>			
Cereal grain	0	0	0
Other crops	0	0	0
Subtotal	0	0	0
<b>Spring<sup>b</sup></b>			
Cereal grain	0	0	0
Other crops	0	1	0
Subtotal	0	1	0
<b>Fall<sup>c</sup></b>			
Cereal grain	235	643	257
Other crops	0	0	0
Subtotal	235	643	257
<b>Total</b>	<b>235</b>	<b>644</b>	<b>257</b>

a. Winter season included January 1–February 28 and November 7–December 31.

b. Spring season is March 1–June 30.

c. Fall season is July 1–November 6.

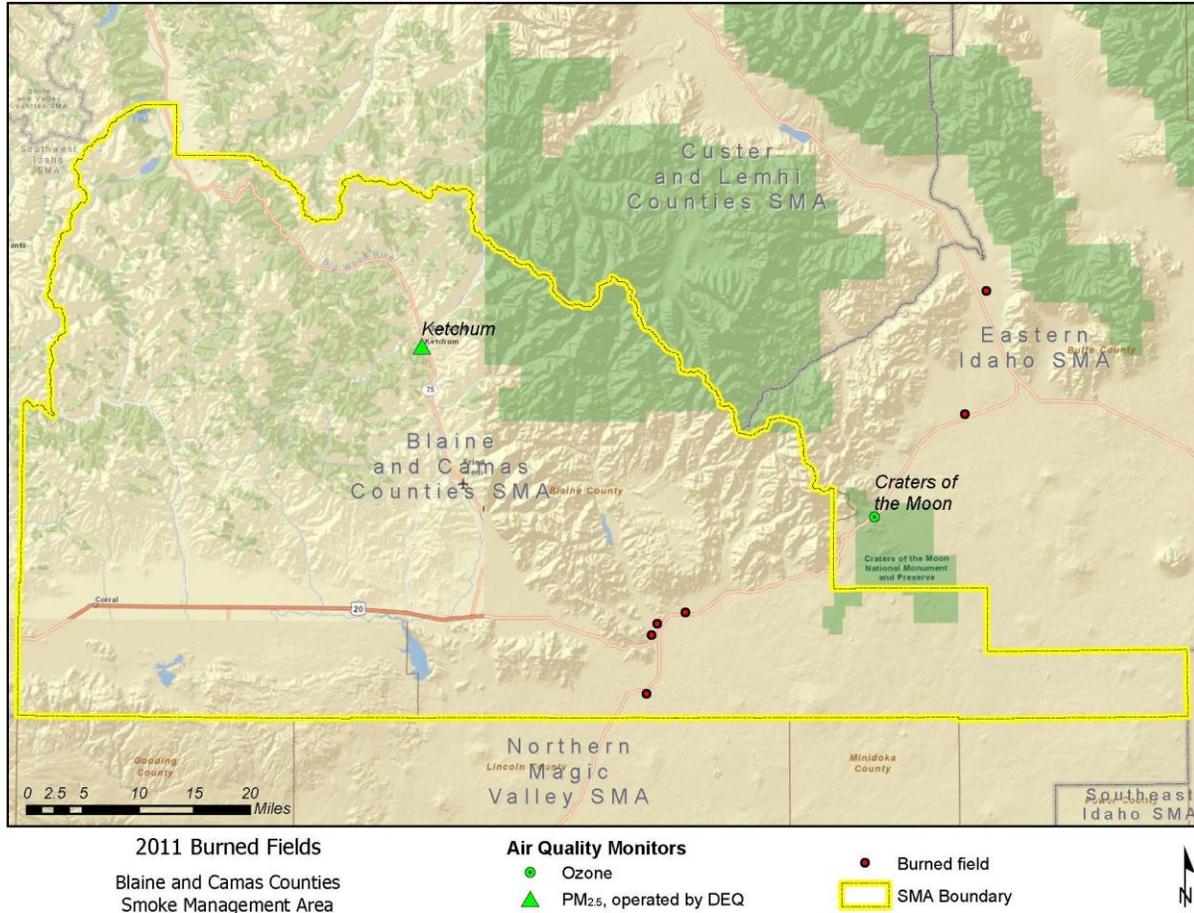


Figure 13. Location of 2011 burns in the Blaine and Camas Counties Smoke Management Area.

**4.6.7.2 Daily Burn Decisions and Air Quality**

Table 14 shows the summary of burn decisions for the two counties in this SMA for 2011. The most common reason for a no-burn decision was that no requests to burn were received. Forecasted ozone concentrations above the PCL were the reason for no-burn decisions on 5 days in Blaine County, while fuel moisture was cited once as a reason for a no-burn decision. (In Table 14, each day listed as no-burn due to air quality was no-burn due to forecasted ozone concentrations.)

Table 14. Summary of burn decisions for the Blaine and Camas Counties Smoke Management Area.

County	Approved burn days	Days with no requests to burn <sup>a</sup>	No-burn days due to air quality	No-burn days due to meteorological conditions			Days with no burning for other reasons
				Fuel moisture	Wind	Ventilation	
Blaine	3	221	5	0	0	0	0
Camas	2	226	0	1	0	0	0

a. This summary includes all burn decisions issued for 2011. The majority of the no-burn decisions due to requests occurred outside the typical burn seasons (i.e., summer and winter).

Appendix K contains a comparison of the acres burned versus the 1-hour, 4-hour, and 24-hour average PM<sub>2.5</sub> concentrations recorded and collected by DEQ monitors and 8-hour ozone concentrations recorded and collected by the National Park Service for the Blaine and Camas Counties SMA. Only those weeks when burning occurred are included in Appendix K.

#### **4.6.8 Southern Magic Valley Smoke Management Area**

The Southern Magic Valley SMA consists of Twin Falls and Cassia Counties (Figure 1). Burning occurred throughout both counties. The primary crop burned was cereal grain stubble. Burning may occur year-round, but the typical burn seasons are spring (March through May) and fall (July through October). The Southern Magic Valley SMA has one PM<sub>2.5</sub> air quality monitor located in Twin Falls and ozone monitors operated by the National Park Service at City of Rocks National Reserve and Craters of the Moon National Monument. Additionally, a PM<sub>2.5</sub> monitor located in Paul (in the Northern Magic Valley SMA) is within the relevant vicinity of portions of this SMA and is used in the burn decision process.

The Southern Magic Valley SMA covers 4,508 square miles and includes mountains and valleys in the south and the Snake River valley in the north. The area is somewhat arid and often experiences windy conditions. The cooling effect of water in the Snake River and several water storage reservoirs has the potential to influence smoke dispersion and transport.

##### **4.6.8.1 Acres Burned**

Table 15 shows the acres burned during the winter, spring, and fall burn seasons for each crop type during the 2009–2011 burn seasons. Figure 14 shows the locations of fields burned during 2011: 114 fields totaling 5,102 acres were burned in this SMA, a substantial increase in acres burned from 2010 and 2009. Out of the total burned, 58 fields (51%) and 2,051 acres (40%) were located within 3 miles of an ISP. In 2011, 48 growers burned fields within the CRB program in the SMA.

**Table 15. Summary of acres burned in the Southern Magic Valley Smoke Management Area.**

Burn season and crop type	Acres burned		
	2009	2010	2011
<b>Winter<sup>a</sup></b>			
Cereal grain	0	0	0
Other crops	0	0	0
Subtotal	0	0	0
<b>Spring<sup>b</sup></b>			
Cereal grain	365	71	381
Other crops	23	56	61
Subtotal	388	127	442
<b>Fall<sup>c</sup></b>			
Cereal grain	2,047	2,603	4,495
Other crops	151	52	165
Subtotal	2,198	2,655	4,660
<b>Total</b>	<b>2,586</b>	<b>2,782</b>	<b>5,102</b>

a. Winter season included January 1–February 28 and November 7–December 31.

b. Spring season is March 1–June 30.

c. Fall season is July 1–November 6.

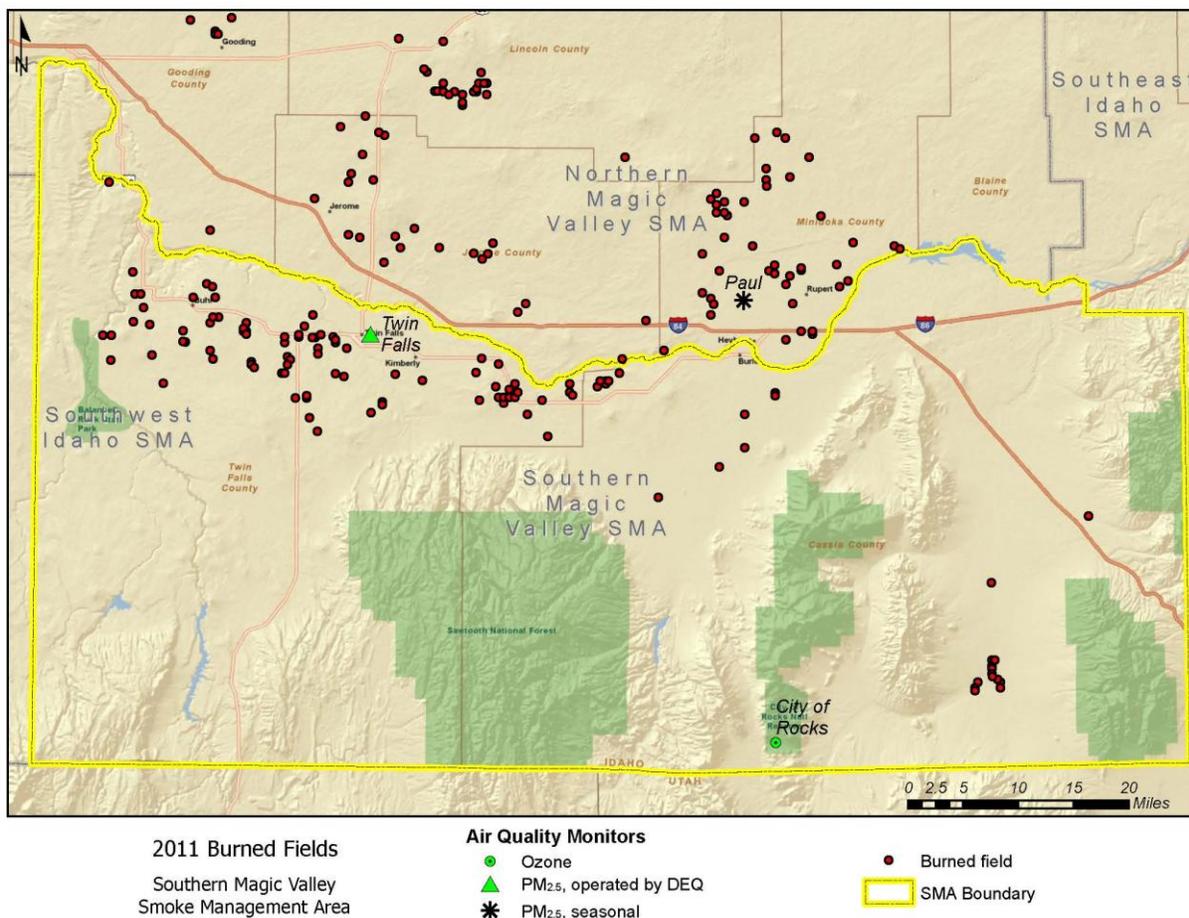


Figure 14. Location of 2011 burns in the Southern Magic Valley Smoke Management Area.

**4.6.8.2 Daily Burn Decisions and Air Quality**

Table 16 shows the summary of 2011 burn decisions for the two counties in the Southern Magic Valley SMA. The most common reason for a no-burn decision was that no requests to burn were received. Fuel moisture and unsuitable meteorological conditions were occasional reasons for no-burn decisions. Forecasted ozone concentrations above the PCL were the reason for no-burn decisions on 3 days in Cassia County and 8 days in Twin Falls County. (In Table 16, each day listed as no-burn due to air quality was no-burn due to forecasted ozone concentrations.)

The growing season in this SMA was affected by unusually wet and cool weather during the late spring and early summer, which resulted in some growers being ready to burn later in the summer or fall than normal. Because of reduced atmospheric mixing and dispersion in the fall compared to summer, it was a challenge to find suitable burn days for all grower requests to burn. Nonetheless, DEQ accommodated most of the requests to burn. Most of the denied requests were those for August and early September when ozone concentrations were frequently above the PCL. Some of the growers who had been denied burn days remained in the program and were approved to burn at a later date. However, many growers who had been denied burn days used other means of crop residue disposal to meet their planting schedules.

**Table 16. Summary of burn decisions for the Southern Magic Valley Smoke Management Area.**

County	Approved burn days	Days with no requests to burn <sup>a</sup>	No-burn days due to air quality	No-burn days due to meteorological conditions			Days with no burning for other reasons
				Fuel moisture	Wind	Ventilation	
Cassia	20	193	3	9	3	0	1
Twin Falls	49	160	8	11	1	0	0

a. This summary includes all burn decisions issued for 2011. The majority of the no-burn decisions due to no requests occurred outside the typical burn seasons (i.e., summer and winter).

Appendix L contains a comparison of the acres burned versus the 1-hour, 4-hour, and 24-hour average PM<sub>2.5</sub> concentrations recorded and collected by DEQ monitors and 8-hour ozone concentrations recorded and collected by the National Park Service for the Southern Magic Valley SMA. Only those weeks when burning occurred are included in Appendix L.

#### 4.6.9 Northern Magic Valley Smoke Management Area

The Northern Magic Valley SMA includes southeast Elmore County; all of Gooding, Lincoln, Jerome, and Minidoka Counties; and the Blaine County panhandle (Figure 1). Burning was conducted in all counties in the SMA except for the panhandle of Blaine County. The primary crop burned was cereal grain stubble. Burning may occur year-round, but the typical burn seasons are spring (March through April) and fall (July through October). The Northern Magic Valley SMA has one PM<sub>2.5</sub> air quality monitor located in the town of Paul. Additionally, a PM<sub>2.5</sub> monitor located in Twin Falls (in the Southern Magic Valley SMA) and ozone monitors operated by the National Park Service at Craters of the Moon National Monument and City of Rocks National Reserve are in the relevant vicinity of portions of this SMA and are used in the burn decision process.

The Northern Magic Valley SMA covers 2,542 square miles. The topography of the area is dominated by the Snake River valley in the south, foothills in the north, and lava beds in the northeast. The cooling effect of water in the Snake River and several reservoirs has the potential to affect smoke dispersion and transport.

##### 4.6.9.1 Acres Burned

Table 17 shows the acres burned during the winter, spring, and fall burn seasons for each crop type during the 2009–2011 burn seasons. Figure 15 shows the locations of fields burned during 2011: 103 fields totaling 6,451 acres were burned in this SMA, a large increase in acres burned from 2010 and 2009. Out of the total burned, 43 fields (42%) and 2,105 acres (33%) were located within 3 miles of an ISP. In 2011, 46 growers burned fields within the CRB program in the SMA.

**Table 17. Summary of acres burned in the Northern Magic Valley Smoke Management Area.**

Burn season and crop type	Acres burned		
	2009	2010	2011
<b>Winter<sup>a</sup></b>			
CRP	23	0	0
Cereal grain	0	0	0
Other crops	0	0	0
Subtotal	23	0	0
<b>Spring<sup>b</sup></b>			
CRP	30	0	62
Cereal grain	0	254	428
Other crops	0	0	0
Subtotal	30	254	490
<b>Fall<sup>c</sup></b>			
CRP	0	568	193
Cereal grain	4,268	3,535	5,537
Other crops	190	273	231
Subtotal	4,458	4,376	5,961
<b>Total</b>	<b>4,511</b>	<b>4,630</b>	<b>6,451</b>

a. Winter season included January 1–February 28 and November 7–December 31.

b. Spring season is March 1–June 30.

c. Fall season is July 1–November 6.

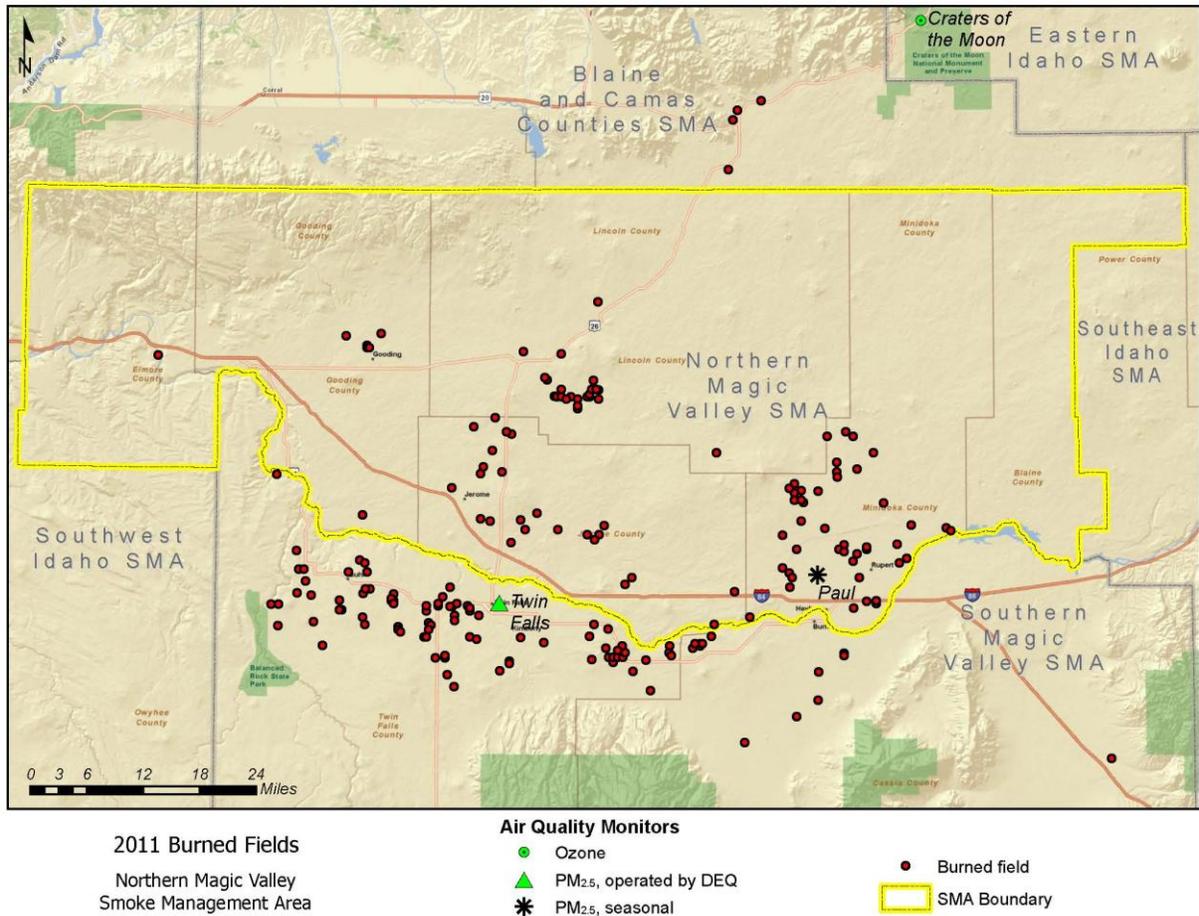


Figure 15. Location of 2011 burns in the Northern Magic Valley Smoke Management Area.

#### 4.6.9.2 Daily Burn Decisions and Air Quality

Table 18 shows the summary of 2011 burn decisions for each county in the Northern Magic Valley SMA. The most common reason for a no-burn decision was that no requests to burn were received. Fuel moisture and unsuitable meteorological conditions were occasional reasons for no-burn decisions. Forecasted ozone concentrations above the PCL were the reason for no-burn decisions on 6 to 7 days in each county. Other reasons for no-burn decisions were NWS-issued red-flag warnings on August 4 in Gooding County and September 12 in Lincoln and Minidoka Counties.

The growing season in this SMA was affected by unusually wet and cool weather during the late spring and early summer, which resulted in some growers being ready to burn later in the summer or fall than normal. Because of reduced atmospheric mixing and dispersion in the fall compared to summer, it was a challenge to find suitable burn days for all grower requests to burn. Nonetheless, DEQ accommodated most of the requests to burn. Most of the denied requests were those for August and early September when ozone concentrations were frequently above the PCL. Some of the growers who had been denied burn days remained in the program and were approved to burn at a later date. However, many growers who had been denied burn days used other means of crop residue disposal to meet their planting schedules.

**Table 18. Summary of burn decisions for the Northern Magic Valley Smoke Management Area.**

County	Approved burn days	Days with no requests to burn <sup>a</sup>	No-burn days due to air quality	No-burn days due to meteorological conditions			Days with no burning for other reasons <sup>b</sup>
				Fuel moisture	Wind	Ventilation	
Gooding	7	212	8	0	1	0	1
Jerome	15	205	7	1	1	0	0
Lincoln	13	208	6	1	0	0	1
Minidoka	34	179	7	8	0	0	1

a. This summary includes all burn decisions issued for 2011. The majority of the no-burn decisions due to no requests occurred outside the typical burn seasons (i.e., summer and winter).

b. Other reasons include NWS-issued red-flag warnings.

Appendix M contains a comparison of the acres burned versus the 1-hour, 4-hour, and 24-hour average PM<sub>2.5</sub> concentrations recorded and collected by DEQ monitors and 8-hour ozone concentrations recorded and collected by the National Park Service for the Northern Magic Valley SMA. Only those weeks when burning occurred are included in Appendix M.

#### **4.6.10 Southeast Idaho Smoke Management Area**

The Southeast Idaho SMA includes Bingham, Power, Bannock, Caribou, Oneida, Franklin, and Bear Lake Counties (Figure 1). Burning was conducted in each of these counties during the year; however, Franklin and Bear Lake Counties had only minimal burning. The primary crops burned in the SMA were cereal grain stubble and CRP. Burning may occur year-round, but the typical burn seasons in the SMA are spring (April through May) and fall (July through October). Ambient air quality monitors that measure PM<sub>2.5</sub> are located in Pocatello and Soda Springs. Additionally, ozone monitors operated by the National Park Service at Craters of the Moon National Monument and City of Rocks National Reserve and an ozone monitor operated by the Utah Department of Environmental Quality at Logan are in the relevant vicinity of portions of this SMA and are used in the burn decision process.

The Southeast Idaho SMA covers 9,428 square miles. The area is topographically complex with the exception of the relatively flat lowlands of the Snake River plain. The mountainous terrain, with its ridges and valleys, can strongly influence wind flow patterns and affect smoke dispersion. Two large water supply reservoirs in the region and the Snake River can also influence smoke dispersion and transport due to the cooling effect of the water.

##### **4.6.10.1 Acres Burned**

Table 19 shows the acres burned during the winter, spring, and fall burn seasons for each crop type during the 2009–2011 burn seasons. Figure 16 shows the locations of fields burned during 2011: 131 fields totaling 13,187 acres were burned in this SMA, and 36 fields (27%) and 3,361 acres (25%) were located within 3 miles of an ISP. In 2011, 57 growers burned fields within the CRB program in the SMA.

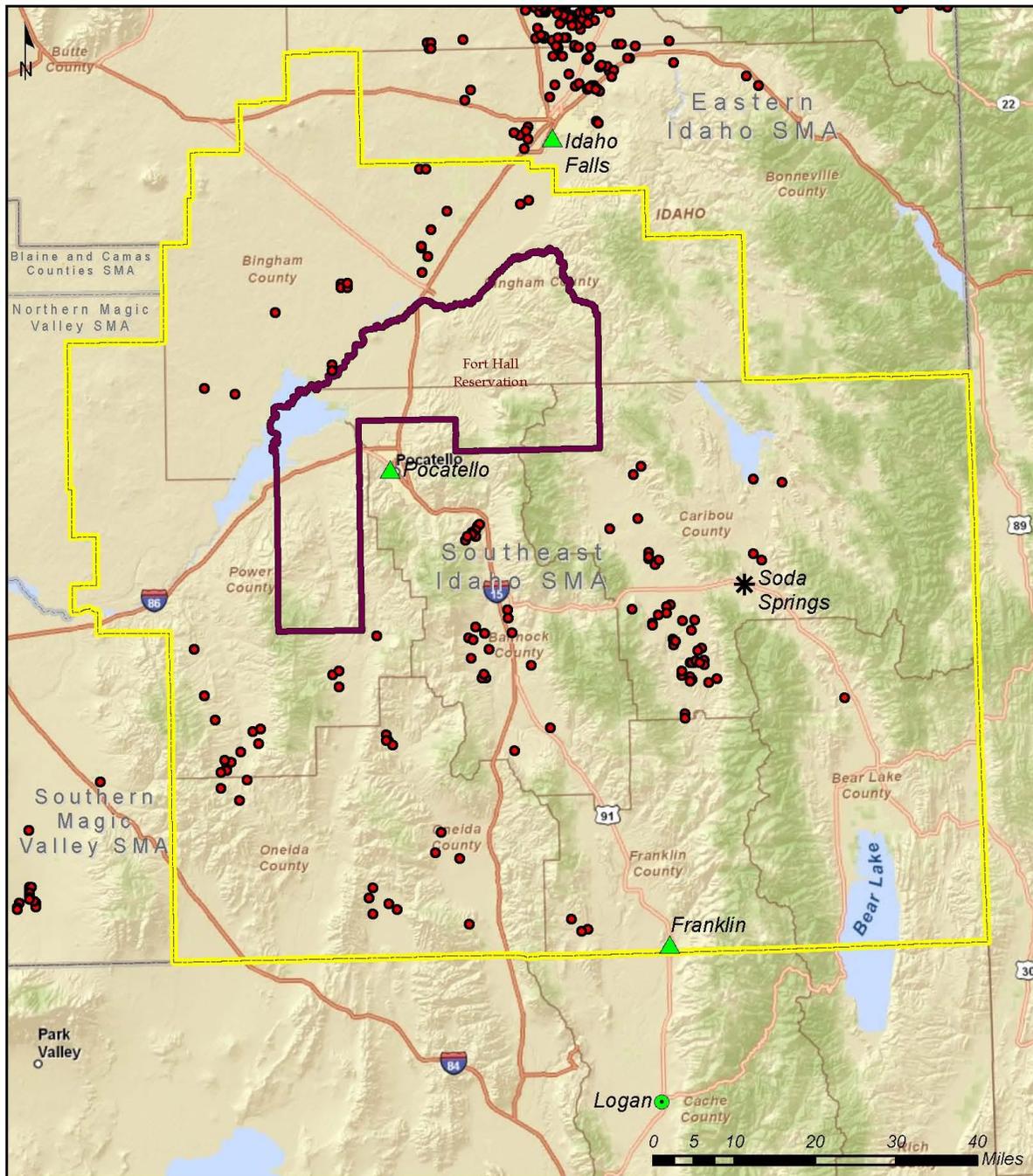
**Table 19. Summary of acres burned in the Southeast Idaho Smoke Management Area.**

Burn season and crop type	Acres burned		
	2009	2010	2011
<b>Winter<sup>a</sup></b>			
CRP	1,532	0	<1
Cereal grain	620	0	28
Other crops	35	0	0
Subtotal	2,187	0	29
<b>Spring<sup>b</sup></b>			
CRP	0	286	2,215
Cereal grain	62	1,289	396
Other crops	22	4	0
Subtotal	84	1,579	2,611
<b>Fall<sup>c</sup></b>			
CRP	179	3,891	4,395
Cereal grain	6,131	8,270	6,152
Other crops	15	43	0
Subtotal	6,325	12,204	10,547
<b>Total</b>	<b>8,596</b>	<b>13,783</b>	<b>13,187</b>

a. Winter season included January 1–February 28 and November 7–December 31.

b. Spring season is March 1–June 30.

c. Fall season is July 1–November 6.



**2011 Burned Fields**  
Southeast Idaho  
Smoke Management Area

**Air Quality Monitors**

- Ozone
- ▲ PM<sub>2.5</sub>, operated by DEQ
- \* PM<sub>2.5</sub>, seasonal
- Burned field
- ▭ Reservation Boundaries
- ▭ SMA Boundary

Figure 16. Location of 2011 burns in the Southeast Idaho Smoke Management Area.

#### 4.6.10.2 Daily Burn Decisions and Air Quality

Table 20 shows the summary of 2011 burn decisions for each county in the Southeast Idaho SMA. The most common reason for a no-burn decision was that no requests to burn were received. Fuel moisture and unsuitable meteorological conditions were occasional reasons for a no-burn decision. Forecasted ozone concentrations above the PCL were the reason for no-burn decisions 5 to 7 days in Bannock, Bingham, and Oneida Counties. Other reasons for no-burn decisions were a local fire agency burn ban on September 1 in Bingham County and NWS-issued red-flag warnings on September 12 in Bingham and Caribou Counties and September 14 in Caribou County.

The growing season in this SMA was affected by unusually wet and cool weather during the late spring and early summer, which resulted in some growers being ready to burn later in the summer or fall than normal. Because of reduced atmospheric mixing and dispersion in the fall compared to the summer, it was a challenge to find suitable burn days for all grower requests to burn. Nonetheless, DEQ accommodated most of the requests to burn. The denied requests generally consisted of those for late fall when cold, wet weather brought an end to the burn season and those for August and early September when ozone concentrations were frequently above the PCL. Some of the growers who had been denied burn days remained in the program and were approved to burn at a later date. However, many of these growers who had been denied burn days used other means of crop residue disposal to meet their planting schedules.

**Table 20. Summary of burn decisions for the Southeast Idaho Smoke Management Area.**

County	Approved burn days	Days with no requests to burn <sup>a</sup>	No-burn days due to air quality	No-burn days due to meteorological conditions			Days with no burning for other reasons <sup>b</sup>
				Fuel moisture	Wind	Ventilation	
Bannock	23	197	6	3	0	0	0
Bear Lake	1	224	0	4	0	0	0
Bingham	13	205	7	1	0	0	2
Caribou	27	196	0	3	1	0	2
Franklin	3	226	0	0	0	0	0
Oneida	28	192	5	3	0	0	0
Power	20	203	0	6	0	0	0

a. This summary includes all burn decisions issued for 2011. The majority of the no-burn decisions due to no requests occurred outside the typical burn seasons (i.e., summer and winter).

b. Other reasons include a local fire agency burn ban and NWS-issued red-flag warnings.

Appendix N contains a comparison of the acres burned versus the 1-hour, 4-hour, and 24-hour average PM<sub>2.5</sub> concentrations recorded and collected by DEQ monitors and 8-hour ozone concentrations recorded and collected by the National Park Service and Utah DEQ for the Southeast Idaho SMA. Only those weeks when burning occurred are included in Appendix N.

#### 4.6.11 Eastern Idaho Smoke Management Area

The Eastern Idaho SMA includes Clark, Fremont, Butte, Jefferson, Madison, Teton, and Bonneville Counties (Figure 1). Burning was mainly conducted in Jefferson and Bonneville Counties. The only crop burned was cereal grain stubble. Burning may occur year-round, but the

typical burn seasons are spring (April through May) and fall (August through October). Two ambient PM<sub>2.5</sub> monitors are located in the Eastern Idaho SMA, one in Rexburg and one in Idaho Falls. Additionally, ozone monitors operated by the National Park Service at Craters of the Moon National Monument and Yellowstone National Park are within the relevant vicinity and are used in the burn decision process.

The Eastern Idaho SMA covers 9,826 square miles. The topography of the area consists of mountains and valleys to the west, north, and east. The large central area of the SMA consists of the Snake River valley and is relatively flat. The cooling effect of water in the Snake River, as well as several smaller waterways and reservoirs, has the potential to influence smoke dispersion and transport.

#### 4.6.11.1 Acres Burned

Table 21 shows the acres burned during the winter, spring, and fall burn seasons for each crop type during the 2009–2011 burn seasons. Figure 17 shows the locations of fields burned during 2011: 258 fields totaling 13,617 acres were burned in the SMA, and 144 fields (56%) and 6,418 acres (47%) were located within 3 miles of an ISP. In 2011, 74 growers burned fields within the CRB program in the SMA.

**Table 21. Summary of acres burned in the Eastern Idaho Smoke Management Area.**

Burn season and crop type	Acres burned		
	2009	2010	2011
<b>Winter<sup>a</sup></b>			
CRP	39	0	0
Cereal grain	354	0	0
Other crops	0	0	0
Subtotal	393	0	0
<b>Spring<sup>b</sup></b>			
CRP	0	0	0
Cereal grain	1,364	1,642	1,908
Other crops	0	0	0
Subtotal	1,364	1,642	1,908
<b>Fall<sup>c</sup></b>			
CRP	0	640	0
Cereal grain	9,867	14,419	11,709
Other crops	41	42	0
Subtotal	9,908	15,101	11,709
<b>Total</b>	<b>11,665</b>	<b>16,743</b>	<b>13,617</b>

a. Winter season included January 1–February 28 and November 7–December 31.

b. Spring season is March 1–June 30.

c. Fall season is July 1–November 6.

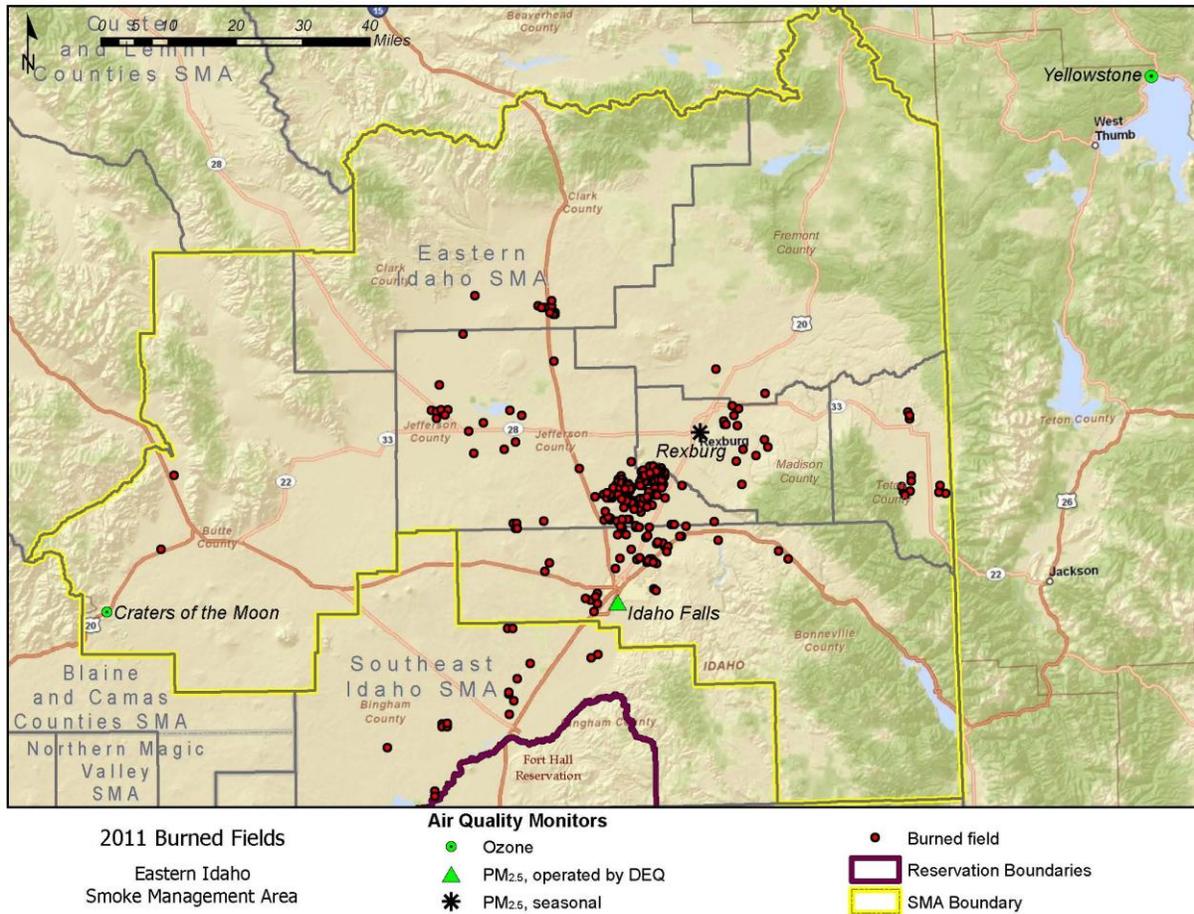


Figure 17. Location of 2011 burns in the Eastern Idaho Smoke Management Area.

#### 4.6.11.2 Daily Burn Decisions and Air Quality

Table 22 shows the summary of 2011 burn decisions for each county in the Eastern Idaho SMA. The most common reason for a no-burn decision was that no requests to burn were received. Fuel moisture and unsuitable meteorological conditions were occasional reasons for a no-burn decision. Forecasted ozone concentrations above the PCL were the reason for no-burn decisions up to 5 days in two of the counties in the SMA. (In Table 22, each day listed as no-burn due to air quality was no-burn due to forecasted ozone concentrations.) Another reason for no-burn decisions was NWS-issued red-flag warnings on September 12 in Butte, Clark, Jefferson, and Bonneville Counties and September 14 in Jefferson, Madison, and Bonneville Counties.

The growing season in this SMA was affected by unusually wet and cool weather during the late spring and early summer, which resulted in some growers being ready to burn later in the summer or fall than normal. Because of reduced atmospheric mixing and dispersion in the fall compared to summer, it was a challenge to find suitable burn days for all grower requests to burn. Nonetheless, DEQ accommodated most of the requests to burn. The denied requests generally consisted of those for late fall when cold, wet weather brought an end to the burn season and those for August and early September when ozone concentrations were frequently above the PCL. Some of the growers who had been denied burn days remained in the program

and were approved to burn at a later date. However, many of these growers who had been denied burn days used other means of crop residue disposal to meet their planting schedules. Also, some unfulfilled requests to burn were for areas near ISPs that required specific wind conditions that did not occur within the grower's time frame.

**Table 22. Summary of burn decisions for the Eastern Idaho Smoke Management Area.**

County	Approved burn days	Days with no requests to burn <sup>a</sup>	No-burn days due to air quality	No-burn days due to meteorological conditions			Days with no burning for other reasons <sup>b</sup>
				Fuel moisture	Wind	Ventilation	
Butte	2	223	3	0	0	0	1
Clark	10	213	4	0	1	0	1
Fremont	4	225	0	0	0	0	0
Jefferson	30	179	5	11	2	0	2
Madison	9	218	1	0	0	0	1
Bonneville	23	188	5	10	1	0	2
Teton	5	222	1	1	0	0	0

a. This summary includes all burn decisions issued for 2011. The majority of the no-burn decisions due to no requests occurred outside the typical burn seasons (i.e., summer and winter).

b. Other reasons include NWS-issued red-flag warnings.

Appendix O contains a comparison of the acres burned versus the 1-hour, 4-hour, and 24-hour average PM<sub>2.5</sub> concentrations recorded and collected by DEQ monitors and 8-hour ozone concentrations recorded and collected by the National Park Service for the Eastern Idaho SMA. Only those weeks when burning occurred are included in Appendix O.

## 5. Recommendations to the CRB Advisory Committee and the Department's Decision

As DEQ continues to evaluate the implementation and operation of the CRB program, DEQ persistently seeks ways to operate the program more effectively and efficiently without decreasing protection of human health. In the 2010 CRB program annual report, DEQ committed to evaluate two issues and present recommendations to the CRB Advisory Committee in spring 2012. These recommendations fulfill that commitment:

- **Weekend and holiday burning**—During the 2011 Advisory Committee meeting, DEQ committed to evaluate the implications of allowing burning on weekends and holidays. DEQ is currently prohibited from approving crop residue burning on weekends and holidays per existing rule:

**Burning Prohibitions.** Burning of crop residue shall not be conducted on weekends, federal or state holidays, or after sunset or before sunrise (IDAPA 58.01.01.622.01.a).

The following is a summary of the evaluation:

- Southern Idaho growers have historically burned on the weekends and holidays prior to the DEQ program. Many southern Idaho growers are “weekend farmers,” and they can only burn on the weekend without taking time off from their regular jobs.

- Schools would not be considered ISPs on weekends and some holidays. There are several fields very near schools that can only be burned when school is out.
- Frequently, either due to poor dispersion or precipitation in the fall, there have been times when the only good burn days occurred on weekends.
- Allowing burning on the weekends and holidays would require substantial additional DEQ resources.
- The historic practice of not burning on weekends and holidays was a concession of the growers to the public in North Idaho.

**Recommendation: Enter into negotiated rulemaking to modify the restriction of burning on weekends and holiday.**

- **Ozone program concentration limit**—During the 2011 Advisory Committee meeting, DEQ committed to evaluate the PCL for ozone. To approve a crop residue burn, DEQ must determine that ambient air quality levels do not exceed 75% of any NAAQS on any day and are not projected to exceed such level over the next 24 hours. For ozone, 75% of the NAAQS equates to 56 ppb or an Air Quality Index (AQI) of 47 (good air quality).

The following is a summary of the evaluation:

- **Health effects of ozone**—DEQ reviewed the *Integrated Science Assessment of Ozone and Related Photochemical Oxidants* (Second External Review Draft) (<http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=226363>) and the *Air Quality Criteria for Ozone and Related Photochemical Oxidants* (2006 Final) (<http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=149923>). The following is a summary of the health effects of ozone:
  - Irritates respiratory system
  - Reduces lung function
  - Aggravates asthma
  - Inflames and damages cells that line the lungs
  - May aggravate chronic lung disease
- **How smoke affects ozone**
  - Ozone is not emitted directly; it requires sunlight to form, usually in the mid to late afternoon.
  - Ozone concentration generally increases with elevation and near cities and varies regionally.
  - Ozone background concentrations in rural areas are usually between 40 and 60 ppb.
  - Ozone formation is reduced near fires.
  - Very large wildfires can increase ozone for a short duration.
  - Analysis of recent smoke impacts in the Boise area indicate no increase in the maximum 8-hour daily average of ozone even though there was a substantial increase in PM<sub>2.5</sub>.
- **Air Quality Index (AQI)**—DEQ evaluated the AQI for all NAAQS pollutants. The following is a summary of AQI for ozone:
  - AQI is a national outreach tool for reporting daily air quality.
  - AQI values of 100 or less are generally thought to be acceptable.

- AQI allows for a comparison of possible health effects from different pollutants.
  - At 75% of the NAAQS, there are similar levels of health effects for all criteria pollutants except ozone.
- **Is DEQ not allowing burning on good or marginal burn days due solely to ozone concentration?** DEQ issued many no-burn decisions in southern Idaho solely due to ozone concentrations above the current PCL. The table below summarizes the number of days DEQ issued a no-burn decision due to ozone for each county (Table 23). DEQ then reviewed the fire weather forecast from the contract meteorologist for those days and counties. The contract meteorologist provides a recommendation for each county based on the expected smoke management parameters (i.e., mixing height, wind speeds, and ventilation). The recommendation can be burn, conditional burn, or no burn.

**Table 23. Summary of DEQ no-burn decisions due to ozone.**

County	Number of days DEQ declared no burn due to ozone	Number of days with a burn recommendation <sup>a</sup>	Number of days with a conditional burn recommendation <sup>b</sup>
Ada	11	6	5
Bannock	6	4	2
Bingham	7	3	4
Blaine	5	3	2
Bonneville	5	2	3
Butte	3	3	0
Canyon	27	7	20
Cassia	3	3	0
Clark	4	4	0
Gooding	7	4	3
Jefferson	5	3	2
Jerome	6	1	5
Lincoln	6	5	1
Madison	1	1	0
Minidoka	7	1	6
Oneida	5	2	3
Owyhee	5	4	1
Teton	1	0	1
Twin Falls	8	7	1
Washington	13	6	7

<sup>a</sup> Burn recommendation from contract meteorologist indicated all meteorological parameters were in the “good burn day” category—DEQ could allow burning

<sup>b</sup> Indicates that 1 or more weather parameters were in the “conditional burn day” category—DEQ could have allowed limited burning

**Recommendation: Enter into negotiated rulemaking to modify the program concentration limit for ozone. This rulemaking would also require amending Section 39-114 of Idaho Code.**

The CRB Advisory Committee met on March 13 and April 18, 2012, to discuss these recommendations.

DEQ will not proceed with the two recommendations at this time. DEQ will continue to evaluate both recommendations during the 2012 burn seasons and may again present them to the Advisory Committee at the 2013 spring meeting for discussion.

This decision is based on input provided by Advisory Committee members and the current lack of adequate support to proceed. There was a lack of consensus on the need for, and how to implement, these recommendations consistently throughout the state. At this time, implementing weekend burning without moving forward on the ozone recommendation would be costly and provide few additional burn day opportunities for southern Idaho growers during the main burn seasons.

The committee expressed concern for, and had questions about, how the recommendation on the ozone program concentration limit would continue to protect public health. These concerns led to strong opposition by some committee members and tepid support by others.

The input from all committee members was valuable but demonstrates that further discussions and understandings will be necessary before DEQ has adequate support to move forward with the recommendations.

## **6. Conclusions**

Overall, DEQ considered the 2011 CRB season a success. Although DEQ air quality monitors recorded values above the CRB PCLs for 8-hour ozone and 1-hour and 24-hour average PM<sub>2.5</sub>, none of these occurrences was likely a direct result of DEQ-approved crop residue burning. DEQ operated the CRB program during 2011 without any adverse impacts to ISPs and with no verified public roadway safety impacts.