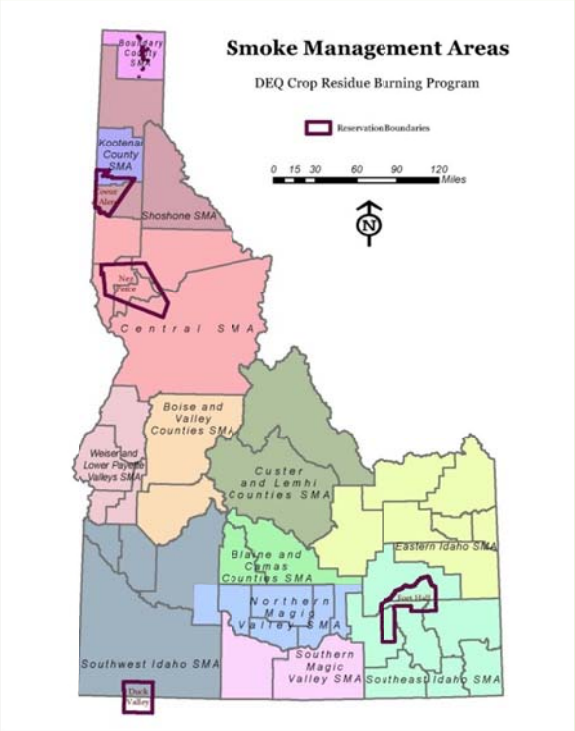
Crop Residue Burning Program
2014 Annual Report



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Crop Residue Burning Program 2014 Annual Report

February 2015

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Executive Summary

The open burning of crop residue (crop residue burning) is a historic practice in Idaho and 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 (DEQ) crop residue burning (CRB) program for the 2014 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 outreach for the 2014 burn season and an analysis of the 2014 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). DEQ did not identify any program improvements during the burn season review. Therefore, no recommendations are included in this report.

Burn Season Evaluation

The 2014 burn season was influenced by a hot and dry summer that was characterized by record heat, numerous large wildfires, and periodic wetting rains during late summer and early fall. In northern Idaho, wildfire smoke during July, August, and September hindered crop residue burn approvals. However, northern Idaho was able to complete almost all of its requested acreage and was in the normal range for acres burned. In southern Idaho, precipitation during August and September damaged crops, prevented and/or delayed harvests, and greened up fields, resulting in some fields being plowed instead of burned.

Statewide, 43,857 acres were burned under the CRB program in 2014, which was a substantial decrease from the amount burned in 2013 (54,438) and 2012 (67,939 acres). In northern Idaho, the number of acres burned during 2014 was similar to the number of acres burned in previous years, whereas the number of acres burned decreased in all of the SMAs in southern Idaho.

Air Quality Evaluation

DEQ operates the CRB program under guidelines and procedures designed to protect public health, avoid causing adverse impacts to institutions with sensitive populations, and avoid causing public roadway safety hazards. DEQ carefully evaluates the program's effectiveness in meeting these goals. The evaluation process is explained in detail within this report.

A thorough evaluation of the 2014 burn season showed that approved crop residue burning did not cause any measured air pollutant concentrations above the 1-hour, 4-hour, or 24-hour program-defined postburn concentration limits. No health concerns were reported resulting from approved crop residue burning.

Recommended Improvements

Subsequent to the annual CRB program analysis, DEQ concluded that no improvements were necessary at this time to protect public health or improve the effectiveness and efficiency of the program.

1. Introduction

This report reviews and analyzes the Idaho Department of Environmental Quality (DEQ) crop residue burning (CRB) program for the 2014 burn season. DEQ is required by the "Rules for the Control of Air Pollution in Idaho" (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 (PCLs) and an assessment of the circumstances related to any reported endangerment to human health associated with a crop residue burn. This report summarizes program updates undertaken in 2014, outreach efforts over the past year, a detailed analysis of the 2014 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 2014 burn season. For more in-depth information on the CRB program design, refer to the 2008 annual report available at *www.deq.idaho.gov/air-quality/burning/crop-residue-burning.aspx.*

2. Program Updates

In the 2013 annual report and at the CRB Advisory Committee meeting held in February 2014, DEQ did not recommend any updates to the CRB program; however, the CRB Advisory Committee made several recommendations to DEQ. This section summarizes the status of the recommendations approved by the DEQ director.

- ***Ozone in the Coeur d'Alene area: Evaluate ozone and weather parameters used for the burn decisions in the Coeur d'Alene area on all days in summer and fall to evaluate the potential impact the ozone program concentration limit may have on burning on the Rathdrum Prairie.***

  Coeur d'Alene ozone forecasting showed that sunny days with increased temperatures are days with ozone levels above the National Ambient Air Quality Standard (NAAQS). Hot sunny days are also often good burn days in the region. This leads to the problem of limiting burning on otherwise good burn days due to elevated ozone concentrations.

- ***DEQ public website:*** *Develop an alternative method to issue burn approvals and notify the public if the DEQ public website is down. The alternative method must be in accordance with Idaho statute, rules, and the State Implementation Plan.*

  Technical issues may disrupt the DEQ public website. If either the DEQ homepage or the CRB Program online registration application are completely down, no burn approvals or burn decisions can be made. If these websites are up, but the Google mapping interface is not functioning in the application, field approvals and burn decisions will be manually posted to the DEQ homepage. A field approval template and burn decision template were developed to facilitate posting this information to the website.

- ***CRB Advisory Committee members:*** *Develop an introductory packet for new CRB Advisory Committee members.*

  An introductory packet for new CRB Advisory Committee members was completed and is included in Appendix A.

3. Outreach for the 2014 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 2014, 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 institutions with sensitive populations (ISPs), such as schools, hospitals, and assisted-living facilities. DEQ conducted the following new or enhanced outreach methods in 2014:

- ***CRB online grower training***

  DEQ updated the CRB online grower training to reflect changes in the permitting process.

- ***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. Our grower education continually emphasizes that growers must obtain all necessary fire safety permits and consult with the Idaho Transportation Department or applicable county road department regarding public roadway safety requirements.

- ***Collaboration with fire departments***

  DEQ representatives met with several fire chiefs in individual and 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. DEQ also mailed correspondence to fire chiefs and sheriffs detailing the CRB program and website tools.

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

  DEQ used radio advertisements and newspaper articles to reach members of the 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 public and one intended for the grower community.

- ***Outreach to ISPs***

  Each off-season, 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 telephone, 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 before 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. Burn Season Analysis

To manage 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 burn season analysis includes examining statewide air quality impacts, complaints, compliance and enforcement, monitoring network, meteorology, and specific summaries for each SMA.

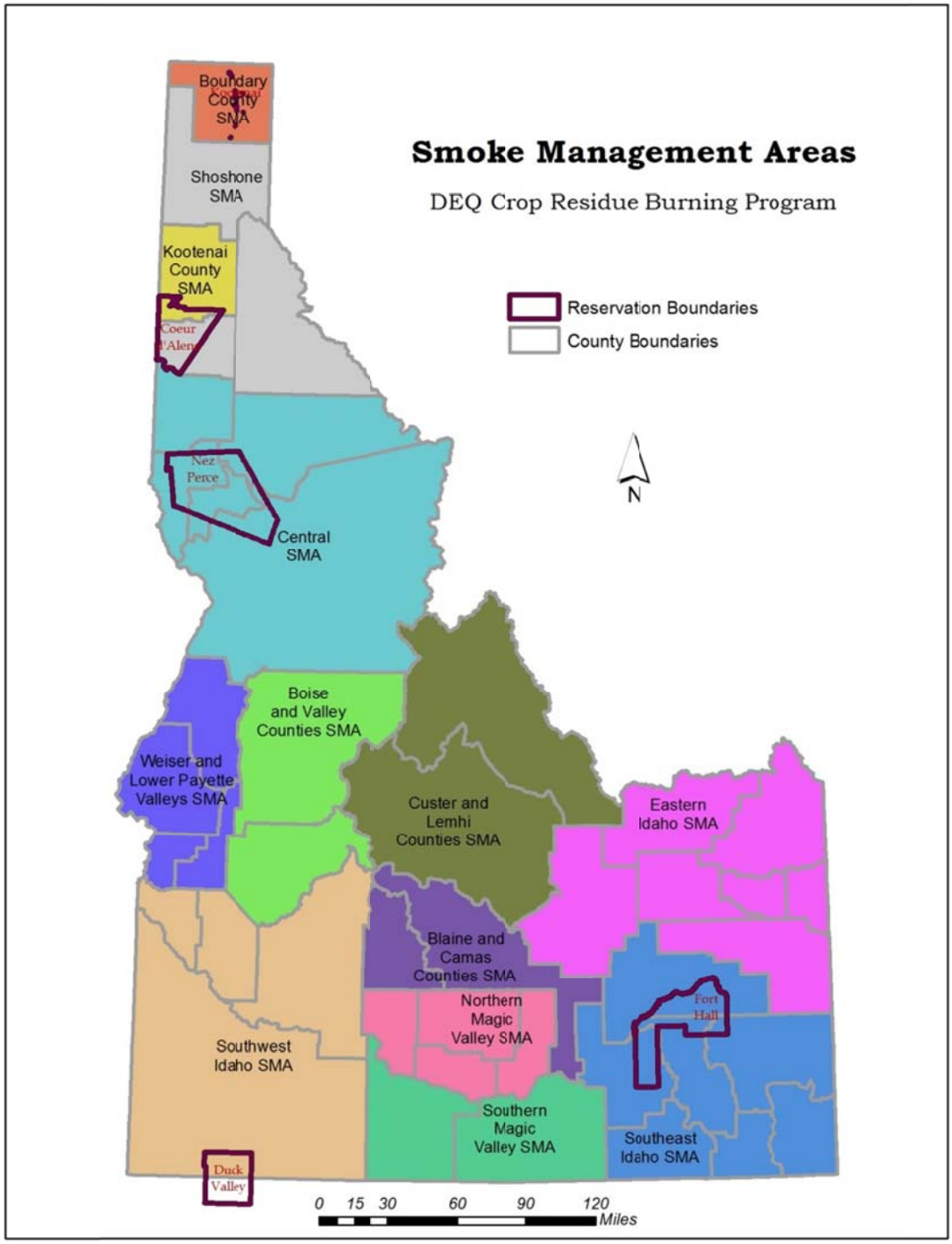


Figure 1. Idaho smoke management areas.

The SMA summaries include area geography descriptions, acres burned, and a summary of daily burn decisions and air quality conditions in 2014. No crop residue burning was conducted in the Boise and Valley Counties SMA during 2014; therefore, this SMA is not discussed further. The Shoshone SMA and Custer and Lemhi Counties SMA have not been included in the statewide summaries since negligible burning has been conducted in these SMAs over the last 3 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 fine particulate matter ($PM_{2.5}$) concentrations were above the program-defined 4-hour average preburn or postburn trigger levels or the 24-hour average preburn trigger levels and (2) to evaluate possible public roadway safety visibility impacts.

4.1.1 Program Concentration Limit Compliance

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 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 ($\mu g/m^3$) of $PM_{2.5}$ or PM_{10} or parts per billion (ppb) of ozone—are defined as follows:

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

During 2014, 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 $PM_{2.5}$ 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.

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 before, the recorded concentration.
- Wind direction and proximity of the burn were such that smoke from the burn was transported toward the monitor.

DEQ uses real-time ambient ozone monitoring data from the National Park Service monitors at Craters of the Moon National Monument, Yellowstone National Park, and Grand Teton National Park in combination with ozone monitoring data from Logan, Utah, (Utah DEQ), Spokane,

Washington (Washington Department of Ecology), and ozone forecast models from the National Weather Service (NWS) and Washington State University. These data provided sufficient coverage of southern Idaho and Kootenai County in northern Idaho so that DEQ could forecast ozone concentrations and use those forecasts in the daily burn-decision process. 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.

In this section of the report, DEQ discusses days when air quality monitors recorded concentrations above a PCL, and crop residue burning was conducted within the same SMA. Since negligible burning occurs near Lewiston and Franklin, air quality monitors in these areas were not evaluated for PCL exceedances. The Nez Perce Tribe, Kootenai Tribe of Idaho, and BC Environment operate air quality monitors that provide additional data for DEQ program decisions and evaluations. Potential adverse impacts and PCL exceedances are not evaluated for these monitors because they are not owned or operated by DEQ. The Greenbluff ozone monitor operated by Washington Department of Ecology is located near Spokane, Washington, and is used to forecast ozone concentrations in Kootenai County.

Ozone Concentrations above the Program Concentration Limit in Southern Idaho

A general explanation is provided here for approved burn days that ozone concentrations were forecasted below, but monitored concentrations exceeded, the 8-hour ozone PCL. Modeling studies have shown that the amount of smoke typical of crop residue burning has negligible effects on maximum daily 8-hour average ozone concentrations.

Available ozone monitors are widely dispersed (three of the monitors used for southern Idaho are not in Idaho, and the monitor used for northern Idaho is in Spokane, Washington), so approved crop residue burning was at least 50 miles, and in many cases 80–100 miles or more, from an ozone monitor. Due to the large distance from the monitors to the burn locations, it is reasonable to conclude that approved burning had a negligible effect or no effect at all on the ozone concentration at a monitor. The source of the elevated ozone concentrations measured on these days was unlikely due to approved crop residue burning.

4.1.2 Institutions with Sensitive Populations

DEQ is prohibited from approving a request to burn if conditions will adversely impact ISPs or if the plume is predicted to impact such institutions. To safeguard these populations, DEQ uses many procedures, such as 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). DEQ field coordinators frequently conduct an in-person examination of ISPs that are near proposed crop residue burns before 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 $\mu g/m^3$ (or visibility is at least 10 miles if no monitor is available):

    - Conclude that no adverse impact occurred.
    - If a complaint is received from an ISP, full evaluation and enhanced documentation will be completed. No additional documentation is needed unless DEQ receives a complaint from an ISP.
- When a monitor is present, and the maximum hourly $PM_{2.5}$ concentration is between 20 and 26.25 µg/m^3:
    - Conclude adverse impact unlikely.
    - Brief evaluation is 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 is 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 µg/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 to ask questions identified on the enhanced documentation form. ISP responses documented.

Discussed below are days when approved crop residue burning was conducted and an ambient air quality monitor located at or near an ISP (such as St. Luke's Hospital in Meridian) recorded a 1-hour average $PM_{2.5}$ concentration of 26 µg/m^3 or more.

February 24—Meridian Monitor in Southwest Idaho SMA

February 24 was a burn day in the Southwest Idaho SMA, where 6.5 acres were burned at two fields in Owyhee County. The $PM_{2.5}$ monitor in Meridian recorded 1-hour average concentrations of 20.5 µg/m^3 for the hour ending at 8 p.m. and 21.2 µg/m^3 at 9 p.m. Enhanced documentation was conducted. The field is located over 50 miles to the south-southeast of the Meridian monitor. Surface winds measured at Meridian at the time of the monitor impacts were variable with a westerly and southerly component, but no winds were from the south-southeast. Thus, the wind would not have carried the smoke from the approved burns toward Meridian. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

March 12—Meridian Monitor in Southwest Idaho SMA

March 12 was a burn day in the Southwest Idaho SMA, where 13 acres were burned at one field in Owyhee County. The $PM_{2.5}$ monitor in Meridian recorded 1-hour average concentrations of 22.3 µg/m^3 for the hour ending at 9 p.m. and 21.2 µg/m^3 at 10 p.m. Enhanced documentation

was conducted. The field is located over 50 miles to the south-southeast of the Meridian monitor. Surface winds measured at Meridian at the time of the monitor impacts were variable with a westerly and easterly component, but no winds were from the south-southeast. Thus, the wind would not have carried the smoke from the approved burns toward Meridian. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

March 13—Meridian Monitor in Southwest Idaho SMA

March 13 was a burn day in the Southwest Idaho SMA, where 5.5 acres were burned at one field in Owyhee County. The $PM_{2.5}$ monitor in Meridian recorded 1-hour average concentrations of 25.1 $\mu g/m^3$ for the hour ending at 9 p.m. and 24.8 $\mu g/m^3$ at 10 p.m. Enhanced documentation was conducted. The field is located over 50 miles to the south-southeast of the Meridian monitor. Surface winds measured at Meridian at the time of the monitor impacts were variable with a westerly, southerly, and easterly component, but no winds were from the south-southeast. Thus, the wind would not have carried the smoke from the approved burns toward Meridian. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

March 25—Moscow Monitor in Central SMA

March 25 was a burn day in Central SMA, where 74 acres were burned at one field in Latah County. The $PM_{2.5}$ monitor in Moscow recorded 1-hour average concentrations of 25.9 $\mu g/m^3$ for the hour ending at 4 p.m., 23.7 $\mu g/m^3$ at 5 p.m., and 24 $\mu g/m^3$ at 7 p.m. Enhanced documentation was conducted. The field was burned during the afternoon, at which time the wind direction was from the northwest and south-southwest. The field is located over 24 miles to the northeast of the monitor. Thus, the wind would not have carried the smoke from the approved burns toward Moscow. Other agency burning did occur in the area. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

March 25—Pocatello Monitor in Southeast Idaho SMA

March 25 was a burn day in the Southeast Idaho SMA, where 70 acres were burned at two fields in Oneida and Bannock Counties. The $PM_{2.5}$ monitor in Pocatello recorded 1-hour average concentrations of 22.9 $\mu g/m^3$ for the hour ending at 1 p.m. and 21.5 $\mu g/m^3$ at 2 p.m. Enhanced documentation was conducted. The fields are located over 25 miles to the south, south-southeast, and southeast of the Pocatello monitor. The wind direction that afternoon at the Pocatello monitor was from the south, south-southeast, and southeast. Wind gust speeds of 23–31 mph were recorded in Pocatello between 1 p.m. and 2 p.m., and windblown dust may have contributed to the elevated $PM_{2.5}$ concentration. The source of the elevated $PM_{2.5}$ concentration was unlikely due to approved crop residue burning.

April 11—Pocatello Monitor in Southeast Idaho SMA

April 11 was a burn day in the Southeast Idaho SMA, where 46 acres were burned at four fields in Caribou, Power, and Bannock Counties. The $PM_{2.5}$ monitor in Pocatello recorded a 1-hour average concentration of 30.8 $\mu g/m^3$ for the hour ending at 12 p.m. Enhanced documentation was conducted. The fields are located over 18 miles to the southeast, south-southwest, southwest, and west-southwest of the Pocatello monitor. The wind direction that afternoon at the Pocatello monitor was from the west and west-northwest. Due to the large distances involved and wind

direction, the approved crop residue burning would not have had an effect on the measured $PM_{2.5}$ concentration at the Pocatello monitor. Therefore, ISPs were not contacted. The source of the elevated $PM_{2.5}$ concentration was unlikely due to approved crop residue burning.

April 14—Porthill International Border Monitor in Boundary SMA

April 14 was a burn day in the Boundary SMA, where 318 acres were burned at three fields in Boundary County. The Porthill International Border monitor (about 10 miles north of the fields) recorded a 1-hour average concentration of 21.2 $\mu g/m^3$ for the hour ending at 1 p.m. Enhanced documentation was conducted. Other monitors located closer to the field burns did not record any elevated readings (Mt. Hall monitor is 2.5 miles southwest of the closest field, and the Kootenai Tribe of Idaho Bonners Ferry monitor is 0.5 miles south of the closest field) All approved burning was completed by 2 p.m. Surface winds at the time of the monitor impacts were from the south and southwest. On-site DEQ staff confirmed that the Mt. Hall School was not impacted by the field burn, and a haze was in the air in the Porthill area and Canada. The source of the smoke in Canada is unknown. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

August 7—Nampa Monitor in Southwest Idaho SMA

August 7 was a burn day in the Southwest Idaho SMA, where 16 acres were burned at one field in Canyon County. The $PM_{2.5}$ monitor in Nampa recorded a 1-hour average concentration of 21 $\mu g/m^3$ for the hour ending at 9 p.m. Enhanced documentation was conducted. The closest field is located over 5 miles to the south-southeast, south, and south-southwest of the Nampa monitor. Surface winds measured at Meridian at the time of the monitor impacts were variable with a southerly component. The source of the elevated $PM_{2.5}$ concentration was unlikely due to approved crop residue burning.

August 8—Nampa and Meridian Monitors in Southwest Idaho SMA

August 8 was a burn day in the Southwest Idaho SMA, where 82 acres were burned at three fields in Elmore and Owyhee Counties. The $PM_{2.5}$ monitor in Nampa recorded 1-hour average concentrations of 22 $\mu g/m^3$ for the hour ending at 8 p.m. and 23.4 $\mu g/m^3$ at 10 p.m. The $PM_{2.5}$ monitor in Meridian recorded 1-hour average concentrations of 21.4 $\mu g/m^3$ for the hour ending at 9 p.m. and 23.5 $\mu g/m^3$ at 10 p.m. Enhanced documentation was conducted. The closest field is located over 16 miles to the west and west-northwest of the Nampa monitor and over 27 miles to the west of the Meridian monitor. Surface winds measured at Meridian were variable throughout the day. The source of the elevated $PM_{2.5}$ concentration was unlikely due to approved crop residue burning.

August 11—Nampa Monitor in Southwest Idaho SMA

August 11 was a burn day in the Southwest Idaho SMA, where 159 acres were burned at four fields in Canyon and Owyhee Counties. The $PM_{2.5}$ monitor in Nampa recorded a 1-hour average concentration of 23.3 $\mu g/m^3$ for the hour ending at 5 p.m. Enhanced documentation was conducted. The closest field is located over 14 miles to the west of the Nampa monitor. Other fields are located over 60 miles to the southeast of Nampa. Surface winds measured at Meridian

at the time of the monitor impacts were variable with a southerly component. The source of the elevated $PM_{2.5}$ concentration was unlikely due to approved crop residue burning.

August 15—Nampa and Meridian Monitors in Southwest Idaho SMA

August 15 was a burn day in the Southwest Idaho SMA, where 78 acres were burned at four fields in Ada, Canyon, and Elmore Counties. The $PM_{2.5}$ monitor in Nampa recorded a 1-hour average concentration of 26.7 $\mu g/m^3$ for the hour ending at 10 p.m. The $PM_{2.5}$ monitor in Meridian recorded a 1-hour average concentration of 20.3 $\mu g/m^3$ for the hour ending at 10 p.m. The closest field is 1 acre in size, and located over 8 miles to the east and east-southeast of the Nampa monitor and over 6 miles to the south and south-southeast of the Meridian monitor. Surface winds measured at Meridian at the time of the monitor impacts were variable with a southerly component. The closest fields in a southerly direction are over 60 miles away. It is unlikely the wind would have carried smoke the lengthy distance from the approved burns to Nampa or Meridian. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

August 27—Moscow Monitor in Central SMA

August 27 was a burn day in the Central SMA, where 1.5 acres were burned at one field in Latah County. The $PM_{2.5}$ monitor in Moscow recorded a 1-hour average concentration of 20.4 $\mu g/m^3$ for the hour ending at 1 p.m., at which time the wind direction was from the northwest and the south-southwest. Enhanced documentation was conducted. The field is located over 24 miles to the northeast of the monitor. Thus, the wind would not have carried the smoke from the approved burns toward Moscow. The Potlatch monitor within 3 miles of the field did not experience any elevated readings on this day. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

August 28—Ketchum Monitor in Blaine and Camas Counties SMA

August 28 was a burn day in the Blaine and Camas Counties SMA, where 70 acres were burned at one field in Blaine County. The $PM_{2.5}$ monitor in Ketchum recorded 1-hour average concentrations of 29.3 $\mu g/m^3$ for the hour ending at 7 p.m., 54.2 $\mu g/m^3$ at 8 p.m., 51.73 $\mu g/m^3$ at 9 p.m., and 44.8 $\mu g/m^3$ at 10 p.m. Enhanced documentation was conducted. The Twin Falls monitor is used to monitor field burns in this SMA. No elevated readings were recorded at the Twin Falls monitor. The field is located over 33 miles to the southeast of the Ketchum monitor and 55 miles to the northeast of the Twin Falls monitor. The wind direction that afternoon at the Twin Falls monitor was from the east-southeast and the southwest. ISP contact was not necessary because area schools were not in session on this date. The source of the elevated $PM_{2.5}$ concentration was unlikely due to approved crop residue burning.

August 29—Idaho Falls Monitor in Eastern Idaho SMA

August 29 was a burn day in the Eastern Idaho SMA, where 166 acres were burned at two fields in Clark and Jefferson Counties. The $PM_{2.5}$ monitor in Idaho Falls recorded a 1-hour average concentration of 24.5 $\mu g/m^3$ for the hour ending at 8 p.m. Enhanced documentation was conducted. DEQ does not operate meteorological equipment in the Idaho Falls area. Therefore, wind direction data from the monitor are unavailable. The fields are located over 9 miles to the

northwest, north-northwest, and north of the Idaho Falls monitor. The source of the elevated $PM_{2.5}$ concentration was unlikely due to approved crop residue burning.

August 29—Meridian Monitor in Southwest Idaho SMA

August 29 was a burn day in the Southwest Idaho SMA, where 51 acres were burned at one field in Elmore County. The $PM_{2.5}$ monitor in Meridian recorded 1-hour average concentrations of 23.8 $\mu g/m^3$ for the hour ending at 9 p.m. Enhanced documentation was conducted. The field is located over 60 miles to the southeast of the Meridian monitor. Surface winds measured at Meridian at the time of the monitor impacts were variable with a westerly and southerly component, but no winds were from the southeast. Thus, the wind would not have carried the smoke from the approved burns toward Meridian. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

September 4—Cottonwood Monitor in Central SMA

September 4 was a burn day in the Central SMA, where 727 acres were burned at eight fields in Idaho County. The Cottonwood monitor (about 0.8 miles west of the nearest field) recorded 1-hour average concentrations of 46 $\mu g/m^3$ for the hour ending at 5 p.m., 22.3 $\mu g/m^3$ at 6 p.m., and 20.1 $\mu g/m^3$ at 7 p.m. The on-site DEQ field coordinator noted no smoke in the area when the approved burns concluded at 1:45 p.m. Enhanced documentation was conducted. DEQ contacted ISPs, and no health impacts were reported. DEQ concluded that the elevated concentrations were likely the result of multiple agencies burning. The elevated $PM_{2.5}$ concentration could have been partially due to approved crop residue burning.

September 15—Nampa and Meridian Monitors in Southwest Idaho SMA

September 15 was a burn day in the Southwest Idaho SMA, where 78 acres were burned at five fields in Canyon County. The $PM_{2.5}$ monitor in Nampa recorded 1-hour average concentrations of 20.5 $\mu g/m^3$ for the hour ending at 7 p.m. and 23.4 $\mu g/m^3$ at 8 p.m. The $PM_{2.5}$ monitor in Meridian recorded a 1-hour average concentration of 21.3 $\mu g/m^3$ for the hour ending at 9 p.m. Enhanced documentation was completed. Winds measured at Meridian during the burn were variable and at the time of the elevated readings were variable with an easterly component. No fields were located to the east of the monitors or ISPs. The source of the elevated $PM_{2.5}$ was not due to approved crop residue burning.

September 16—Nampa and Meridian Monitors in Southwest Idaho SMA

September 16 was a burn day in the Southwest Idaho SMA, where 50 acres were burned at two fields in Canyon County. The $PM_{2.5}$ monitor in Nampa recorded 1-hour average concentrations of 23.3 $\mu g/m^3$ for the hour ending at 8 p.m., 28.2 $\mu g/m^3$ at 9 p.m., and 22.8 $\mu g/m^3$ at 10 p.m. The $PM_{2.5}$ monitor in Meridian recorded a 1-hour average concentration of 25.8 $\mu g/m^3$ for the hour ending at 9 p.m. Enhanced documentation was completed. Winds measured at Meridian during the burn were variable and at the time of the elevated readings were variable with an easterly and southerly component. No fields were located to the east or the south of the monitors or ISPs. Therefore, ISPs were not contacted. The source of the elevated $PM_{2.5}$ was not due to approved crop residue burning.

September 17—Nampa and Meridian Monitors in Southwest Idaho SMA

September 17 was a burn day in the Southwest Idaho SMA, where 12 acres were burned at one field in Owyhee County. The $PM_{2.5}$ monitor in Nampa recorded 1-hour average concentrations of 33.2 µg/m^3 for the hour ending at 7 p.m., 34.4 µg/m^3 at 8 p.m., 25.4 µg/m^3 at 9 p.m., and 28.5 µg/m^3 at 10 p.m. The $PM_{2.5}$ monitor in Meridian recorded a 1-hour average concentration of 23.2 µg/m^3 for the hour ending at 6 p.m., 29.6 µg/m^3 at 8 p.m., 28.3 µg/m^3 at 9 p.m., and 29.2 µg/m^3 at 10 p.m. Enhanced documentation was completed. Winds measured at Meridian during the burn were variable and at the time of the elevated readings were variable with a westerly and southerly component. No west winds were recorded, and west-southwest winds were only recorded for the 15-minute period at 7:45 p.m. The field was located to the west and west-southwest of the monitors in Nampa and Meridian. Thus, the wind would not have carried the smoke from the approved burns toward Nampa or Meridian. Therefore, ISPs were not contacted. The source of the elevated $PM_{2.5}$ was unlikely due to approved crop residue burning.

September 23—Nampa Monitor in Southwest Idaho SMA

September 23 was a burn day in the Southwest Idaho SMA, where 24 acres were burned at one field in Canyon County. The $PM_{2.5}$ monitor in Nampa recorded a 1-hour average concentration of 20.4 µg/m^3 for the hour ending at 10 p.m. Enhanced documentation was conducted. The field is located over 4 miles to the south and south-southwest of the Nampa monitor. Surface winds measured at Meridian at the time of the monitor impacts were from the south and south-southwest. The source of the elevated $PM_{2.5}$ concentration was unlikely due to approved crop residue burning.

September 24—Rexburg Monitor in Eastern Idaho SMA

September 24 was a burn day in the Eastern Idaho SMA, where 240 acres were burned at five fields in Jefferson County. The $PM_{2.5}$ monitor in Rexburg recorded a 1-hour average concentration of 30.5 µg/m^3 for the hour ending at 7 p.m., 54.2 µg/m^3 at 8 p.m., and 51.73 µg/m^3 at 7 p.m. Enhanced documentation was conducted. DEQ does not operate meteorological equipment in the Rexburg area. Therefore, wind direction data from the monitor are unavailable. The fields are located over 8 miles to the southwest, south-southwest, and south of the Rexburg monitor. Field staff observed the burns and noted that winds were from the southwest and west-southwest. ISPs were not contacted due to staff oversight. The source of the elevated $PM_{2.5}$ concentration was unlikely due to approved crop residue burning.

September 25—Cottonwood and Grangeville Monitors in Central SMA

September 25 was a burn day in the Central SMA, where 2,054 acres were burned at 22 fields in Idaho County. The Cottonwood monitor (about 8 miles northwest of the field) recorded a 1-hour average concentration of 21.2 µg/m^3 for the hour ending at 3 p.m. The Grangeville monitor (about 1 mile southeast of the field) recorded a 1-hour average concentration of 23.7 µg/m^3 for the hour ending at 3 p.m. Enhanced documentation was conducted. Other agency burning, prescribed burning, and wildfires were occurring in the area surrounding the ISPs and monitors. DEQ contacted the ISPs, and no health impacts were reported. DEQ concluded that the elevated concentrations were likely the result of multiple agencies burning and wildfires. The elevated $PM_{2.5}$ concentration could have been partially due to approved crop residue burning.

September 25—Meridian Monitor in Southwest Idaho SMA

September 25 was a burn day in the Southwest Idaho SMA, where 6 acres were burned at one field in Owyhee County. The $PM_{2.5}$ monitor in Meridian recorded 1-hour average concentrations of 22.7 µg/m^3 for the hour ending at 7 p.m. Enhanced documentation was conducted. The field is located over 18 miles to the west and west-southwest of the Meridian monitor. Surface winds measured at Meridian at the time of the monitor impacts were from the northwest and west-northwest. Thus, the wind would not have carried the smoke from the approved burns toward Meridian. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

September 26—Idaho Falls Monitor in Eastern Idaho SMA

September 26 was a burn day in the Eastern Idaho SMA, where 387 acres were burned at nine fields in Teton, Bonneville, and Jefferson County. The $PM_{2.5}$ monitor in Idaho Falls recorded a 1-hour average concentration of 24.5 µg/m^3 for the hour ending at 8 p.m. Enhanced documentation was conducted. DEQ does not operate meteorological equipment in the Idaho Falls area. Therefore, wind direction data from the monitor are unavailable. The fields are located from 1 to 46 miles to the west, north, and northeast of the Idaho Falls monitor. The source of the elevated $PM_{2.5}$ concentration is unknown.

October 17—St. Maries Monitor in Shoshone SMA

October 17 was a burn day in the Shoshone SMA, where 10 acres were burned at one field in Benewah County. The $PM_{2.5}$ monitor in St. Maries recorded 1-hour average concentrations of 25 µg/m^3 for the hour ending at 6 p.m., 26 µg/m^3 at 7 p.m., 28 µg/m^3 at 8 p.m., 21 µg/m^3 at 9 p.m., and 23 µg/m^3 at 10 p.m. Enhanced documentation was conducted. The approved burn was approximately 13 miles to the southeast of St. Maries. The field was burned during the afternoon, at which time the wind direction was from the east, west, and west-northwest. Thus, the wind would have dispersed the smoke from the approved burn away from St. Maries. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

October 20—Grangeville Monitor in Central SMA

October 20 was a burn day in the Central SMA, where 256 acres were burned at two fields in Idaho County. The $PM_{2.5}$ monitor in Grangeville recorded a 1-hour average concentration of 25.1 µg/m^3 for the hour ending at 8 p.m. Enhanced documentation was conducted. The approved burn was approximately 5 miles to the west of Grangeville. The field was burned during the afternoon, at which time the wind direction was from the southwest. Thus, the wind would have dispersed the smoke from the approved burn away from Grangeville. Other agency and prescribed burning occurred in the area. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

October 20—Monitor in Southern Magic Valley SMA

October 20 was a burn day in the Southern Magic Valley SMA, where 42 acres were burned at two fields in Twin Falls County. No elevated monitor readings were recorded, but on-site DEQ field staff observed the burns and smoke drifting toward an ISP. During the burn, the winds shifted, and the smoke plume drifted toward Filer High School. Field staff immediately

contacted the ISP, and no adverse impacts were reported. Enhanced documentation was conducted.

4.1.3 Evaluation of Possible Public Roadway Safety Impacts

August 26—Public Roadway Safety in Central SMA

August 26 was a burn day in the Central SMA. A 197-acre field was burned in Idaho County just to the north of Highway 95. A DEQ field coordinator was on site to observe the burn. The DEQ field coordinator measured the wind direction as variable but predominantly from the southeast. The field coordinator gave the grower permission to ignite the field. The grower began ignition on the side furthest from the highway. After ignition, the wind shifted and began blowing out of the north. This caused smoke to drift across the highway. Smoke caused reduced visibility for motorists, and traffic had to be slowed and diverted. The entire burn lasted 13 minutes, and the DEQ field coordinator estimated that the smoke impact was less than 9 minutes long. Enhanced documentation was completed.

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 $PM_{2.5}$ 4-hour average concentration preburn and postburn triggers of 22 $\mu g/m^3$ and 32 $\mu g/m^3$, respectively; the $PM_{2.5}$ 24-hour average concentration preburn trigger of 16 $\mu g/m^3$; 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 $PM_{2.5}$ trigger levels.

April 9—4-Hour Average $PM_{2.5}$ Concentration, Meridian Monitor in Southwest Idaho SMA

April 9 was a burn day in the Southwest Idaho SMA, where 39 acres were burned at two fields in Ada and Canyon Counties. The $PM_{2.5}$ monitor in Meridian recorded a 4-hour average preburn trigger of 23.6 $\mu g/m^3$ for the hour ending at 8 a.m. Preburn enhanced documentation was conducted. Crop residue burning was approved because of forecasted wind directions that keep smoke away from ISPs. Burning did not begin until air quality improved.

August 8—4-Hour Average $PM_{2.5}$ Concentration, Nampa Monitor in Southwest Idaho SMA

August 8 was a burn day in the Southwest Idaho SMA, where 82 acres were burned at three fields in Elmore and Owyhee Counties. The $PM_{2.5}$ monitor in Nampa recorded 4-hour average preburn triggers of 26.2 $\mu g/m^3$ for the hour ending at 8 a.m., 29.8 $\mu g/m^3$ at 9 a.m., 29.1 $\mu g/m^3$ at 10 a.m., and 25.7 $\mu g/m^3$ at 11 a.m. Preburn enhanced documentation was conducted. Crop residue burning was approved because of forecasted wind directions that keep smoke away from ISPs. Burning did not begin until air quality improved.

August 28—4-Hour Average $PM_{2.5}$ Concentration, Ketchum Monitor in Blaine and Camas Counties SMA

August 28 was a burn day in the Blaine and Camas Counties SMA, where 70 acres were burned at one field in Blaine County. The $PM_{2.5}$ monitor in Ketchum recorded 4-hour average concentrations of 35.4 µg/m^3 for the hour ending at 9 p.m. and 44.9 µg/m^3 at 10 p.m. Enhanced documentation was conducted. The Twin Falls monitor is also used to monitor field burns in this SMA. No elevated readings were recorded at the Twin Falls monitor. The field is located over 33 miles to the southeast of the Ketchum monitor and 55 miles to the northeast of the Twin Falls monitor. The wind direction that afternoon at the Twin Falls monitor was from the east-southeast through the southwest. The source of the elevated $PM_{2.5}$ concentration was unlikely due to approved crop residue burning.

September 19—4-Hour and 24-Hour Average $PM_{2.5}$ Concentration, Twin Falls and Paul Monitors in Northern and Southern Magic Valley SMAs

September 19 was a burn day in the Northern Magic Valley SMA, where 65 acres were burned at one field in Lincoln County. The $PM_{2.5}$ monitor in Twin Falls is located over 20 miles to the south-southwest of the field. The Twin Falls monitor recorded the following:

- 4-hour average concentration preburn triggers: 34.3 µg/m^3 for the hour ending at 5 a.m., 34.7 µg/m^3 at 6 a.m., 34.9 µg/m^3 at 7 a.m., 35 µg/m^3 at 8 a.m., 34.8 µg/m^3 at 9 a.m., 34.5 µg/m^3 at 10 a.m., and 34 µg/m^3 at 11 a.m.
- 4-hour average concentration postburn triggers: 33.5 µg/m^3 for the hour ending at 12 p.m. and 32.7 µg/m^3 at 1 p.m.
- 24-hour average concentration preburn triggers: 34.3 µg/m^3 for the hour ending at 5 a.m., 34.7 µg/m^3 at 6 a.m., 34.7 µg/m^3 at 7 a.m., 34.7 µg/m^3 at 8 a.m., 34.7 µg/m^3 at 9 a.m., 34.7 µg/m^3 at 10 a.m., and 34.7 µg/m^3 at 11 a.m.
- 24-hour average concentration postburn triggers: 27.7 µg/m^3 for the hour ending at 12 p.m., 28.5 µg/m^3 at 1 p.m., 29.1 µg/m^3 at 2 p.m., 29.5 µg/m^3 at 3 p.m., 29.8 µg/m^3 at 4 p.m., 29.9 µg/m^3 at 5 p.m., 30 µg/m^3 at 6 p.m., 29.9 µg/m^3 at 7 p.m., 29.7 µg/m^3 at 8 p.m., 29.3 µg/m^3 at 9 p.m., and 28.9 µg/m^3 at 10 p.m.

The $PM_{2.5}$ monitor in Paul is located over 30 miles southeast of the field. The Paul monitor recorded the following:

- 4-hour average concentration preburn triggers: 41.3 µg/m^3 for the hour ending at 5 a.m. and 30.1 µg/m^3 at 6 a.m.
- 24-hour average concentration preburn triggers: 41.5 µg/m^3 for the hour ending at 5 a.m., 41.8 µg/m^3 at 6 a.m., 42 µg/m^3 at 7 a.m., 42.1 µg/m^3 at 8 a.m., 41.9 µg/m^3 at 9 a.m., 41.3 µg/m^3 at 10 a.m., and 41.1 µg/m^3 at 11 a.m.
- 24-hour average concentration postburn triggers: 41.1 µg/m^3 for the hour ending at 12 p.m., 41 µg/m^3 at 1 p.m., 40.1 µg/m^3 at 2 p.m., 38 µg/m^3 at 3 p.m., 35.4 µg/m^3 at 4 p.m., 32.7 µg/m^3 at 5 p.m., 29.6 µg/m^3 at 6 p.m., and 26.8 µg/m^3 at 7 p.m.

Preburn and postburn enhanced documentation was conducted. Crop residue burning was approved because Kimberly meteorological data showed that winds were out of the west-southwest and south-southwest in the morning before burn time, which should have kept $PM_{2.5}$

to acceptable levels at the ISPs and monitors in Twin Falls and Paul. DEQ staff did not observe the burn because no ISPs were within 3 miles of the burn. During 12 p.m. to 5 p.m., the winds were from the west-northwest and west in Kimberly but were from the west-southwest and southwest in Jerome. At 10 p.m., the winds were from the west-northwest and south-southwest in Kimberly and were from the east-southeast in Jerome. Thus, because of the large distances involved and the wind direction measurements, smoke from the approved crop residue burning would not have had an effect on the measured $PM_{2.5}$ concentration at the Twin Falls monitor. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

September 24—4-Hour and 24-Hour Average $PM_{2.5}$ Concentration, Potlatch Monitor in Central SMA

September 24 was a burn day in the Central SMA, where 702 acres were burned in Latah County. The $PM_{2.5}$ monitor in Potlatch recorded 4-hour average concentration preburn triggers of 37 $\mu g/m^3$ for the hour ending at 8 a.m. and 24-hour average concentration preburn triggers of 16 $\mu g/m^3$ for the hour ending at 8 a.m. and 16 $\mu g/m^3$ at 9 a.m. Enhanced documentation was conducted. Crop residue burning was approved because of a forecasted inversion lift that would return the $PM_{2.5}$ to acceptable levels. Burning did not begin until air quality improved. DEQ staff observed the burns and noted that surface winds kept smoke away from the ISPs.

September 24—4-Hour Average $PM_{2.5}$ Concentration, Moscow and Kendrick Monitors in Central SMA

September 24 was a burn day in the Central SMA, where 702 acres were burned in Latah County. The $PM_{2.5}$ monitor in Moscow recorded a 4-hour average concentration preburn trigger of 44.6 $\mu g/m^3$ for the hour ending at 8 a.m. and a 24-hour average concentration preburn trigger of 16 $\mu g/m^3$ for the hour ending at 8 a.m. The $PM_{2.5}$ monitor in Kendrick recorded 24-hour average concentration preburn triggers of 16 $\mu g/m^3$ at the hour ending at 8 a.m. and 16.2 $\mu g/m^3$ at 9 a.m. Enhanced documentation was conducted. Crop residue burning was approved because of a forecasted inversion lift that would return the $PM_{2.5}$ to acceptable levels. Burning did not begin until air quality improved. DEQ staff observed the burns and noted that surface winds kept smoke away from the ISPs.

October 17—24-Hour Average $PM_{2.5}$ Concentration, St. Maries Monitor in Shoshone SMA

October 17 was a burn day in the Shoshone SMA, where 10 acres were burned at one field in Benewah County. The $PM_{2.5}$ monitor in St. Maries recorded 24-hour average concentration preburn triggers of 16 $\mu g/m^3$ for the hour ending at 6 a.m., 16.3 $\mu g/m^3$ at 7 a.m., 16.9 $\mu g/m^3$ at 8 a.m., 17.3 $\mu g/m^3$ at 9 a.m., 17.3 $\mu g/m^3$ at 10 a.m., and 17.4 $\mu g/m^3$ at 11 a.m. Enhanced documentation was conducted. DEQ determined that the elevated concentrations were possibly due to prescribed fire smoke and woodstove smoke. The $PM_{2.5}$ concentrations were improving throughout the morning of the burn day and were expected to be within the acceptable range during the burn window; the approved burn would not cause or contribute to any elevated concentrations. The approved burn was approximately 13 miles to the southeast of St. Maries, and winds were forecasted to keep smoke away from St. Maries and ISPs. The source of the elevated $PM_{2.5}$ concentration was not due to approved crop residue burning.

4.2 Complaints

Complaint response remains a critical part of DEQ's CRB 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, as well as complaints regarding prescribed burning and wildfire smoke.

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 DEQ field coordinators. In all cases, crop residue burning complaints were entered into DEQ's Complaint Tracking System by regional office staff. Table 1 shows the total number of crop residue burning complaints received by SMAs, including those that were related to DEQ's CRB program and those from non-DEQ crop residue burning and other smoke complaints.

Table 1. Summary of complaints responded to by the crop residue burn program during 2014.

Smoke Management Area[a]	Total Crop Residue Burning Related Complaints	Complaints Likely Associated with Approved Burning	Complaints Associated with Other Smoke Sources[b]
Central	12	4	8
Boundary Counties	6	5	1
Northern Magic Valley	2	2	0

a. Smoke management areas with no related complaints during 2014 are not included.
b. Complaints from other sources include other open burning within DEQ jurisdiction, open burning outside DEQ jurisdiction, and wildfires.

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 2014, with the goal of educating growers that are new to the program about their permits and requirements and helping them to understand how to comply with those requirements. In instances where a violation was documented and an enforcement action was appropriate, DEQ continued to use both informal and formal enforcement tools.

During 2014, no violations of the CRB rules (IDAPA 58.01.01.617-624) were forwarded to the enforcement coordinator in the Air Quality Division. DEQ issued five notices to comply for minor violations of the CRB rule. These minor violations were escaped fires, limited visibility on roadways, and failure to obtain a Spot and Bale Permit.

4.4 Crop Residue Burning Ambient Air Quality Monitoring Network

DEQ continued to operate the existing air quality monitors and seasonal CRB $PM_{2.5}$ monitors (nephelometers) during 2014. Figure 2, Figure 3, and Figure 4 show the locations of monitors in Northern, Central, and Southern Idaho SMAs, respectively.

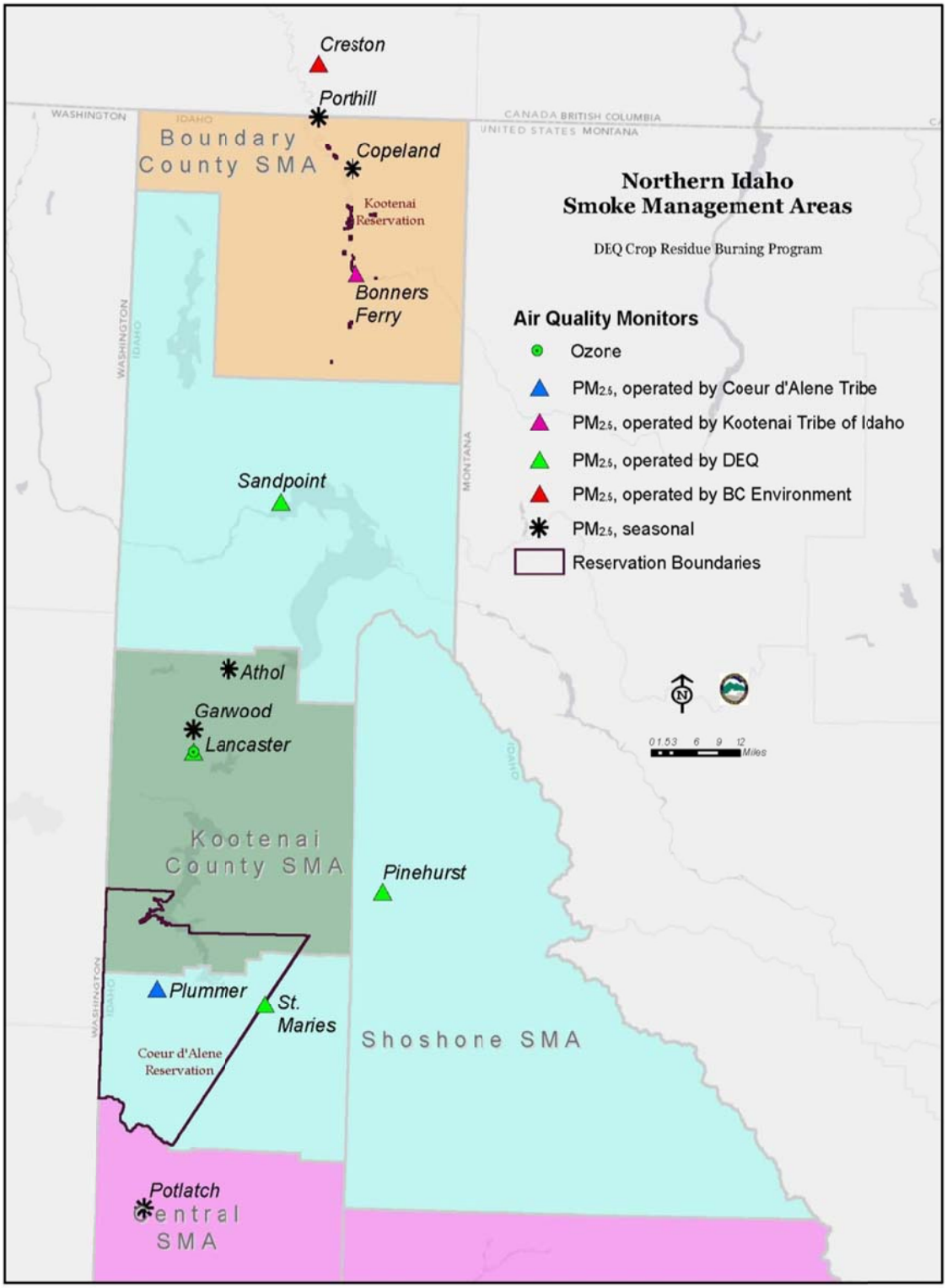


Figure 2. Air quality monitor locations for Northern Idaho Smoke Management Area.

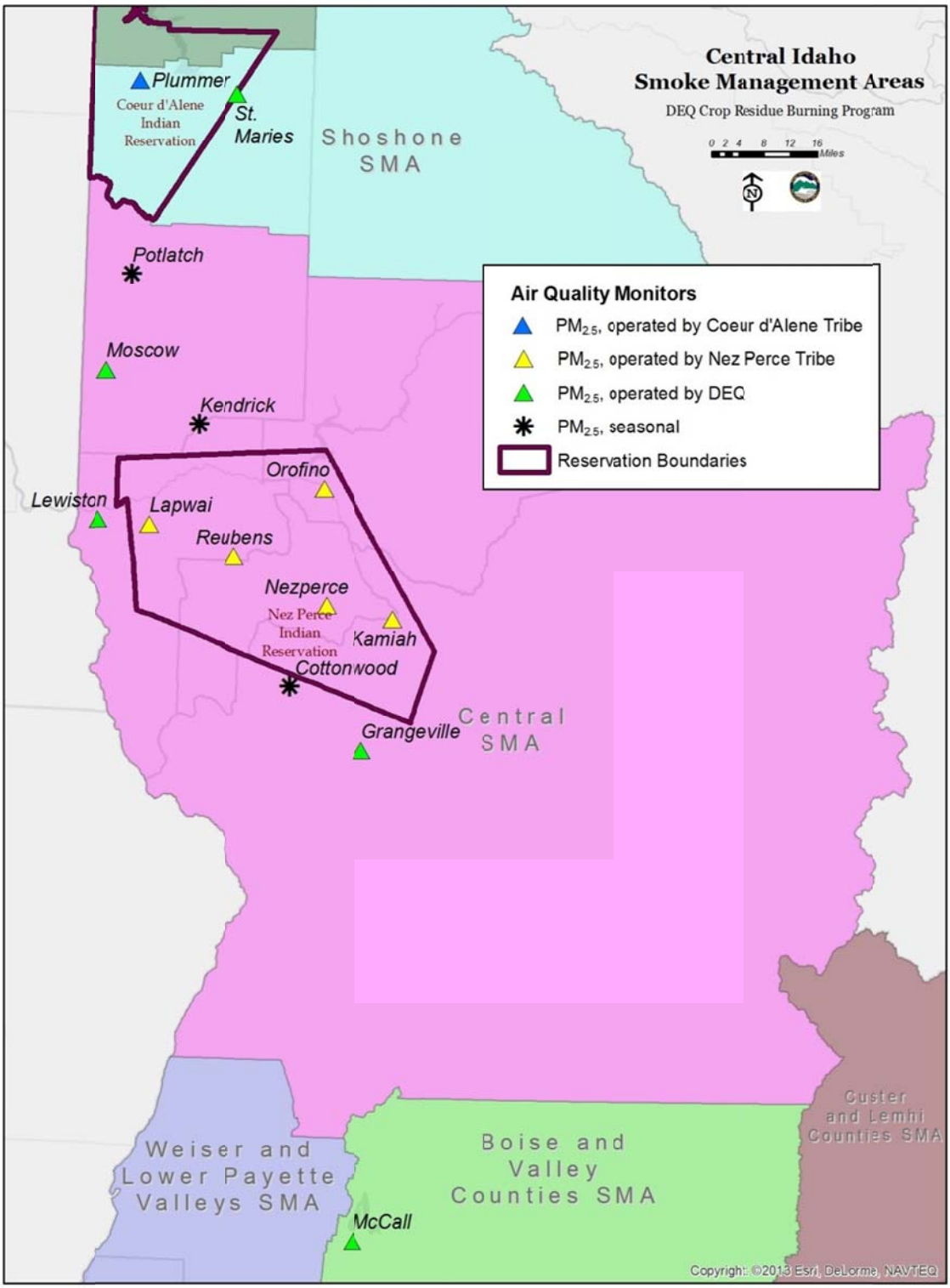


Figure 3. Air quality monitor locations for the Central Smoke Management Area.

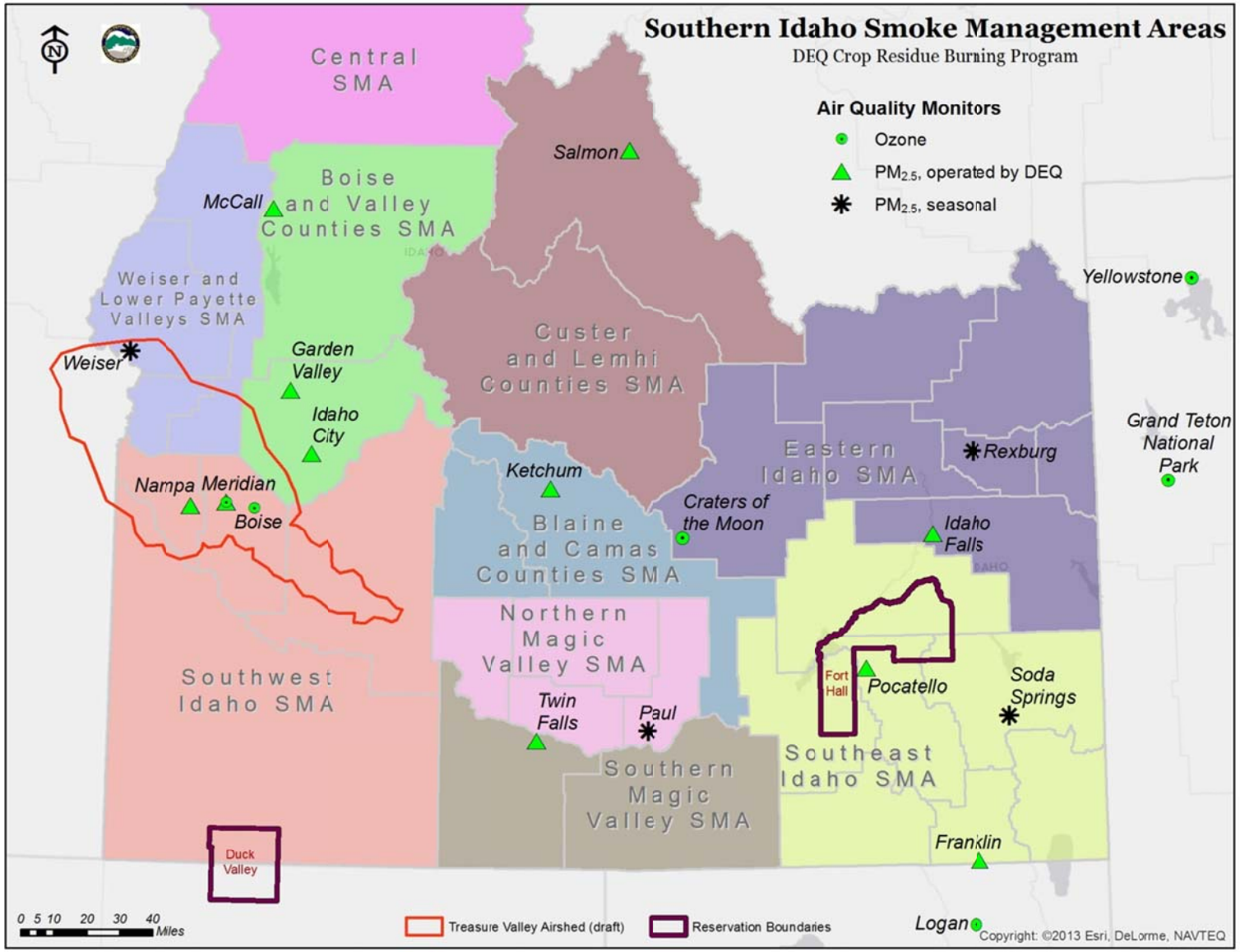


Figure 4. Air quality monitor locations for Southern Idaho Smoke Management Area.

4.5 Meteorology

Meteorological conditions play an important part in DEQ's burn decision process. DEQ contracted with Bennett Fire Weather Services, LLC to provide fire weather forecasting services during the fall burn season in northern Idaho. 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. An on-staff meteorologist provided twice-daily fire weather forecasts for southern Idaho. Appendix B contains detailed summaries 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 (pibals) to predict smoke dispersion.

4.6 Smoke Management Area Summaries

During 2014, 43,857 acres were burned statewide under the CRB program. This is less acreage than in previous years (54,438 and 67,939 acres in 2013 and 2012, respectively). The majority of the burning (86%) occurred during the fall burn season.

Detailed summaries of each SMA follow. Acres burned under the CRB program are broken down by burn season and crop type. Crop types include Kentucky bluegrass, other grass species, 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.

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 stable since 2012.

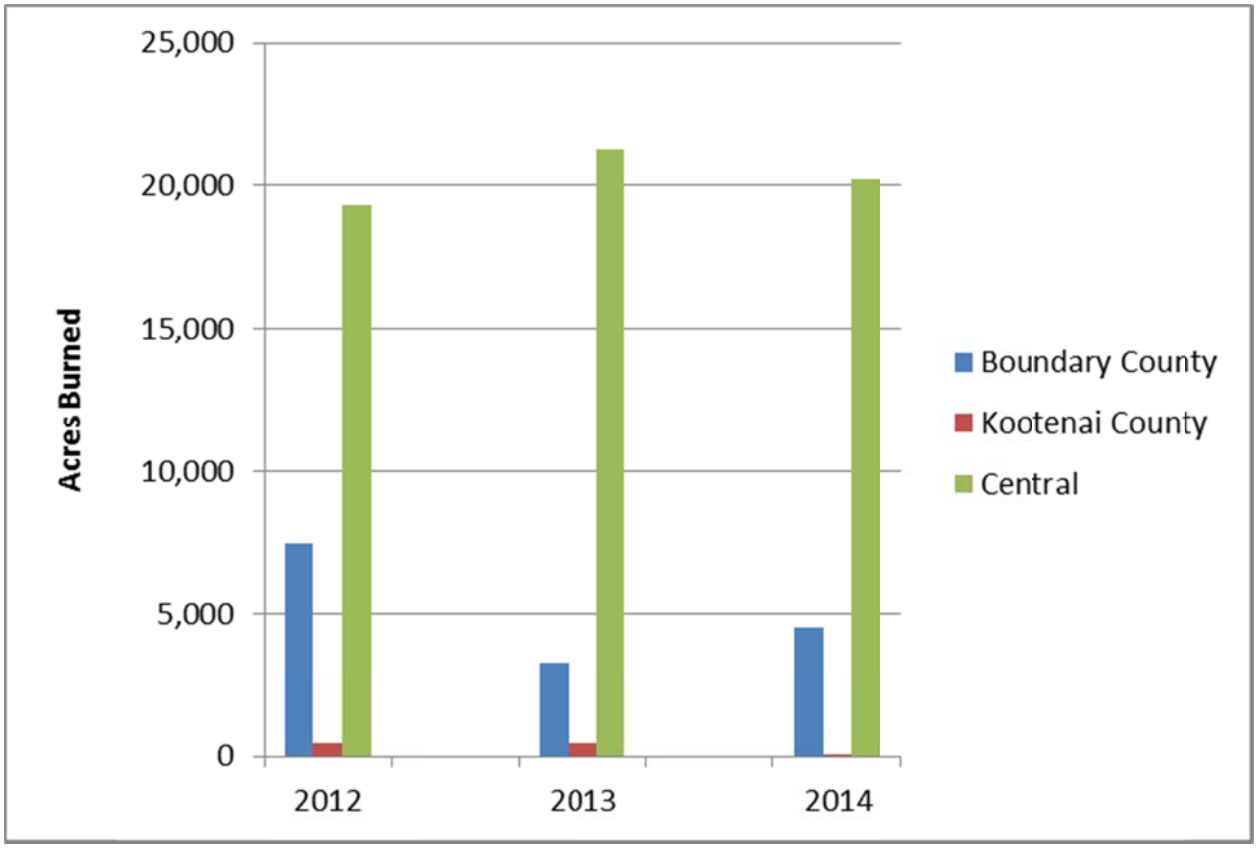


Figure 5. Acres burned in northern Idaho smoke management areas.

Figure 6 shows the number of acres burned under the CRB program in the southern Idaho SMAs for the last 3 years. The data show that the number of acres burned has decreased steadily since 2012.

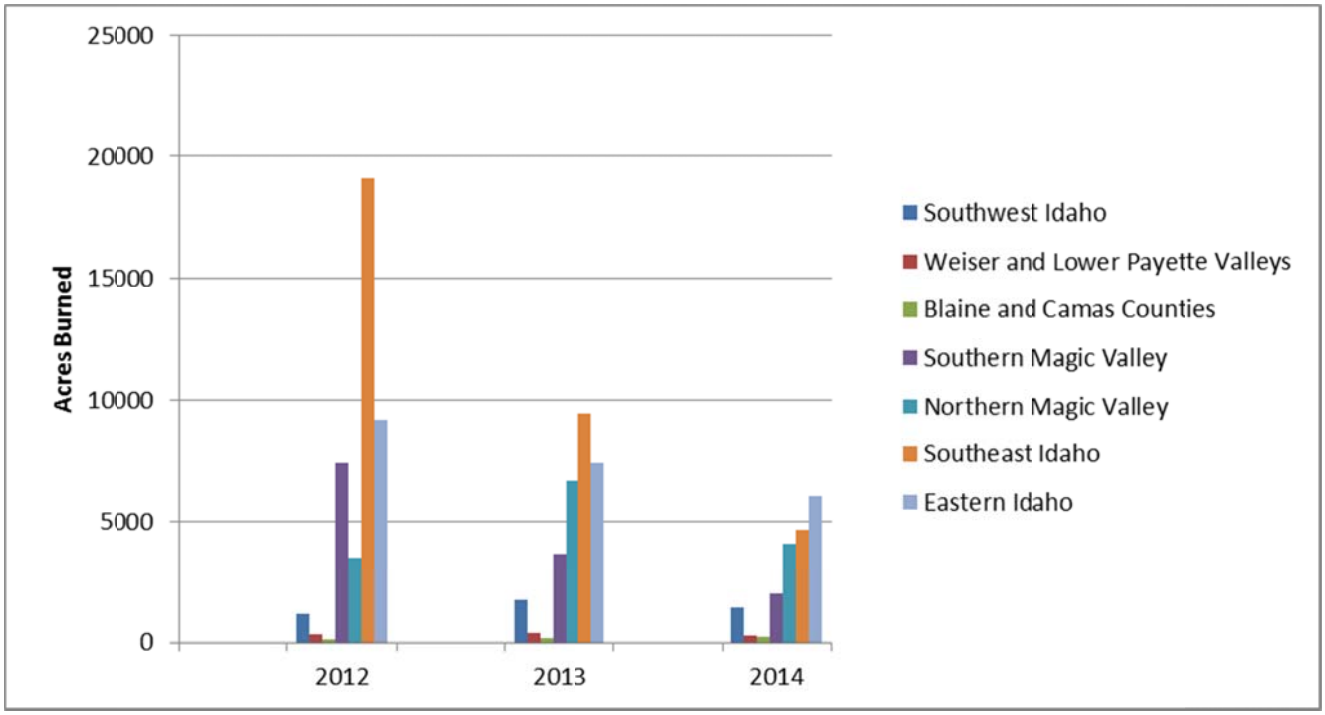


Figure 6. Acres burned in the southern Idaho smoke management areas.

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 primary crop residue burned in the Boundary County SMA in 2014 was cereal grain stubble; however, residue from other crops, such as Kentucky bluegrass, legumes, and hops, has historically been burned as well. Peak burn months for this SMA are April–June and August–October. High relative humidity and high fuel moisture often limit burning in the early spring and late fall.

Seasonal monitors are located in Porthill and Copeland. Year-round monitors in Creston, British Columbia, operated by BC Environment, and in Bonners Ferry, operated by the Kootenai Tribe of Idaho, provide additional data for program decisions and evaluations.

4.6.1.1 Acres Burned

Table 2 shows the acres burned in the spring and fall for each crop type during the 2012–2014 burn seasons. During 2014, fewer acres were burned as compared to 2012, but more than 2013. Figure 7 shows the locations of the fields burned during 2014: 32 fields totaling 4,503 acres were burned in the SMA, and 10 fields (31%) amounting to 1,077 acres (24%) were located within 3 miles of an ISP. In 2014, 12 growers burned fields within the CRB program in the SMA.

Table 2. Summary of acres burned in the Boundary County Smoke Management Area.

Burn Season and Crop Type	Acres Burned		
	2012	**2013**	**2014**
Spring[a]			
Cereal grain	3,348	1,071	1,209
CRP	0	0	55
Other crops	0	0	0
Subtotal	3,348	1,071	1,264
Fall[b]			
Cereal grain	3,935	2,217	3,169
Kentucky bluegrass	150	0	0
Other crops	0	0	70
Subtotal	4,085	2,217	3,239
Total	**7,433**	**3,288**	**4,503**

a. Spring season is January 1–June 30.
b. Fall season is July 1–December 31.
Note: CRP = Conservation Reserve Program lands

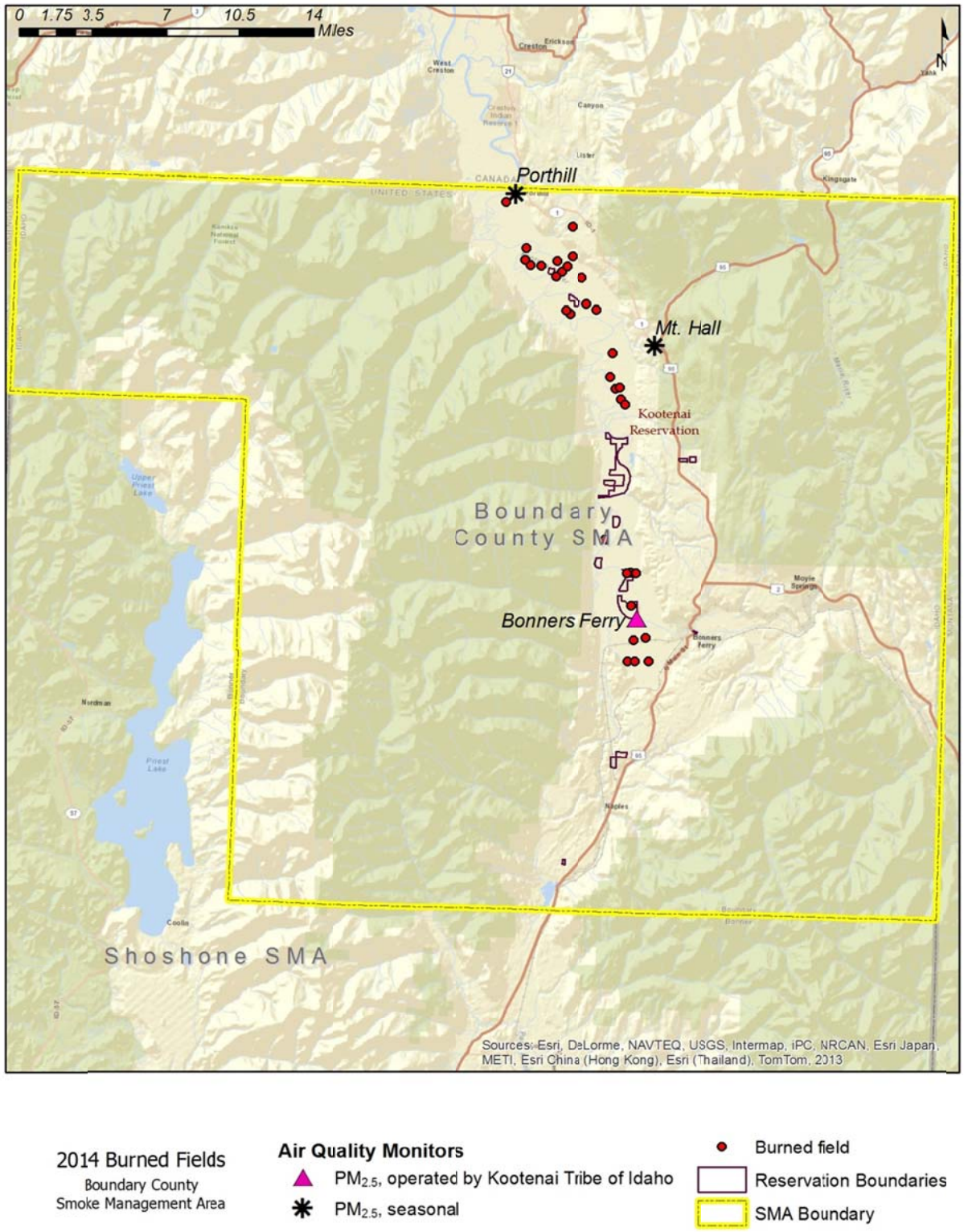


Figure 7. Locations of 2014 burns in the Boundary County Smoke Management Area.

4.6.1.2 Daily Burn Decisions and Air Quality

DEQ field coordinators were on site in this SMA on many 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 issued 14 burn days. On many of these days, conditions were marginal and only limited burning could be approved.

Table 3 shows the summary of 2014 burn decisions for the Boundary County SMA. DEQ issued 14 burn days in this SMA during 2014. The most common reason for a no-burn decision was that no requests to burn were received.

Table 3. Summary of burn decisions for the Boundary County Smoke Management Area.

County	Approved Burn Days	Days with No Requests to Burn[a]	No-Burn Days Due to Air Quality	No-Burn Days Due to Meteorological Conditions			No-Burn Days Due to Other Reasons
				Fuel Moisture	Wind	Ventilation	
Boundary	14	144	5	6	3	8	10

a. This summary includes all burn decisions issued for 2014. 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 an inventory of the acres burned for each SMA, including the Boundary County SMA.

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 that follow the Coeur d'Alene River as it flows into Coeur d'Alene Lake.

Historically, the primary crop burned in the Kootenai County SMA is Kentucky bluegrass. The peak burn months are August–October.

Seasonal ambient air quality monitors are located at Athol and Garwood. A year-round monitor is located in Hayden (Lancaster monitor). A Washington Department of Ecology ozone monitor in Spokane and DEQ monitors in Sandpoint and Pinehurst also provide additional data, although they are located outside the SMA. The ozone monitor operated by the Washington Department of Ecology is used to forecast ozone in Kootenai County.

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 Kentucky bluegrass 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 field requirements that severely limit the approval of an acceptable wind direction in Kootenai County.

4.6.2.1 Acres Burned

Table 4 shows the acres burned in the fall for each crop type during the 2012–2014 burn seasons. During the 2014 burn season, the number of burned acres decreased from 2012 and 2013. Figure 8 shows the locations of the fields burned during 2014: Two fields totaling 88 acres were burned in this SMA. These fields were not within 3 miles of an ISP. In 2014, one grower burned fields within the CRB program in the SMA.

Table 4. Summary of acres burned in the Kootenai County Smoke Management Area.

Burn Season and Crop Type	Acres Burned		
	2012	**2013**	**2014**
Fall[a]			
Kentucky bluegrass	470	370	0
Cereal grain	20	0	0
Other grass species	0	100	88
Total	**490**	**470**	**88**

a. Fall season is July 1–December 31.

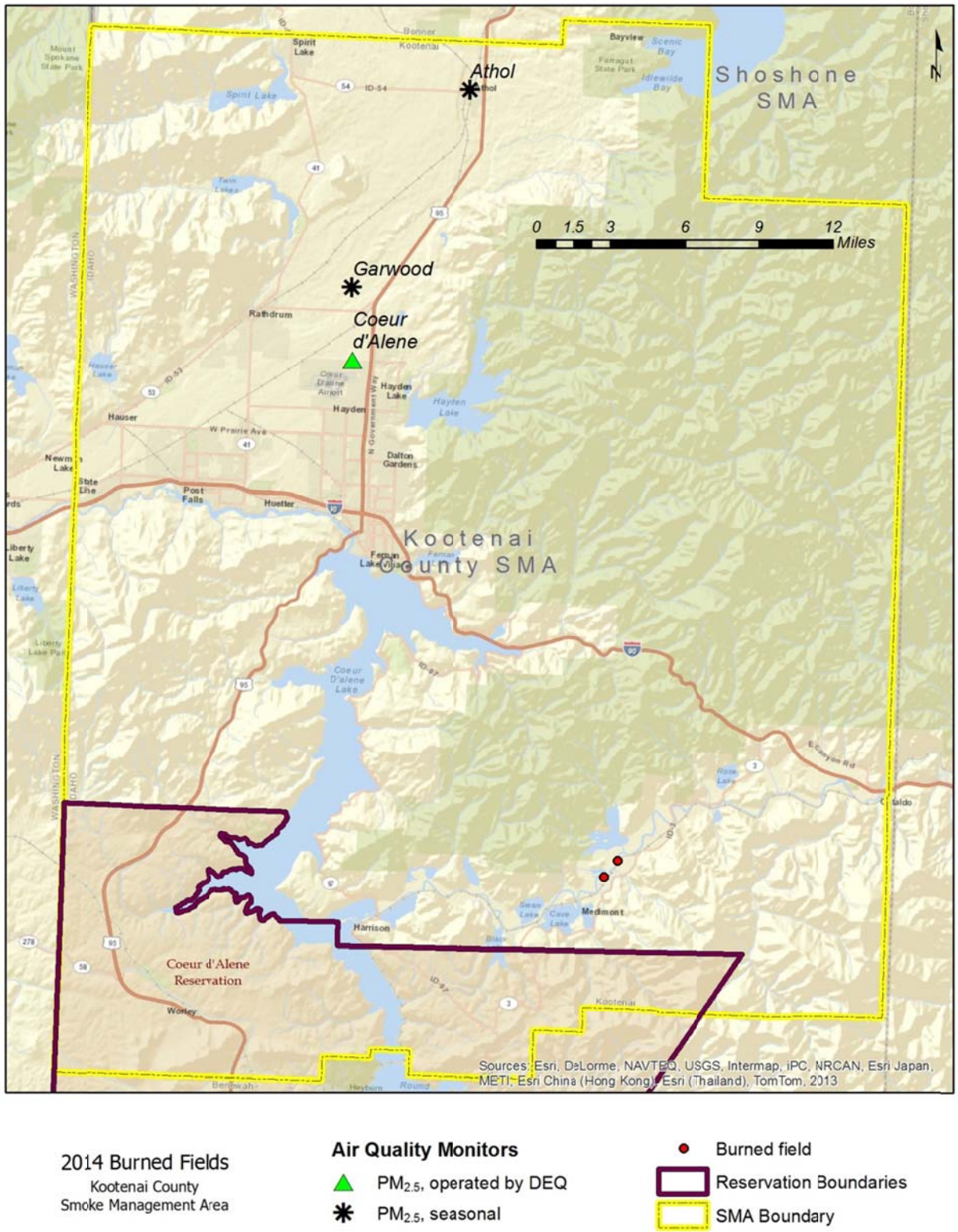


Figure 8. Locations of 2014 burns in the Kootenai County Smoke Management Area.

4.6.2.2 Daily Burn Decisions and Air Quality

Table 5 shows the summary of 2014 burn decisions for the Kootenai County SMA. DEQ issued two burn days in this SMA during 2014. The most common reason for a no-burn decision was that no requests to burn were received.

Table 5. Summary of burn decisions for the Kootenai County Smoke Management Area.

County	Approved Burn Days	Days with No Requests to Burn[a]	No-Burn Days Due to Air Quality	No-Burn Days Due to Meteorological Conditions			No-Burn Days Due to Other Reasons
				Fuel Moisture	Wind	Ventilation	
Kootenai	2	117	5	23	17	17	9

a. This summary includes all burn decisions issued for 2014. 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 an inventory of the acres burned for each SMA, including the Kootenai County SMA.

4.6.3 Central Smoke Management Area

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

Burning is mainly conducted in southwestern Clearwater, northwestern Idaho, northeastern Nez Perce, and Latah Counties. The primary crop burned in the Central SMA is cereal grain stubble followed by Kentucky bluegrass. Peak burn months for this SMA are August through early November.

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.

Year-round ambient air quality monitors that measure $PM_{2.5}$ are located in Moscow, Lewiston, and Grangeville; seasonal monitors are deployed at Potlatch, Cottonwood, and Kendrick. DEQ also uses data from air quality monitors in Kamiah, Orofino, Nez Perce, and Lapwai, which are operated by the Nez Perce Tribe.

4.6.3.1 Acres Burned

Table 6 shows the acres burned in the spring and fall for each crop type during the 2012–2014 burn seasons. During 2014, the majority of burning occurred during the fall. Figure 9 shows the locations of fields burned during 2014: 241 fields totaling 20,217 acres were burned in this

SMA, and 19 fields (8%) amounting to 1,536 acres (8%) were located within 3 miles of an ISP. In 2014, 74 growers burned fields within the CRB program in the SMA.

Table 6. Summary of acres burned in the Central Smoke Management Area.

Burn Season and Crop Type	Acres Burned		
	2012	**2013**	**2014**
Spring[a]			
CRP	1,355	549	378
Cereal grain	822	1,543	3,521
Turf grass	162	27	0
Other grass	0	0	85
Other crops	45	118	150
Subtotal	2,384	2,237	4,134
Fall[b]			
CRP	876	688	859
Cereal grain	12,561	14,478	12,499
Kentucky bluegrass	0	1,092	1,092
Turf grass	2,693	76	0
Pasture	0	0	103
Other grass	150	1,395	1,310
Other crops	393	237	220
Subtotal	16,943	17,965	16,083
Total	**19,327**	**20,202**	**20,217**

a. Spring season is January 1–June 30.
b. Fall season is July 1–December 31.
Note: CRP = Conservation Reserve Program lands

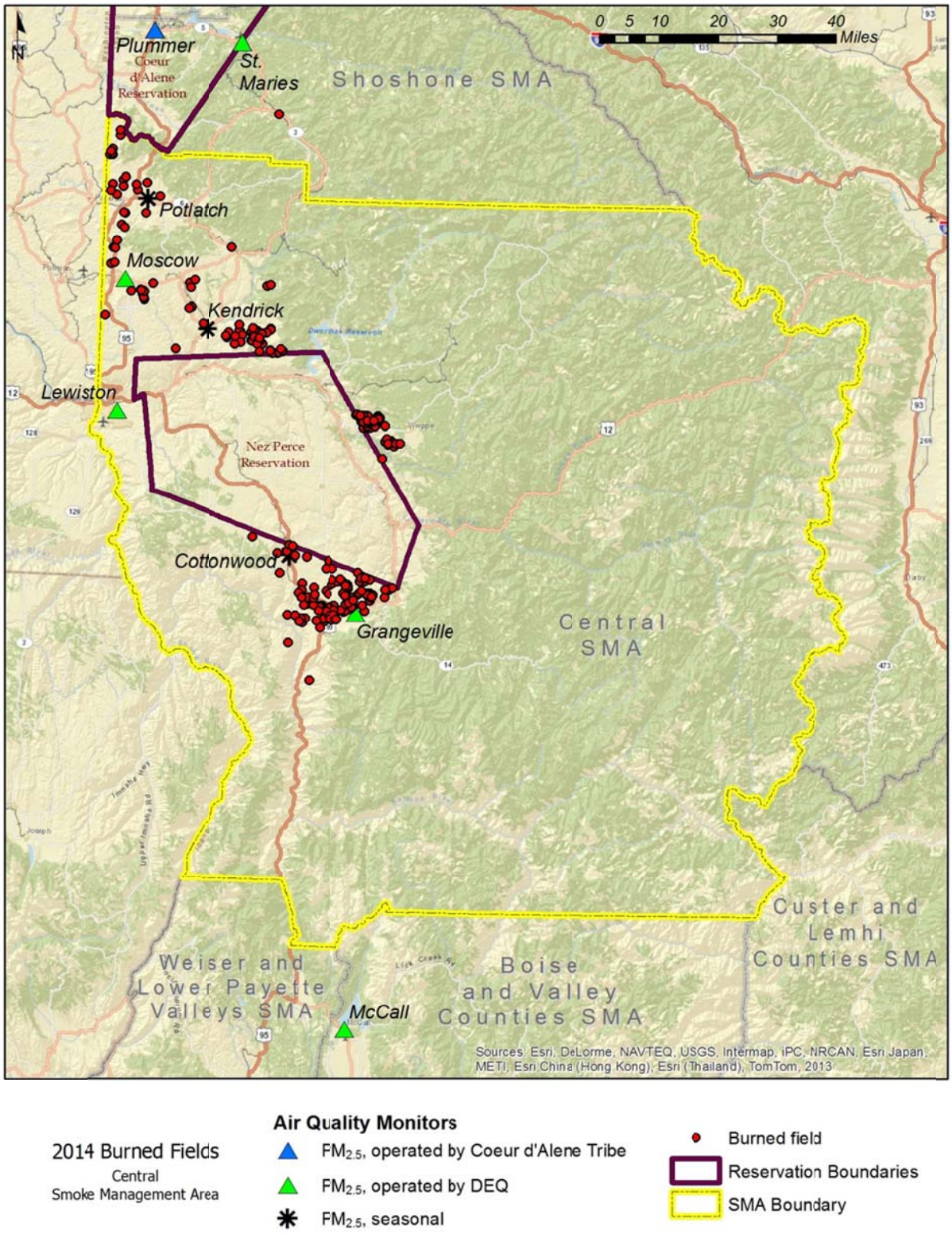


Figure 9. Locations of 2014 burns in the Central Smoke Management Area.

4.6.3.2 Daily Burn Decisions and Air Quality

Table 7 shows the summary of 2014 burn decisions for each county in the Central SMA. DEQ issued 26 burn days in at least one county in this SMA during 2014. The most common reason for a no-burn decision was that no requests to burn were received. Fuel moisture was also a reason for a no-burn decision.

Table 7. Summary of burn decisions for the Central Smoke Management Area.

County	Approved Burn Days	Days with No Requests to Burn[a]	No-Burn Days due to Air Quality	No-Burn Days Due to Meteorological Conditions			No-Burn Days Due to Other Reasons
				Fuel Moisture	Wind	Ventilation	
Clearwater	11	134	10	17	4	3	11
Idaho	26	102	12	27	5	7	11
Latah	19	107	13	28	6	5	12
Nez Perce	11	148	11	5	2	3	10

a. This summary includes all burn decisions issued for 2014. 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 an inventory of the acres burned for each SMA, including the Central SMA.

4.6.4 Southwest Idaho Smoke Management Area

The Southwest Idaho SMA includes Canyon, Ada, Owyhee, and Elmore Counties (Figure 1). Most of the crop residue burning activity occurred in western Canyon County, northwestern Owyhee County, and southeastern Owyhee County. The primary crops burned included cereal grain stubble, pasture, and alfalfa residue. Burning may occur year-round, but the peak burn periods in this SMA are March–April and July–October. Two ambient air quality monitors that measure $PM_{2.5}$ are located in Nampa and Boise, and two 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.

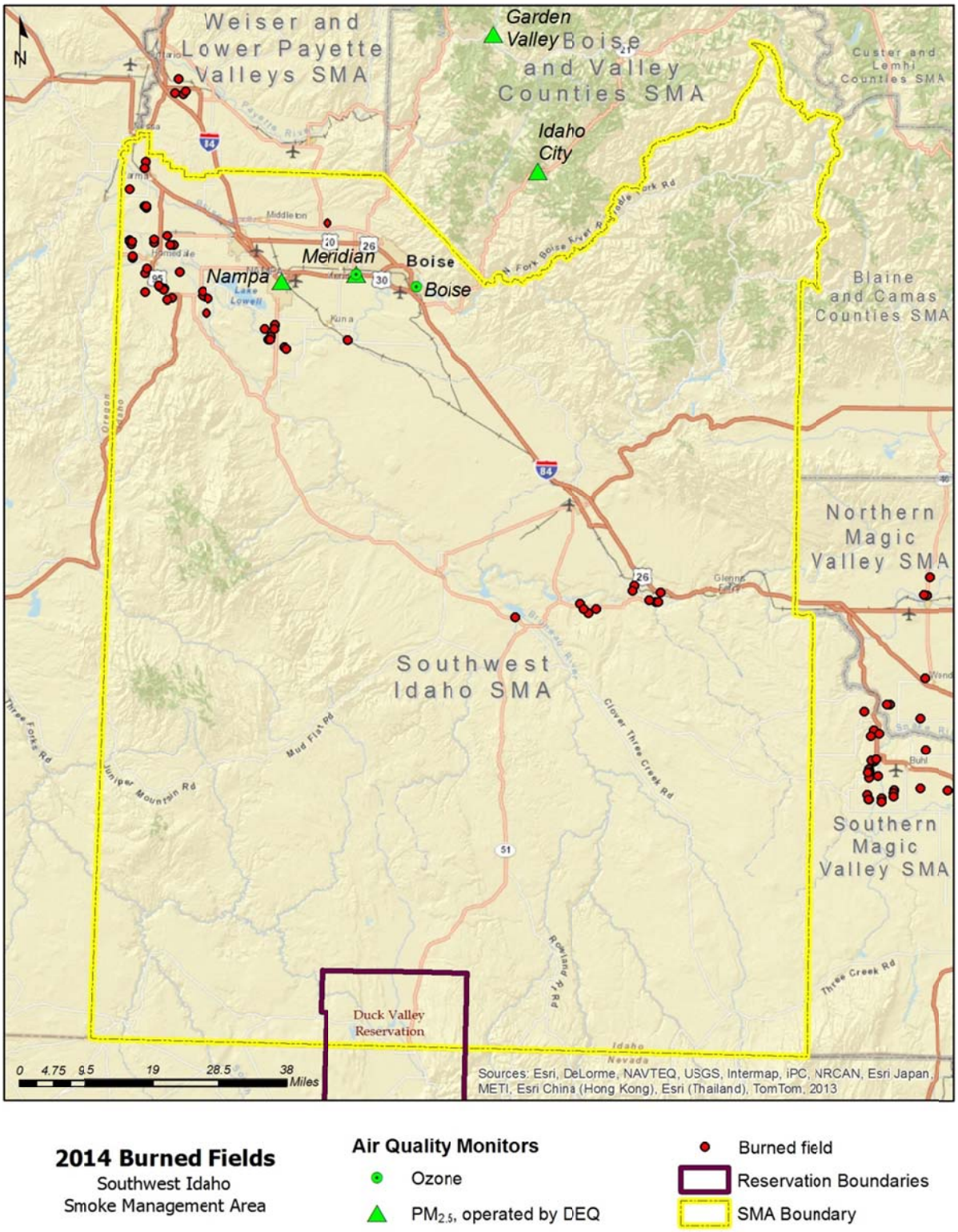
4.6.4.1 Acres Burned

Table 8 shows the acres burned in the spring and fall for each crop type during the 2012–2014 burn seasons. Figure 10 shows the locations of fields burned during 2014: 54 fields totaling 1,429 acres were burned in this SMA, and 5 fields (9%) amounting to 78 acres (5%) were located within 3 miles of an ISP. In 2014, 22 growers burned fields within the CRB program in the SMA.

Table 8. Summary of acres burned in the Southwest Idaho Smoke Management Area.

Burn Season and Crop Type	Acres Burned		
	2012	**2013**	**2014**
Spring[a]			
Alfalfa	0	0	19
Cereal grain	20	16	0
Corn	0	0	20
Other crops	85	63	25
Subtotal	105	79	64
Fall[b]			
Alfalfa		207	321
Cereal grain	460	1,508	1,033
CRP	200	0	0
Other crops	226	0	5
Pasture	0	0	6
Subtotal	886	1,715	1,365
Total	**991**	**1,794**	**1,429**

a. Spring season is January 1–June 30.
b. Fall season is July 1–December 31.
Note: CRP = Conservation Reserve Program lands



2014 Burned Fields
Southwest Idaho
Smoke Management Area

Air Quality Monitors
- Ozone
- $PM_{2.5}$, operated by DEQ

- Burned field
- Reservation Boundaries
- SMA Boundary

Figure 10. Locations of 2014 burns in the Southwest Idaho Smoke Management Area.

4.6.4.2 Daily Burn Decisions and Air Quality

Table 9 shows the summary of 2014 burn decisions for each county in the Southwest Idaho SMA. DEQ issued 15 burn days in at least one county in this SMA during 2014. The most common reason for a no-burn decision was that no requests to burn were received. Fuel moisture and poor air quality were also reasons for a no-burn decision.

Table 9. Summary of burn decisions for the Southwest Idaho Smoke Management Area.

County	Approved Burn Days	Days with No Requests to Burn[a]	No-Burn Days Due to Air Quality	No-Burn Days Due to Meteorological Conditions			No-Burn Days Due to Other Reasons[b]
				Fuel Moisture	Wind	Ventilation	
Ada	3	174	6	0	0	0	7
Canyon	15	149	6	11	1	1	7
Elmore	6	175	0	2	0	0	7
Owyhee	10	155	1	15	1	1	7

a. This summary includes all burn decisions issued through December 31, 2014. 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 National Weather Service-issued red-flag warnings.

Appendix C contains an inventory of the acres burned for each SMA, including the Southwest Idaho SMA.

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). Payette and Washington Counties account for the majority of acres burned. The primary crops burned in the SMA were cereal grain stubble and pasture. Burning may occur year-round, but the peak burn periods are March–April and July–October. An ambient air quality monitor that measures $PM_{2.5}$ is located in Weiser. The closest ambient ozone monitor is located in Meridian in the Southwestern 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 10 shows the acres burned in the spring and fall for each crop type during the 2012–2014 burn seasons. Figure 11 shows the locations of fields burned during 2014: 15 fields totaling 265 acres were burned in this SMA, and 4 fields (27%) amounting to 77 acres (71%) were located within 3 miles of an ISP. In 2014, eight growers burned fields within the CRB program in the SMA.

Table 10. Summary of acres burned in the Weiser and Lower Payette Valleys Smoke Management Area.

Burn Season and Crop Type		Acres Burned		
		2012	2013	2014
Spring[a]				
	Cereal grain	3	20	0
	Corn	0	145	28
	Other crops	223	92	52
	Subtotal	226	257	80
Fall[b]				
	Cereal grain	0	53	157
	Corn	0	0	21
	Other crops	72	0	8
	Subtotal	72	53	186
Total		**298**	**310**	**265**

a. Spring season is January 1–June 30.
b. Fall season is July 1–December 31.

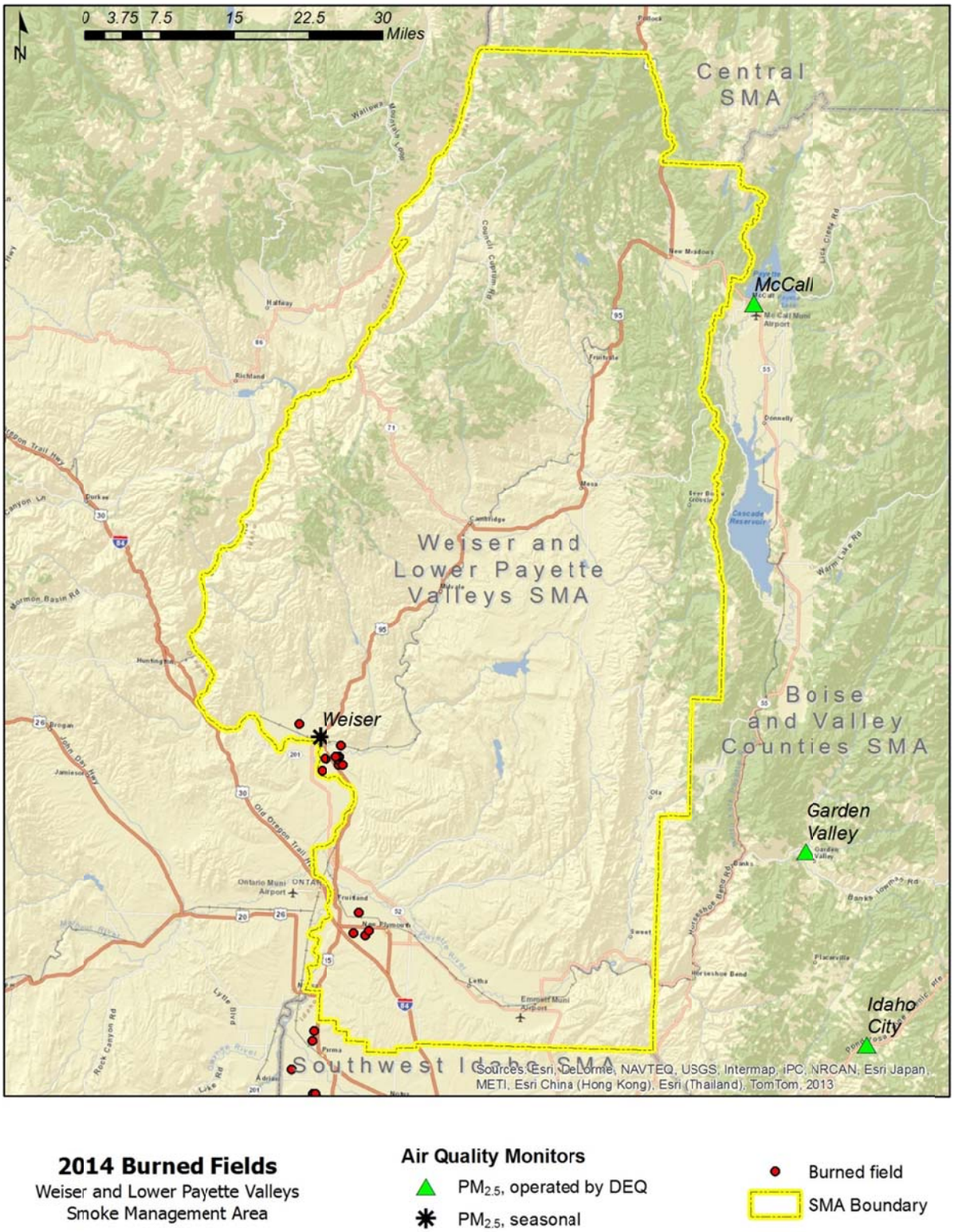


Figure 11. Locations of 2014 burns in the Weiser and Lower Payette Valleys Smoke Management Area.

4.6.5.2 Daily Burn Decisions and Air Quality

Table 11 shows the summary of 2014 burn decisions for each county in the Weiser and Lower Payette Valleys SMA. DEQ issued five burn days in one county in this SMA during 2014. The most common reason for a no-burn decision was that no requests to burn were received.

Table 11. Summary of burn decisions for the Weiser and Lower Payette Valleys Smoke Management Area.

County	Approved Burn Days	Days With No Requests to Burn[a]	No-Burn Days Due to Air Quality	No-Burn Days Due to Meteorological Conditions			No-Burn Days Due to Other Reasons[b]
				Fuel Moisture	Wind	Ventilation	
Adams	0	183	0	0	0	0	7
Gem	0	183	0	0	0	0	7
Payette	0	183	0	0	0	0	7
Washington	5	171	1	4	1	0	8

a. This summary includes all burn decisions issued through December 31, 2014. 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 National Weather Service-issued red-flag warnings.

Appendix C contains an inventory of the acres burned for each SMA, including the Weiser and Lower Payette valleys SMA.

4.6.6 Blaine and Camas Counties Smoke Management Area

The Blaine and Camas Counties SMA consists of Blaine and Camas Counties (Figure 1), but burning was only conducted in Blaine County. Burning may occur year-round, but the typical burn season is fall. A $PM_{2.5}$ 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. Additionally, $PM_{2.5}$ monitors located in Twin Falls (Southern Magic Valley SMA) and Paul (Northern Magic Valley SMA) are within the relevant vicinity of portions of this SMA and are used in the burn decision process.

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 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.

4.6.6.1 Acres Burned

Table 12 shows the acres burned in the spring and fall for each crop type during the 2012–2014 burn seasons. Figure 12 shows the locations of the fields burned during 2014: two growers burned three fields totaling 217 acres in this SMA. These fields were not within 3 miles of an ISP.

Table 12. Summary of acres burned in the Blaine and Camas Counties Smoke Management Area.

Burn Season and Crop Type	Acres Burned		
	2012	**2013**	**2014**
Fall[a]			
Cereal grain	100	180	217
Other crops	0	0	0
Total	**100**	**100**	**217**

a. Fall season is July 1–December 31.

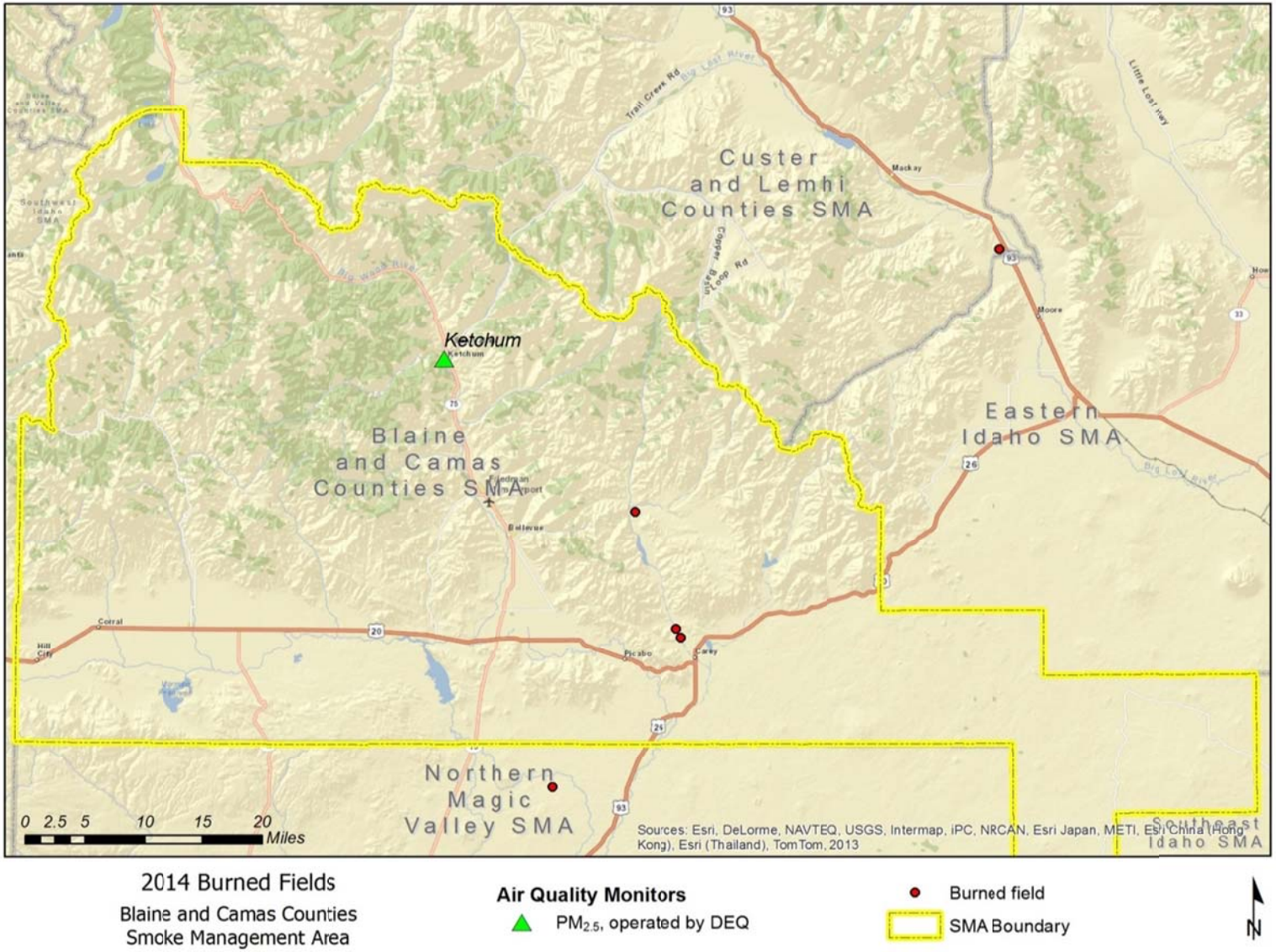


Figure 12. Locations of 2014 burns in the Blaine and Camas Counties Smoke Management Area.

4.6.6.2 Daily Burn Decisions and Air Quality

Table 13 shows the summary of 2014 burn decisions for the two counties in this SMA. DEQ issued five burn days in one county in this SMA during 2014. The most common reason for a no-burn decision was that no requests to burn were received.

Table 13. Summary of burn decisions for the Blaine and Camas Counties Smoke Management Area.

County	Approved Burn Days	Days With No Requests to Burn[a]	No-Burn Days Due to Air Quality	No-Burn Days Due to Meteorological Conditions			No-Burn Days Due to Other Reasons
				Fuel Moisture	Wind	Ventilation	
Blaine	5	165	2	11	0	0	7
Camas	0	183	0	0	0	0	7

a. This summary includes all burn decisions issued through December 31, 2014. 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 an inventory of the acres burned for each SMA, including the Blaine and Camas Counties SMA.

4.6.7 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 has generally been cereal grain stubble. Burning may occur year-round, but the peak burn periods are March–May and July–October. The Southern Magic Valley SMA has one $PM_{2.5}$ air quality monitor located in Twin Falls. Additionally, a $PM_{2.5}$ monitor located in Paul (Northern Magic Valley SMA) and an ozone monitor operated by the National Park Service at Craters of the Moon National Monument are within the relevant vicinity of portions of this SMA and are 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.

4.6.7.1 Acres Burned

Table 14 shows the acres burned in the spring and fall for each crop type during the 2012–2014 burn seasons. Figure 13 shows the locations of fields burned during 2014: 57 fields totaling 2,010 acres were burned in this SMA, and 3 fields (5%) amounting to 115 acres (6%) were located within 3 miles of an ISP. In 2014, 26 growers burned fields within the CRB program in the SMA.

Table 14. Summary of acres burned in the Southern Magic Valley Smoke Management Area.

Burn Season and Crop Type	Acres Burned		
	2012	**2013**	**2014**
Spring[a]			
CRP	1,001	85	0
Corn	0	33	16
Cereal grain	1,752	841	585
Other crops	418	16	17
Subtotal	3,181	975	618
Fall[b]			
CRP	2,605	79	280
Corn	0	122	0
Cereal grain	1,602	2,588	1,079
Other crops	52	0	33
Subtotal	4,259	2,789	1,392
Total	**7,440**	**3,764**	**2,010**

a. Spring season is January–June 30.
b. Fall season is July 1–December 31.
Note: CRP = Conservation Reserve Program lands

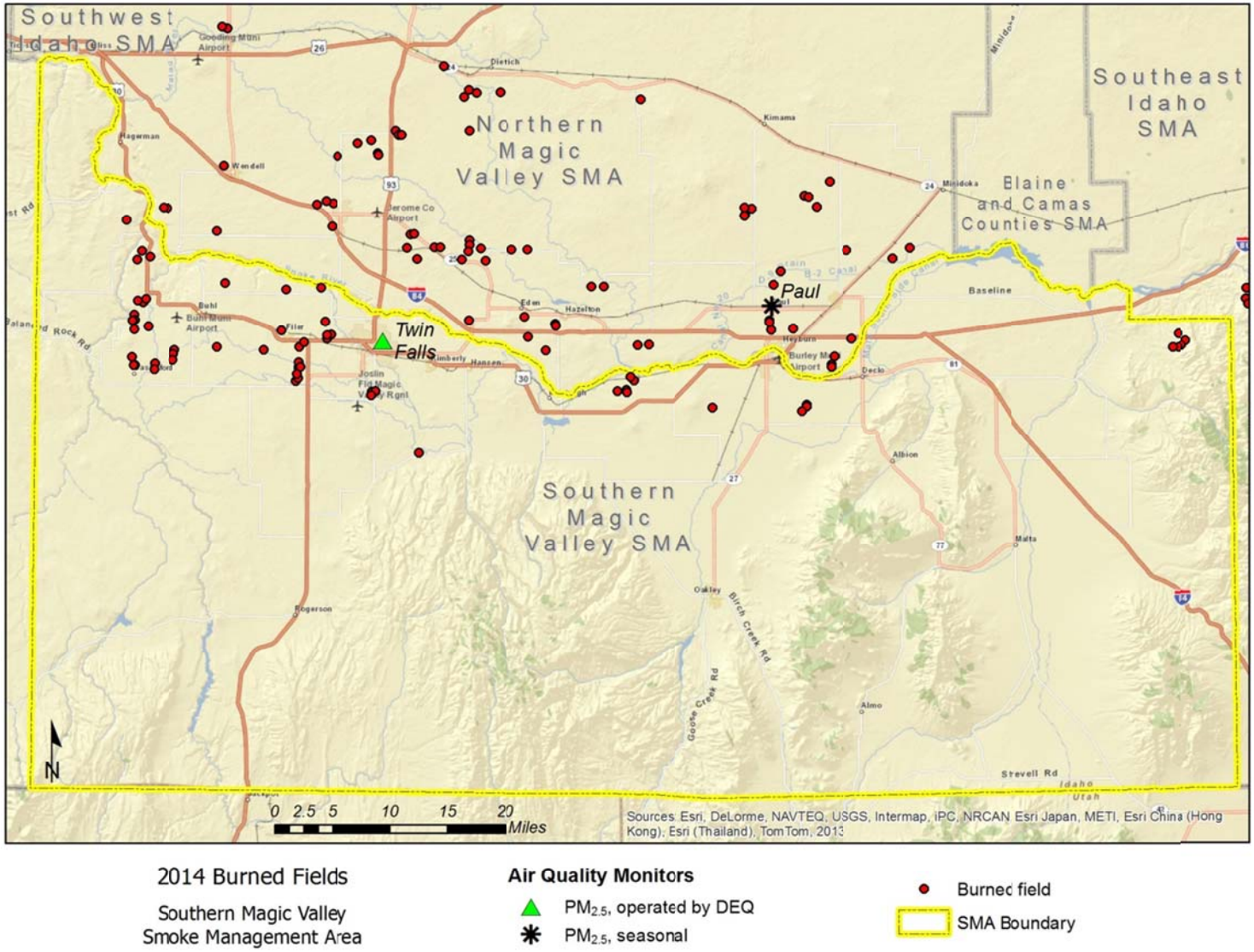


Figure 13. Locations of 2014 burns in the Southern Magic Valley Smoke Management Area.

4.6.7.2 Daily Burn Decisions and Air Quality

Table 15 shows the summary of 2014 burn decisions for the two counties in the Southern Magic Valley SMA. DEQ issued 27 burn days in at least one county in this SMA during 2014. The most common reason for a no-burn decision was that no requests to burn were received. Fuel moisture was also a reason for a no-burn decision.

Table 15. Summary of burn decisions for the Southern Magic Valley Smoke Management Area.

County	Approved Burn Days	Days with No Requests to Burn[a]	No-Burn Days Due to Air Quality	No-Burn Days Due to Meteorological Conditions			No-Burn Days Due to Other Reasons[b]
				Fuel Moisture	Wind	Ventilation	
Cassia	4	164	1	10	4	0	7
Twin Falls	27	135	1	14	6	0	7

a. This summary includes all burn decisions issued through December 31, 2014. 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 National Weather Service-issued red-flag warnings.

Appendix C contains an inventory of the acres burned for each SMA, including the Southern Magic Valley SMA.

4.6.8 Northern Magic Valley Smoke Management Area

The Northern Magic Valley SMA includes Gooding, Lincoln, Jerome, and Minidoka Counties (Figure 1). The primary crop burned was cereal grain stubble. Burning may occur year-round, but the peak burn periods are March–April and July–October. The Northern Magic Valley SMA has one $PM_{2.5}$ air quality monitor located in Paul. Additionally, a $PM_{2.5}$ monitor located in Twin Falls (Southern Magic Valley SMA) and an ozone monitor operated by the National Park Service at Craters of the Moon National Monument are in the relevant vicinity of portions of this SMA and are used in the burn decision process.

The Northern Magic Valley SMA covers 3,305 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.

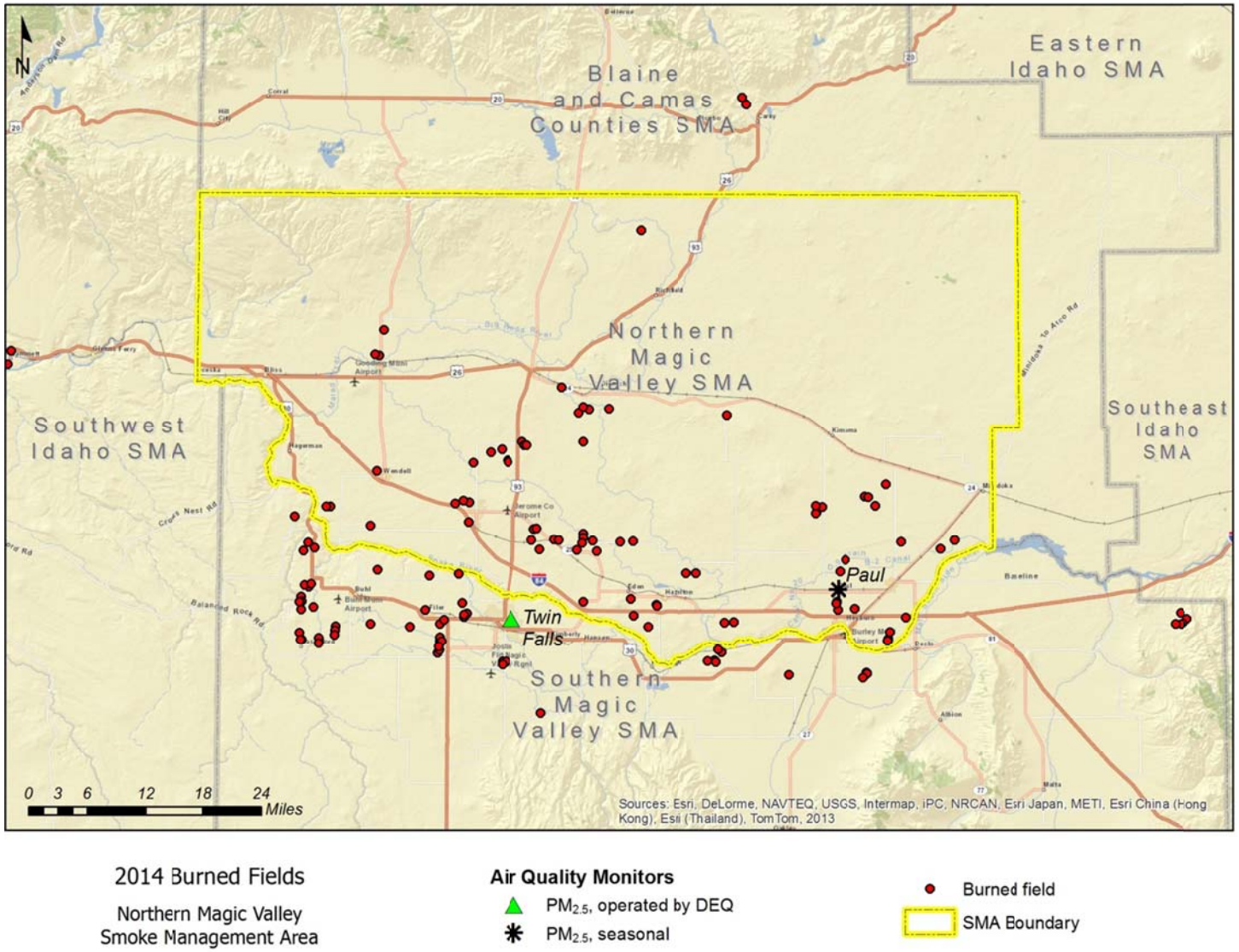
4.6.8.1 Acres Burned

Table 16 shows the acres burned in the spring and fall for each crop type during the 2012–2014 burn seasons. Figure 14 shows the locations of fields burned during 2014: 73 fields totaling 4,049 acres were burned in this SMA, and three fields (5%) and 97 acres (2%) were located within 3 miles of an ISP. In 2014, 36 growers burned fields within the CRB program in the SMA.

Table 16. Summary of acres burned in the Northern Magic Valley Smoke Management Area.

Burn Season and Crop Type	Acres Burned		
	2012	**2013**	**2014**
Spring[a]			
CRP	0	0	0
Cereal grain	193	156	416
Other crops	83	0	0
Subtotal	276	156	416
Fall[b]			
Alfalfa	0	0	74
CRP	150	0	0
Cereal grain	3,067	6,334	3,588
Other crops	35	56	1
Subtotal	3,329	6,390	3,633
Total	**3,605**	**6,546**	**4,049**

a. Spring season is January 1–June 30.
b. Fall season is July 1–December 31.
Note: CRP = Conservation Reserve Program lands



2014 Burned Fields

Northern Magic Valley Smoke Management Area

Air Quality Monitors

- $PM_{2.5}$, operated by DEQ
- $PM_{2.5}$, seasonal

- Burned field
- SMA Boundary

Figure 14. Locations of 2014 burns in the Northern Magic Valley Smoke Management Area.

4.6.8.2 Daily Burn Decisions and Air Quality

Table 17 shows the summary of 2014 burn decisions for each county in the Northern Magic Valley SMA. DEQ issued 15 burn days in at least one county in this SMA during 2014. The most common reason for a no-burn decision was that no requests to burn were received. Fuel moisture was also a reason for a no-burn decision.

Table 17. Summary of burn decisions for the Northern Magic Valley Smoke Management Area.

County	Approved Burn Days	Days with No Requests to Burn[a]	No-Burn Days due to Air Quality	No-Burn Days Due to Meteorological Conditions			No-Burn Days Due to Other Reasons[b]
				Fuel Moisture	Wind	Ventilation	
Gooding	2	175	0	5	0	0	8
Jerome	15	151	1	11	4	0	8
Lincoln	11	163	0	7	1	0	8
Minidoka	14	152	1	12	4	0	7

a. This summary includes all burn decisions issued through December 31, 2014. 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 National Weather Service-issued red-flag warnings.

Appendix C contains an inventory of the acres burned for each SMA, including the Northern Magic Valley SMA.

4.6.9 Southeast Idaho Smoke Management Area

The Southeast Idaho SMA includes Bingham, Power, Bannock, Caribou, Oneida, Franklin, and Bear Lake Counties (Figure 1). Burning occurred in all counties excluding Bear Lake and Franklin. The primary crops burned in the SMA were cereal grain stubble and CRP lands. Burning may occur year-round, but the peak burn periods in the SMA are April–May and July–October. Ambient air quality monitors that measure $PM_{2.5}$ are located in Pocatello and Soda Springs. Additionally, ozone monitors operated by the National Park Service at Craters of the Moon National Monument and the Utah Department of Environmental Quality in Logan and Brigham City 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.

4.6.9.1 Acres Burned

Table 18 shows the acres burned in the spring and fall for each crop type during the 2012–2014 burn seasons. Figure 15 shows the locations of fields burned during 2014: 76 fields totaling 4,661 acres were burned in this SMA, and 7 fields (9%) totaling 563 acres (12%) were located

within 3 miles of an ISP. In 2014, 30 growers burned fields within the CRB program in the SMA.

Table 18. Summary of acres burned in the Southeast Idaho Smoke Management Area.

Burn Season and Crop Type	Acres Burned		
	2012	**2013**	**2014**
Spring[a]			
CRP	3,647	1,786	460
Cereal grain	515	332	1,263
Pasture	0	0	36
Other crops	270	251	0
Subtotal	4,432	2,369	1,759
Fall[b]			
CRP	10,392	1,868	633
Cereal grain	4,142	5,011	2,269
Other crops	125	200	0
Subtotal	14,659	7,079	2,902
Total	**19,091**	**9,448**	**4,661**

a. Spring season is January 1–June 30.
b. Fall season is July 1–December 31.
Note: CRP = Conservation Reserve Program lands

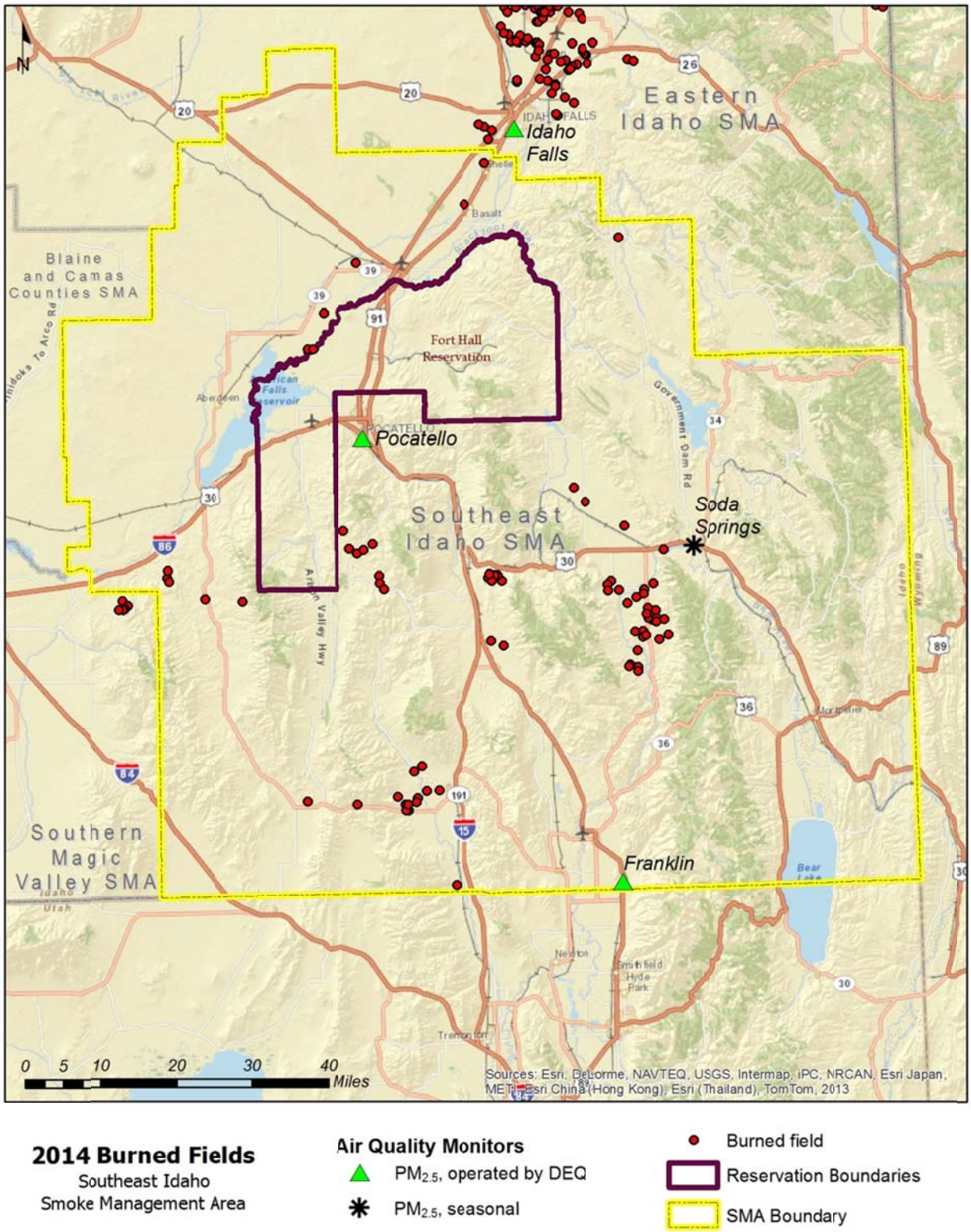


Figure 15. Locations of 2014 burns in the Southeast Idaho Smoke Management Area.

4.6.9.2 Daily Burn Decisions and Air Quality

Table 19 shows the summary of 2014 burn decisions for each county in the Southeast Idaho SMA. DEQ issued 20 burn days in at least one county in this SMA during 2014. The most common reason for a no-burn decision was that no requests to burn were received. Fuel moisture was also a reason for a no-burn decision.

Table 19. Summary of burn decisions for the Southeast Idaho Smoke Management Area.

County	Approved Burn Days	Days with No Requests to Burn[a]	No-Burn Days due to Air Quality	No-Burn Days Due to Meteorological Conditions			No-Burn Days Due to Other Reasons[b]
				Fuel Moisture	Wind	Ventilation	
Bannock	1	182	0	0	0	0	7
Bear Lake	0	183	0	0	0	0	7
Bingham	6	174	0	0	3	0	7
Caribou	20	153	0	9	0	1	7
Franklin	0	183	0	0	0	0	7
Oneida	3	180	0	0	0	0	7
Power	2	175	0	5	0	1	7

a. This summary includes all burn decisions issued through December 31, 2014. 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 National Weather Service-issued red-flag warnings.

Appendix C contains an inventory of the acres burned for each SMA, including the Southeast Idaho SMA.

4.6.10 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, Clark, and Bonneville Counties. The primary crops burned were cereal grain stubble and CRP lands. Burning may occur year-round, but the peak burn periods are April–May and August–October. Two ambient $PM_{2.5}$ 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, Grand Teton National Park, and Yellowstone National Park are within the relevant vicinity of portions of this SMA 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 Plain 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.

4.6.10.1 Acres Burned

Table 20 shows the acres burned in the spring and fall for each crop type during the 2012–2014 burn seasons. Figure 16 shows the locations of fields burned during 2014: 114 fields totaling

6,016 acres were burned in the SMA, and 30 fields (26%) totaling 1,310 acres (22%) were located within 3 miles of an ISP. In 2014, 48 growers burned fields within the CRB program in the SMA.

Table 20. Summary of acres burned in the Eastern Idaho Smoke Management Area.

Burn Season and Crop Type	Acres Burned		
	2012	2013	2014
Spring[a]			
CRP	339	1,205	112
Cereal grain	599	467	245
Other crops	0	53	0
Subtotal	938	1,725	357
Fall[b]			
CRP	60	0	0
Cereal grain	8,076	5,641	5,659
Other crops	89	0	0
Subtotal	8,226	5,641	5,659
Total	**9,164**	**7,366**	**6,016**

a. Spring season is January 1–June 30.
b. Fall season is July 1–December 31.
Note: CRP = Conservation Reserve Program lands

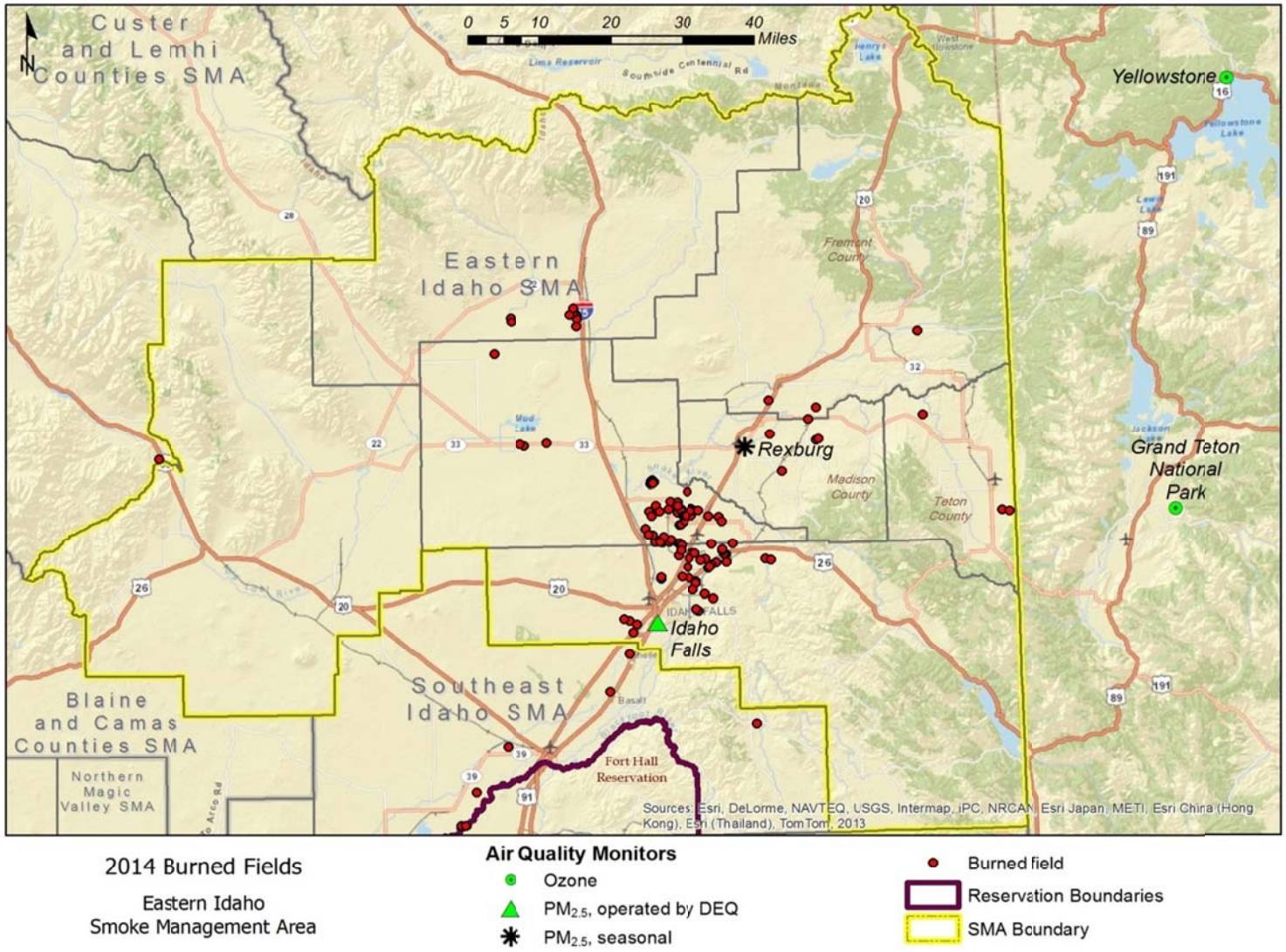


Figure 16. Locations of 2014 burns in the Eastern Idaho Smoke Management Area.

4.6.10.2 Daily Burn Decisions and Air Quality

Table 21 shows the summary of 2014 burn decisions for each county in the Eastern Idaho SMA. DEQ issued 24 burn days in at least one county in this SMA during 2014. The most common reason for a no-burn decision was that no requests to burn were received. Fuel moisture was also a reason for a no-burn decision.

Table 21. Summary of burn decisions for the Eastern Idaho Smoke Management Area.

County	Approved Burn Days	Days with No Requests to Burn[a]	No-Burn Days Due to Air Quality	No-Burn Days Due to Meteorological Conditions			No-Burn Days Due to Other Reasons[b]
				Fuel Moisture	Wind	Ventilation	
Butte	0	183	0	0	0	0	7
Clark	21	144	0	14	4	0	7
Fremont	2	180	0	0	1	0	7
Jefferson	23	128	0	25	6	1	7
Madison	8	165	0	4	5	1	7
Bonneville	24	132	0	22	5	0	7
Teton	3	172	0	7	1	0	7

a. This summary includes all burn decisions issued through December 31, 2014. 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 National Weather Service-issued red-flag warnings.

Appendix C contains an inventory of the acres burned for each SMA, including the Eastern Idaho SMA.

5. CRB Advisory Committee Recommendations

Subsequent to the annual CRB program analysis, DEQ concluded that no improvements were needed at this time to protect public health or improve the effectiveness and efficiency of the program. <CRB Advisory Recommendations>

6. Conclusions

Overall, DEQ considered the 2014 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 $PM_{2.5}$, none of these occurrences was likely a direct result of approved crop residue burning. DEQ determined that there were no instances where approved crop residue burning caused adverse impacts to ISPs.

Appendix A. Introduction to Crop Residue Burning in Idaho

Introduction

Open burning of crop residue is a method used by growers in Idaho and many other areas of the country to improve yields, reduce the need for herbicides and pesticides, reduce fire hazards, and control disease, weeds, and pests. If crop residue burning is not managed properly, smoke from crop residue burning has the potential to impact or endanger public health.

History of the Crop Residue Burning Program

Existing rules for crop residue burning were challenged and litigated, which led to a court decision and ban of such burning in January 2007. Governor Otter called for growers and activists to join with state regulators to negotiate a solution that would allow crop residue burning, while protecting public health from smoke impacts. Negotiations began in July 2007.

Central parties to these discussions included representatives from Safe Air for Everyone, Idaho Department of Environmental Quality (DEQ), Idaho State Department of Agriculture, US Environmental Protection Agency, the Coeur d'Alene, Kootenai, and Nez Perce Tribes, and numerous farm organizations and farmers who burn crop residue. Several meetings were held to identify the issues and to find common ground. The goal was to design a program that was protective of public health, transparent to the public, and restored the use of fire as a tool for the agricultural community. After several months of discussion, and with help from an independent mediator, an agreement was reached on December 19, 2007.

From the agreement, the new crop residue burning (CRB) program would implement the following:

- Be administered by DEQ.
- Be modeled after the Nez Perce Tribe's program, specifically by protecting air quality to 75% of the National Ambient Air Quality Standard (NAAQS).
- Incorporate aspects of transparency from the Washington State Department of Ecology program.
- Examine the adequacy of the existing monitoring network.
- Incorporate cooperation with other regional smoke management regulators.
- Conduct monitoring and exposure studies if grant money is available.
- Conduct an air quality analysis before authorizing the annual open burning of 20,000 acres or more of bluegrass.

Through the first half of 2008, Idaho amended its statutes and air quality rules to reflect the agreement, satisfy the court decision, and allow the CRB program to move forward. DEQ developed a *Crop Residue Burning Operating Guide* to serve as the program's smoke management implementation tool. The guide describes the overall and day-to-day operation in detail, and is reviewed each year and improved with input from DEQ and stakeholders.

Following EPA approval of DEQ's CRB program, the first burn authorized by DEQ was on September 2, 2008. Overall, the first burn season was considered a success. Since that time, DEQ

and stakeholders have reviewed the results of each burn season annually and improvements to the program's effectiveness, without sacrificing the protection of human health, have been implemented.

Burning Subject to the Crop Residue Burning Program

Crop residue is defined in Idaho Code §39-114:

> *Crop residue means any vegetative material remaining in the field after harvest or vegetative material produced on designated conservation reserve program (CRP) lands.*

"Rules for the Control of Air Pollution in Idaho" (IDAPA 58.01.01. 618) also regulate crop residue burning:

> *The open burning of crop residue on fields where the crops were grown is an allowable form of open burning if conducted in accordance with Section 39-114, Idaho Code, and Sections 618 through 624 of these Rules.*

Crop residue burning includes whole fields, pastures, spots within a field or pasture, broken bales in the field generated at the time of harvest, Conservation Reserve Program (CRP) lands, food plots, and blanching or flaming operations. It does not include vegetation along ditch banks, fence lines, orchard prunings, or residential or forest slash piles. Types of crop residue include the following:

- Residue from traditional crops—includes cereal grain, row crops, alfalfa, hay, and Kentucky bluegrass
- CRP and Conservation Reserve Enhancement Program (CREP) lands—includes burning of CRP and CREP lands while the land remains in the CRP and CREP programs and when the land is being taken out of the program to return to agricultural production
- Pasture—grazing lands comprised of introduced or domesticated native forage species that are used primarily for livestock production; lands that receive periodic renovation and/or cultural treatments such as tillage, fertilization, mowing, and weed control and may be irrigated (US Department of Agriculture, Natural Resources Conservation Service [USDA, NRCS] *National Range and Pasture Handbook*, December 2003)
- Wildlife habitat areas or habitat improvement areas—includes nonnative vegetation or food crops that provide forage

Program Concentration Limits

DEQ is prohibited from approving a burn if it determines that ambient air quality levels meet the following (Table 1):

- Have reached, or are forecasted to reach and persist at, 80% of the 1-hour action criteria for particulate matter.
- Are exceeding, or are expected to exceed, 75% of any NAAQS on any day, and these levels are projected to continue or recur over at least the next 24 hours.

Table 1. Air quality limits and standards.

Pollutant	PCL	Averaging Period	Air Quality Standard	
$PM_{2.5}$	64 µg/m^3	1-hour	80 µg/m^3	IDAPA 58.01.01.556.01
	26.25 µg/m^3	24-hour	35 µg/m^3	NAAQS
PM_{10}	308 µg/m^3	1-hour	385 µg/m^3	IDAPA 58.01.01.556.01
	112 µg/m^3	24-hour	150 µg/m^3	NAAQS
Ozone (O_3)	56 ppb	8-hour	75 ppb	NAAQS

Notes: PCL = Crop Residue Burning program concentration limits; PM =particulate matter; µg/m^3 = micrograms per cubic meter; ppb = parts per billion; NAAQS = National Ambient Air Quality Standard

Program Requirements for Institutions with Sensitive Populations

DEQ may approve a burn only when institutions with sensitive populations (ISPs) will not be adversely impacted by the burn, and the smoke plume is not predicted to impact such institutions (IDAPA 58.01.01.621.f).

The following types of facilities are considered ISPs:

- Schools while in session
- Hospitals
- Residential health care facilities for children, the elderly, or infirm persons, including
  - Nursing homes
  - Assisted living centers
- Other ISPs approved by DEQ

DEQ is specifically prohibited from approving a burn if the field is located within 3 miles of any ISP and sustained surface wind speeds are expected to exceed 12 miles per hour (mph) at the field. DEQ may approve a burn if the wind speeds are forecasted to be below 12 mph; however, the grower is required to ensure that the actual sustained wind speed at ignition is below 12 mph.

Other Program Requirements

Other program requirements are described below:

- For the main CRB program— DEQ may not approve crop residue burning on weekends, federal or state holidays, after sunset or before sunrise, or during an episode of air stagnation or degraded air quality.
- DEQ considers the following parameters when making a burn decision:
  - Expected emissions from all burns proposed for the same date
  - Proximity and emissions from other burns within the area
  - Moisture content of the crop residue
  - Acreage, crop type, and fuel characteristics
  - Meteorological conditions
  - Proximity to ISPs

  - Proximity to public roadways and airports
  - Any other factors relevant to preventing exceedances of the program concentration limits or action levels defined by the statute, CRB rule, or State Implementation Plan
- DEQ designates burn or no-burn days, posts the burn decision daily on the website, and offers an e-mail update service with the following information:
  - Burn or no-burn determination
  - Locations of proposed burns and number of acres permitted to be burned in each county
  - Meteorological conditions and real-time ambient air quality monitoring data
  - Toll-free number to receive requests for information
- DEQ provides near real-time information on whether a given day is a burn or no-burn day, location of approved burns and number of acres permitted to be burned, meteorological conditions, and real-time air quality monitoring data.
- DEQ implements an enhanced documentation process for instances when air quality monitoring levels reach trigger limits before the burn approval process or when air quality monitoring levels reach trigger limits following an approved crop residue burn.
- DEQ prepares an annual report that includes, at a minimum, an analysis of exceedances of the program concentration limits that were reasonably suspected to have been caused or contributed to by the approved crop residue burning and an assessment of the circumstances around any reported endangerment to human health associated with approved crop residue burning. The report shall also include recommended revisions to the CRB rule or the *Crop Residue Burning Operating Guide* deemed necessary to prevent future exceedances of the program concentration limits.

Program Requirements for Growers

Growers must complete the following activities for crop residue burning:

- Register for a permit at least 30 days before the proposed burn date.
- Pay a registration fee of $2 per acre, which must be submitted at least 7 days before the requested burn date.
- Obtain all necessary local or state fire safety permits. Permits may be needed from the Idaho Department of Lands (IDL) and local fire district offices. As a convenience to the grower, DEQ's CRB online application communicates with IDL's burn permit system to assist in issuing IDL burn permits. For questions about fire safety permits, contact IDL at (866) 581-6498.
- Successfully complete the CRB training before burning and renew the training every 5 years.
- Notify DEQ 2–3 days before a specific field is ready to burn so it can be placed on the ready-to-burn list.
- Contact appropriate agency to determine any requirements for public roadway safety.
- Obtain approval from DEQ before burning.
- Carry a portable form of communication during the burn.

- Burn crop residue only in the field where it was generated.
- Report postburn results to DEQ within 24 hours.

Program Requirements for Spot and Baled Agricultural Residue Burns and Propane Flaming

Spot and baled agricultural residue burn permits and propane flaming permits were developed to reduce the administrative requirements for burning very small amounts of residue while still protecting public health. Burning under these permits is only allowed on DEQ-designated burn days for the county in which the field is located, and within the designated burn window, which may include weekends and holidays.

The spot and baled agricultural residue burn permit (spot and bale burn permit) is valid for 1 calendar year and can be used to burn small areas of residue or weeds or equivalent piled or baled residue in accordance with IDAPA 58.01.01.624:

- No more than 1 acre of spots and/or equivalent piled or baled agricultural residue may be burned per day. For the purposes of this permit, 2 tons of piled or baled agricultural residue is equivalent to 1 acre of spots.
  - A spot or pile burn may include weed patches, spots of heavy residue, equipment plugs or dumps, pivot corners, and very small pastures but does not include the open burning of wind rows.
  - Baled agricultural residue may be burned to dispose of broken, mildewed, diseased, or otherwise pest-ridden bales still in the field where they were generated. Once a bale has been removed from the field, it cannot be returned to the field and then burned.
- No more than 10 acres of spots and/or equivalent piled or baled agricultural residue may be burned per calendar year.
- Registration and fee payment of $2/acre registration is required at least 14 days before the first proposed burn date.

Propane flaming is the use of flame-generating equipment to briefly apply flame and/or heat to the topsoil of a cultivated field of preemerged or plowed-under crop residue with less than 550 pounds of burnable, nongreen residue per acre. Propane flaming is allowed for control of diseases, insects, pests, and weed emergence; is not used for crop residue disposal; and must be conducted on the field where the residue was generated.

Unlike other types of DEQ-regulated crop residue burning, propane flaming (as defined above) does not require growers to register fields or pay a fee. Instead, growers are deemed to have a permit-by-rule when complying with IDAPA 58.01.01.624.

Burning under a spot and bale burn permit as well as propane flaming may be allowed on weekdays, weekends, and holidays that are DEQ-designated burn days for the county in which the field is located, and within the designated burn window. Burning under a spot and bale burn permit and propane flaming includes several requirements:

- Grower must ensure the material is not allowed to smolder and generate smoke outside the designated burn window.

- Grower is not allowed to burn if the field is located within 3 miles of an ISP if the surface wind speed is greater than 12 mph or if the smoke is adversely or expected to adversely impact an ISP.
- Grower must keep records of all burning done under the spot and bale burn permit.

Appendix B. Meteorological Summary for the Fall Burn Season

Annual Weather Summary for CRB Smoke Dispersion Forecast Season for Northern Idaho, 2014

Prepared for the Nez Perce and Coeur d'Alene Tribes Smoke Management Programs and Idaho Department of Environmental Quality for Crop Residue Disposal via Agricultural Field Burning.

Prepared by Gary D. Bennett–Meteorological Contractor, Bennett Fire Weather Services, LLC

Operations

The 2014 Agricultural Field Burning Smoke Management program for northern Idaho began on July 23 with practice forecasts. Full operational forecasts began on Monday, July 28. The forecasts were prepared by Gary Bennett for the Idaho Department of Environmental Quality (DEQ), Nez Perce Tribe, and Coeur d'Alene Tribe smoke management personnel for crop residue disposal. Smoke dispersion forecasts were e-mailed to DEQ, Nez Perce Tribe, and Coeur d'Alene Tribe recipients by 8 a.m. and 3 p.m. PDT each day throughout the summer and early fall. The delivery of forecasts via e-mail was followed by conference calls at 8:30 a.m. and 3:30 p.m. PDT each day. The morning conference call was used to discuss the weather forecast for the "burn day" (i.e., for the current day), and the afternoon conference call was used to discuss the forecast for the next day.

Meteorological contractor, Gary Bennett, made one operational visit to northern Idaho before the beginning of the burn forecast season. This trip was to the Coeur d'Alene Tribal Headquarters in Plummer, Idaho, on July 8–11 to attend the preburn annual meeting. Training of burning techniques, meteorology for burn coordinators and management staff, and coordination discussions with all management agencies were provided at this meeting. On-site visits to northern Idaho airsheds were again curtailed in 2014 due to time constraints. Contractor visits are used to aid coordinators with problem spots and discuss optimum weather for burning in some of the difficult fields. The meteorological contract services program ensures all coordinators and operational personnel, including farmers, are on the same page meteorologically. The upcoming 2015 burning preseason may allow a chance to visit more northern Idaho burning areas before the crop residue burning season.

Burning Season Weather in Brief

July

The season began with practice forecasts on July 2–25. All participants in the forecast were on board at this time. After a wet June, July was a very warm month for all of northern Idaho. Warm temperatures and generally dry conditions across the Pacific Northwest resulted in a series of lightning-caused wildfires, especially in the mountains. The lightning produced wildfires to the south, north in British Columbia, east in Montana, and west in eastern Oregon and eastern Washington. The smoke generated from the wildfires impacted the northern Idaho airsheds. Lingering smoke from the larger wildfires became an issue by the end of July.

The MM5 500-millibar (mb) graphic (Figure 1) is a representative view of the weather pattern over northern Idaho for much of July. The first half of July was very warm with some of the hottest days of the summer. Lewiston was 106°F on July 29. Lewiston also reported 90°F or greater on 26 of the 31 days in July. All weather reporting stations recorded well above average temperatures and below average precipitation during July.

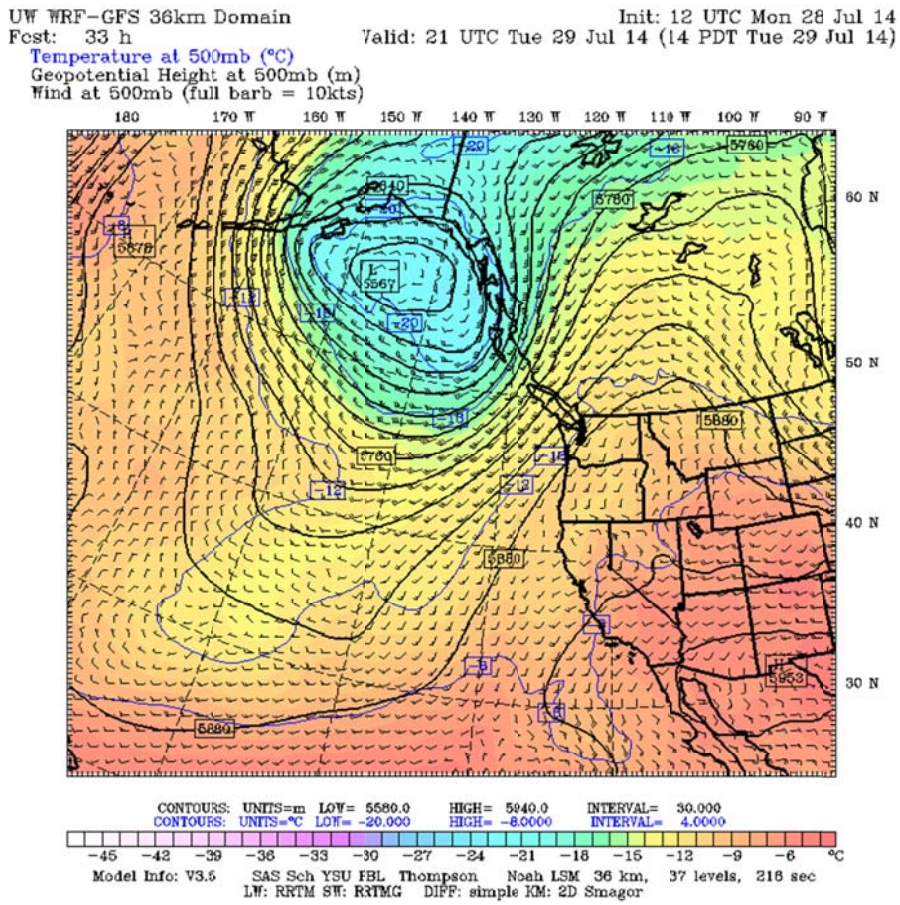


Figure 1. 500 mb temperature valid 21 UTC 29 July 2014.

July monthly precipitation amounts were below average at all reporting weather stations. Felts Field, Washington, near Coeur d'Alene, recorded the greatest monthly amount for northern Idaho reporting weather stations at 0.44 inches of rain. The precipitation was generally associated with scattered thunderstorm activity over northern Idaho on one or two days during July. The last week of July saw maximum temperatures climb over 100°F in Lewiston. July was a warm and dry month across the Inland Northwest.

August

August started where July left off with upper-level high pressure dominating the weather pattern over northern Idaho and the Inland Northwest. The 500 mb graphic from Monday, August 4 (Figure 2) shows the ridge position over the Pacific Northwest extending into eastern British Columbia and Alberta, Canada. The weather pattern changed to a progressive pattern as the northern branch of the jet stream moved south over British Columbia. A series of weather disturbances moved across southern and central British Columbia.

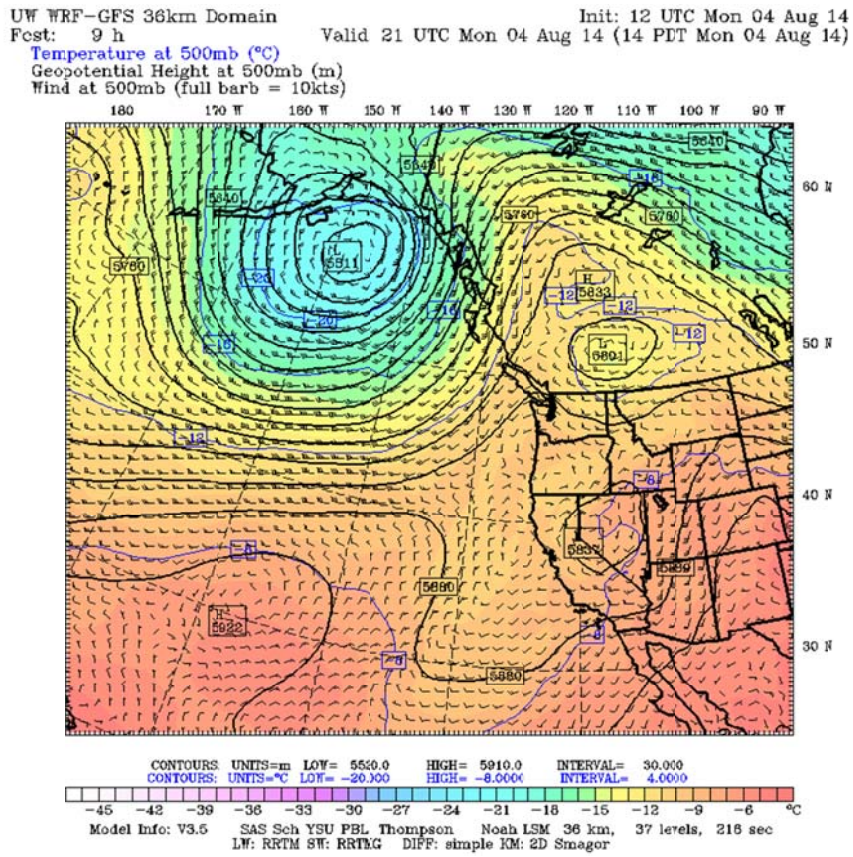


Figure 2. 500 mb temperature valid 21 UTC 4 August 2014.

The first two weeks of August were very warm and dry across most airsheds of northern Idaho. Maximum temperatures were generally in the 90s with warmer valley locations reaching the upper 90s to 105°F. The strong upper ridge position over northern Idaho kept Pacific storms well north of Idaho. A few scattered thunderstorms from monsoon moisture crept north and produced isolated trace amounts of precipitation while the air mass over the region remained very dry. As Figure 3 shows, the weather pattern shifted during mid-August. A Pacific low off the northern California coast and another upper trough that approached the west coast forced the protective upper-level ridge east. The upper-level steering wind backed to the south and carried monsoon moisture north into northern Idaho.

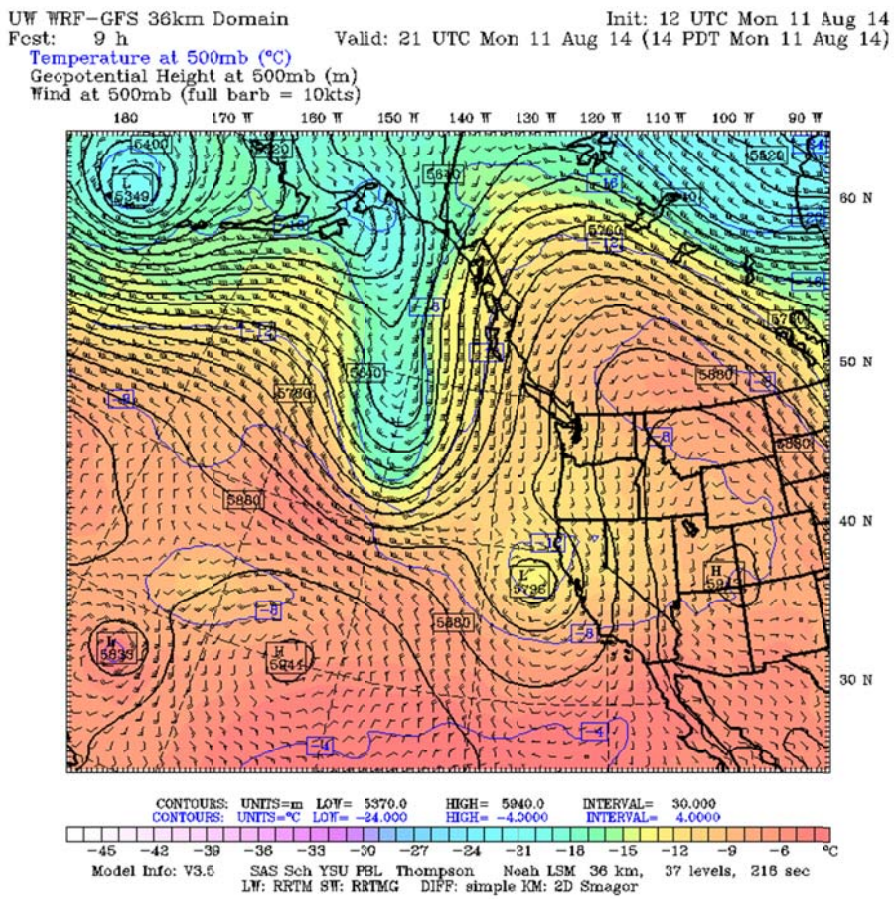


Figure 3: 500 mb temperature valid 21 UTC 11 August 2014.

Monsoon moisture produced thunderstorms over northern Idaho generally south of Interstate 90 (I-90), but the storms were typically of the dry variety (usually less than 0.10 inches of rain). Most of the thunderstorm activity was recorded on August 11–15. During this period, Lewiston received 0.49 inches of rain. On August 22, another thunderstorm moved over Lewiston and dumped another 0.68 inches of rain. For the month, Lewiston received nearly half of an inch above average rainfall. Both Coeur d'Alene and Bonners Ferry reported well above average precipitation. All other weather stations were below average.

Wildfire smoke reduced visibility and ventilation on eight separate days during August, which contributed to a slowdown in burning. Six thunderstorm days were recorded during the month. The heavier precipitation recorded in Boundary and Kootenai Counties also slowed the burning activity during August. The MM5 12-kilometer (km) surface graphic in Figure 4 shows the cool air mass from the thunderstorms that invaded northern Idaho on August 22.

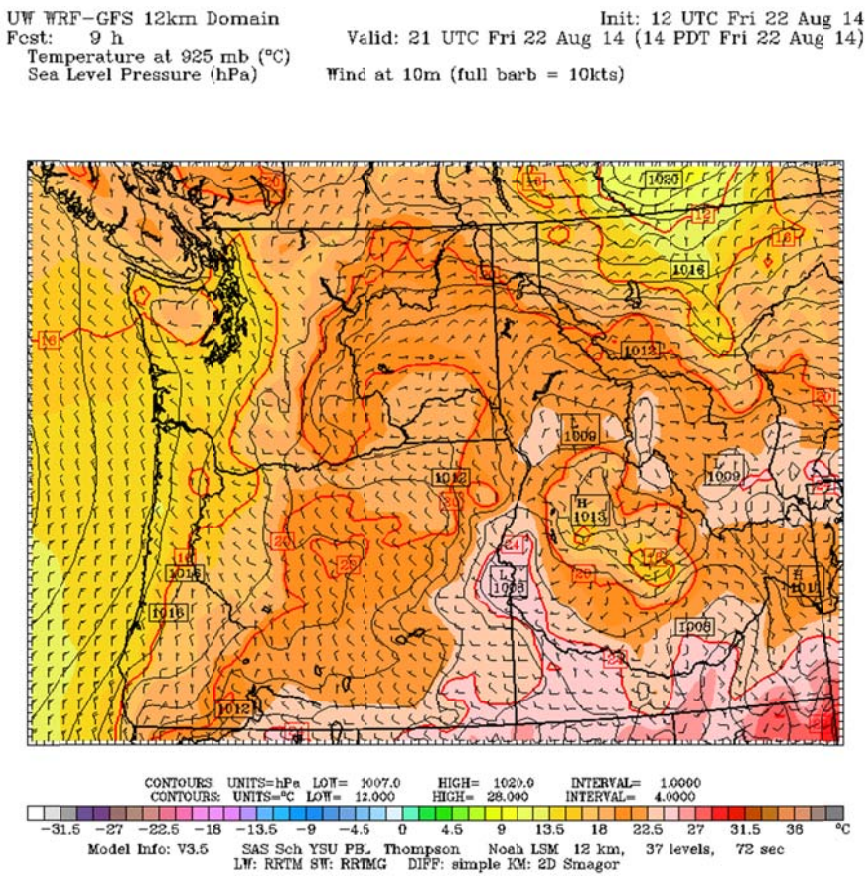


Figure 4. 500 mb temperature valid 21 UTC 22 August 2014.

Figure 5 shows the MM5 at 500 mb, which is the steering level for storms. This graphic clearly shows that a Pacific storm moved over the region and forced the high-pressure ridge well east into the Dakotas. This cold upper storm was a change from the very warm and dry beginning of August. The cool and wet weather with this upper trough slowed the field burning in the northern counties as previously stated. Figure 6 shows the MM5 at 500 mb, indicating that the upper-level Pacific low was progressive over the weekend. By Monday, August 25, another high-pressure ridge built into the Inland Northwest and northern Idaho. This next ridge remained for the rest of August although the upper-level weather pattern continued to show signs of a progressive nature. The remainder of August was dry. August continued the previous trend established in July with above-average temperatures, although the Pacific storm on August 22 produced below-average temperatures for a few days. Precipitation averages were below average at most weather stations, with the exception of Lewiston, Coeur d'Alene, and Bonners Ferry.

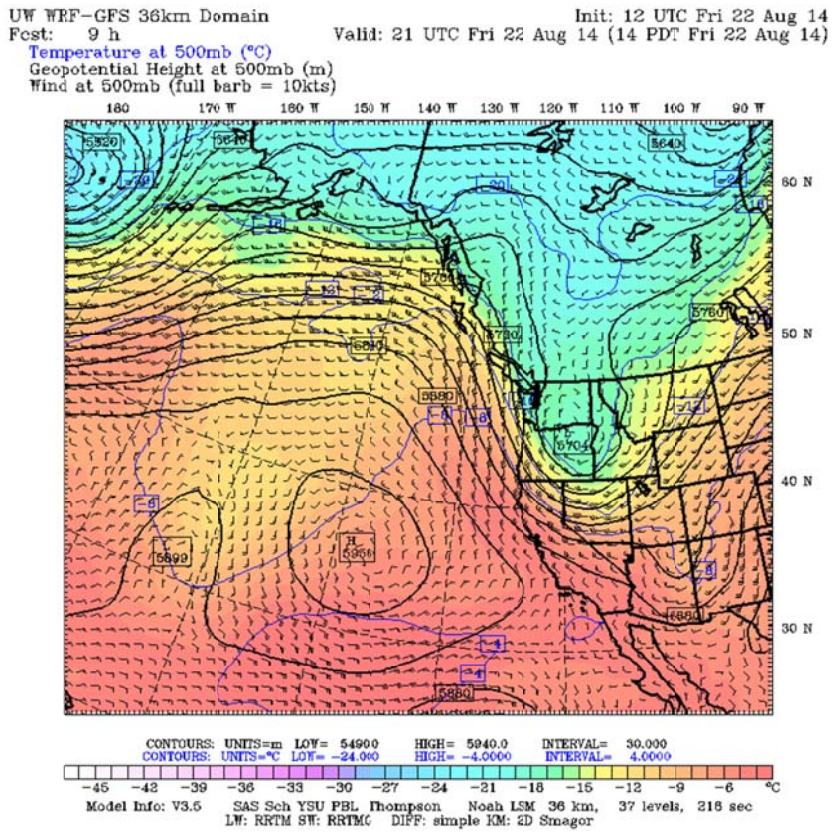


Figure 5. 500 mb temperature valid 21 UTC 22 August 2014.

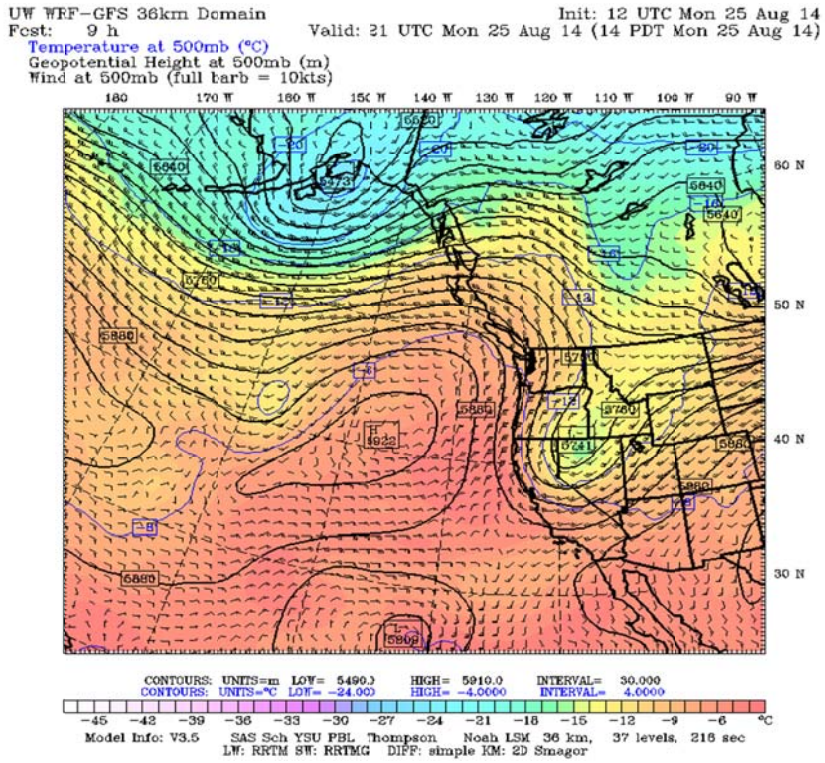


Figure 6. 500 mb temperature valid 21 UTC 25 August 2014.

September

September is typically one of the drier months in the Northwest, and this year was no exception. During the first week of September 2014, a flat upper-level ridge developed over the Pacific Northwest as the upper-level Pacific storm of late August moved east into the Dakotas. The MM5 500 mb level graphic in Figure 7 shows the flat ridge with a strong, cool, upper-level northwest flow aloft. This was generally a dry flow for northern Idaho. The next storm that moved into the northeast Pacific was considered a potential rain shower producer. Nearly all weather stations and airsheds received some rain from this weather disturbance. From September 2–4, light-to-moderate amounts of rain were recorded. This event produced the only days with measurable rain over northern Idaho excluding the last two days of the month.

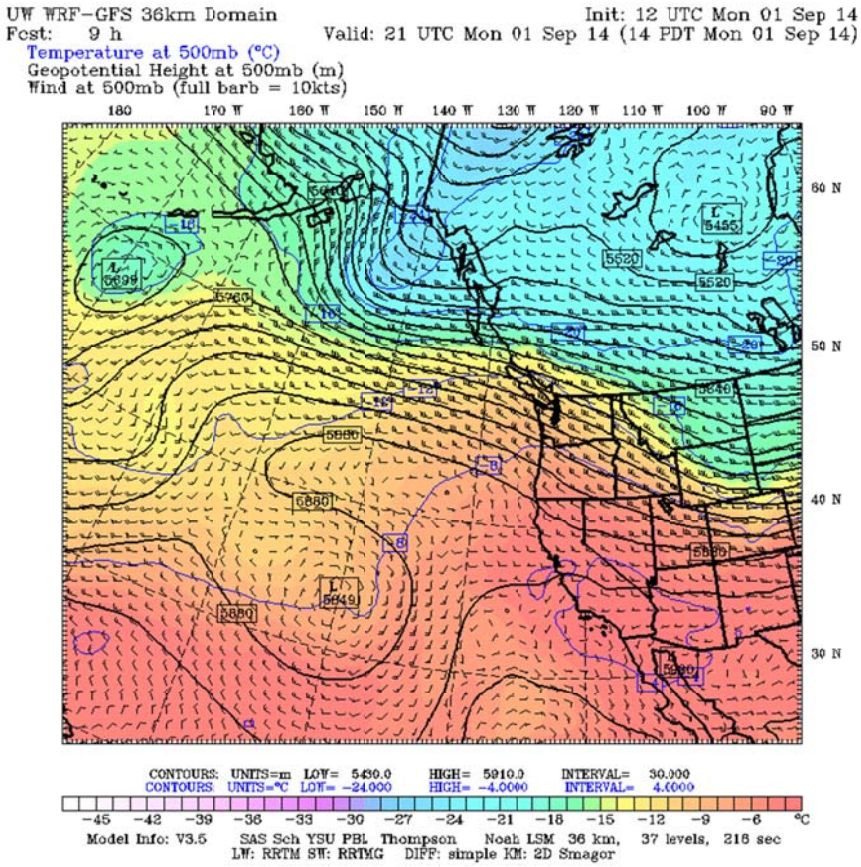


Figure 7. 500 mb temperature valid 21 UTC 01 September 2014.

As September progressed through the first week, showers diminished as the Pacific storm moved east. The cool trough was replaced by a strong, warm, and dry high-pressure ridge as indicated by the MM5 500 mb in Figure 8. The dry northerly flow remained over northern Idaho through the middle of the month.

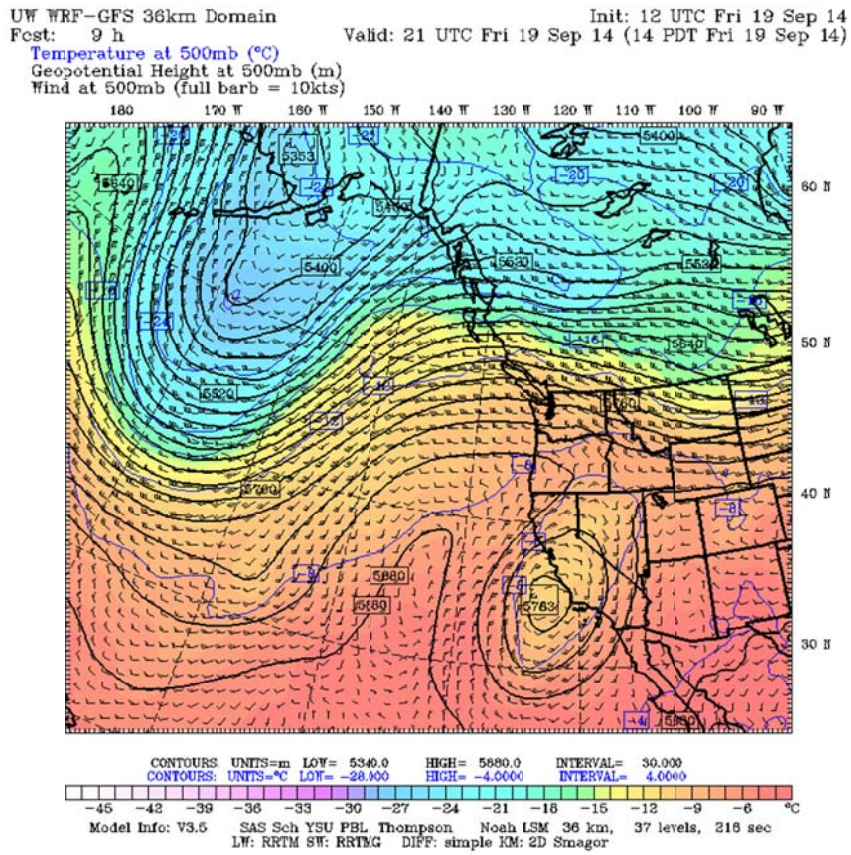


Figure 8. 500 mb temperature valid 21 UTC 19 September 2014.

The upper-level weather pattern in the September 19 500 mb graphic (Figure 8) shows signs of change as the northern branch of the jet stream moved a little south across southern British Columbia and clipped northern Idaho in the process. The progressive weather pattern looked very probable as the deepening low and upper trough in the Gulf of Alaska continued to move east towards the northeast Pacific and the west coast. The upper low over California ejected to the east-northeast across the Intermountain West. Figure 9 clearly shows the movement of the cold upper trough towards the west coast with the upper low centered in the Gulf of Alaska. The California low ejected northeast and opened into an upper-level trough over eastern Idaho and Wyoming. Figure 10, from September 22, indicates that showers increased over most airsheds due to return flow around the ejecting trough over southern Idaho and the incoming trough off the coast. Figure 10 shows the cool and unstable upper trough that moved into the Pacific Northwest, while the upper low moved into northern California.

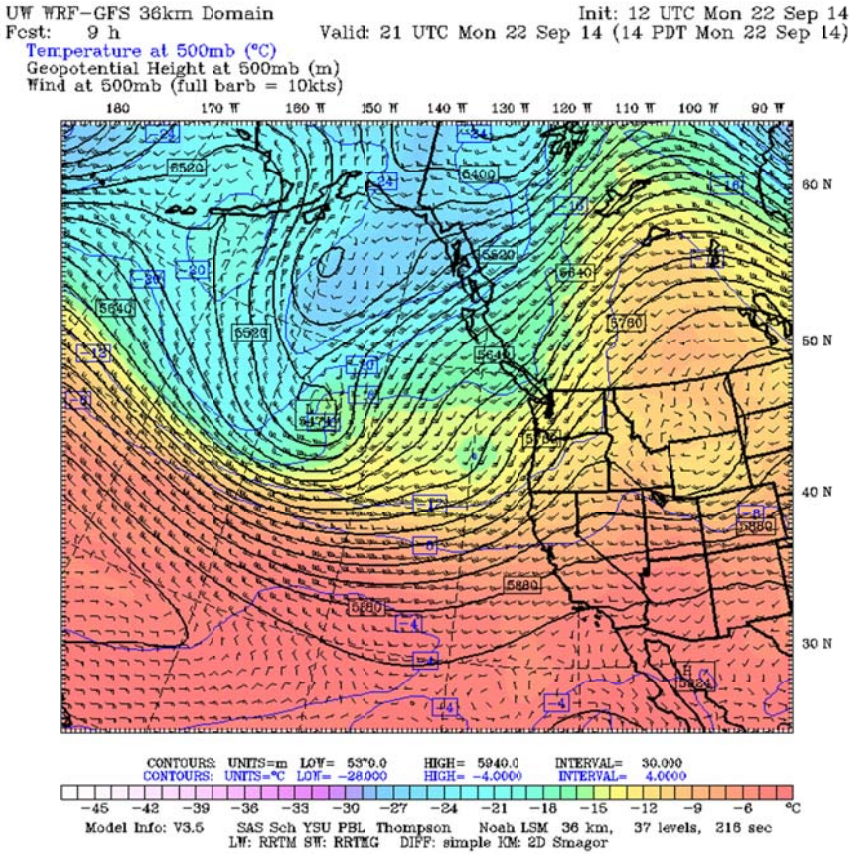


Figure 9. 500 mb temperature valid 21 UTC 22 September 2014.

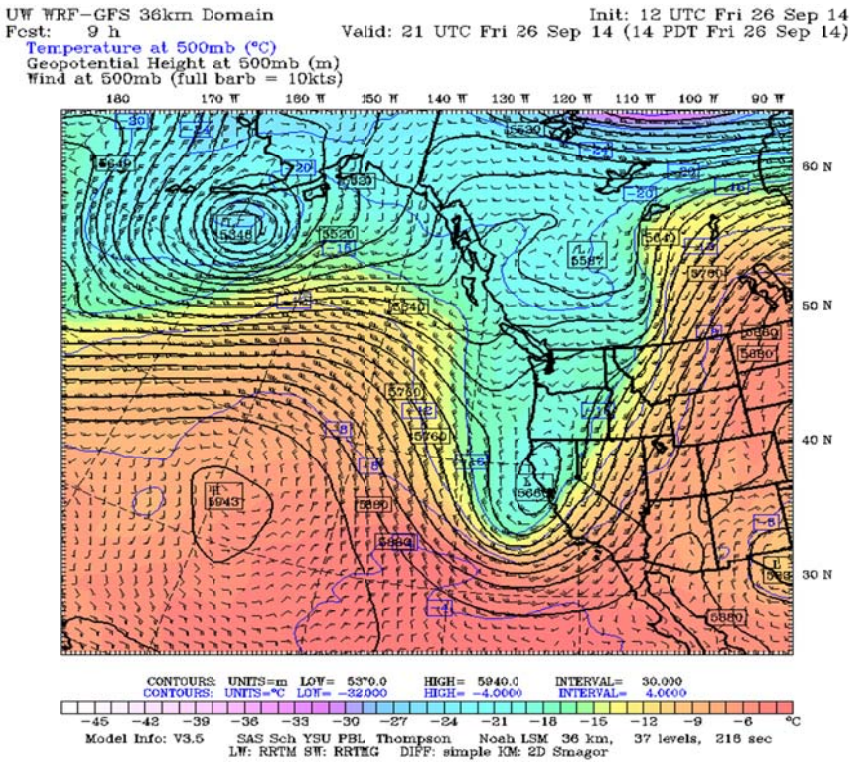


Figure 10. 500 mb temperature valid 21 UTC 26 September 2014.

The progressive weather in late September produced the large share of the precipitation. Accumulatively, rainfall amounts ranged from 0.58 inches at Potlatch, 0.46 inches at Pullman, 0.25 inches at Lewiston, and 0.18 inches at Bonners Ferry. Some of these totals effectively ended the 2014 agricultural burning season.

September ended with well above average temperatures for all weather stations south of I-90 and near average temperatures for Coeur d'Alene and Bonners Ferry. Precipitation amounts for September were still below average at nearly all weather reporting stations even with the above-average rainfall during the last week of the month. Field burning was completed in Boundary County in mid-September.

October

After the relatively damp late September, a few good burn days were still available in October. October started with a dry and stable ridge of high pressure moving into northern Idaho and the Pacific Northwest.

Figure 11 shows the MM5 500 mb level on October 3 and depicts the strong ridge over the region with high pressure centered over central California. A strong ridge that builds in October usually has a lower mixing height, and this type of ridge created a cooler air mass over northern Idaho, diminishing ventilation values. Under the ridge pattern, winds were on the lighter side and contributed to poorer ventilation. In Figure 12, the high resolution 1.3 km MM5 ventilation index shows poor ventilation due to the subsidence aloft and light surface winds. This pattern is common during late season burning.

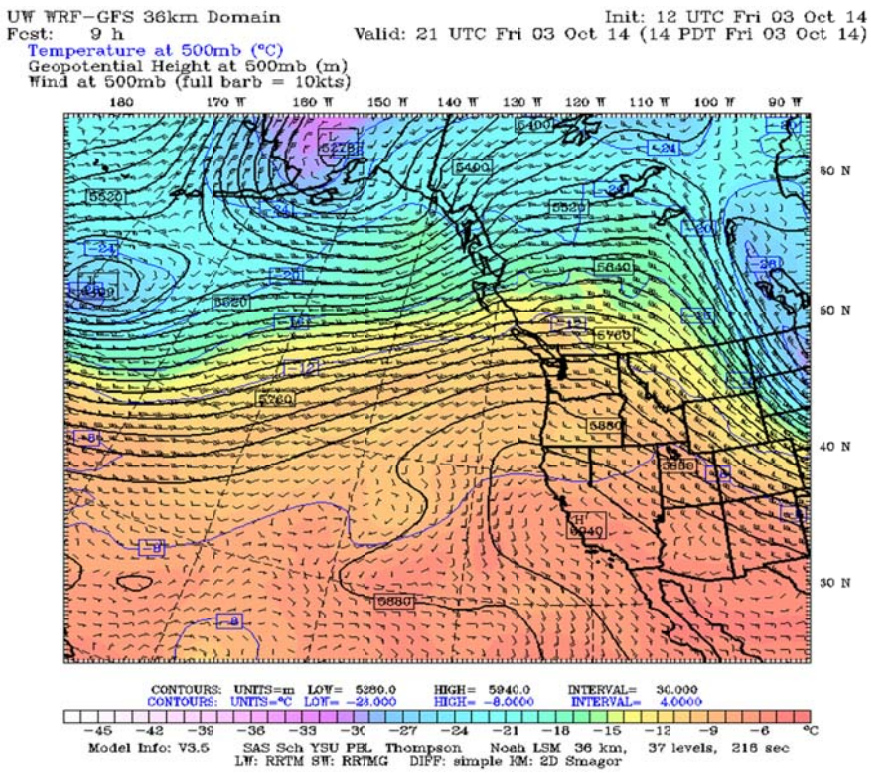


Figure 11. 500 mb temperature valid 21 UTC 03 October 2014.

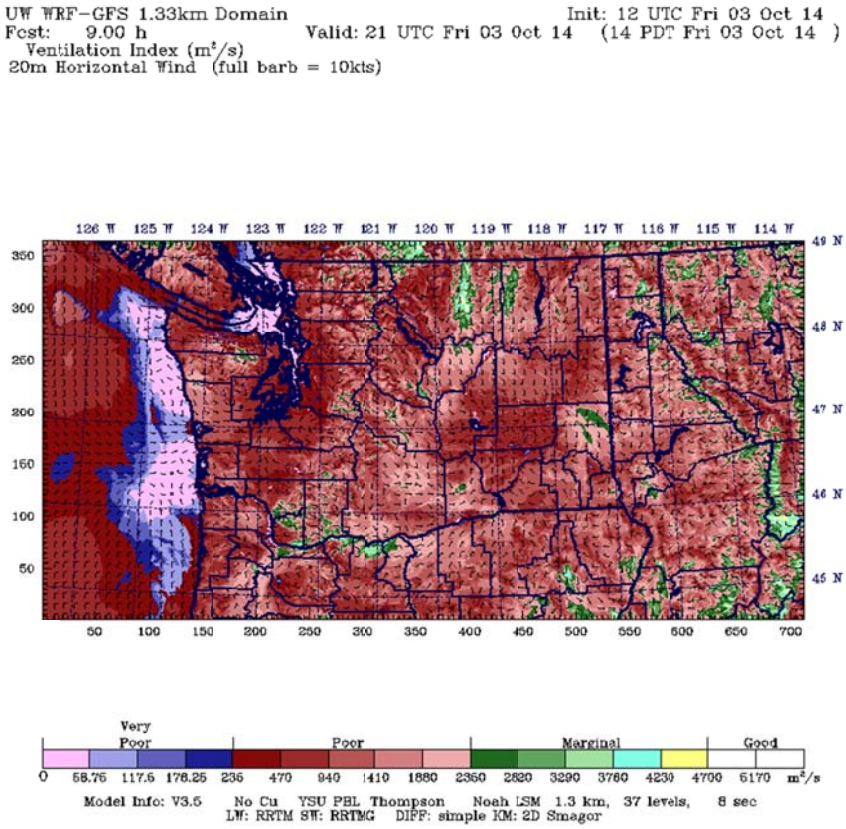


Figure 12. Ventilation Index 1.3 km valid 03 October 2014.

Ridging and dry weather remained over northern Idaho into the second week of October, nearing the end of the 2014 crop residue burning season. During the last week of burning forecasts, a drier and warmer ridge positioned over northern Idaho broke down while a moist Pacific weather pattern eventually became the dominant feature over the Pacific Northwest for the rest of October.

After the dry first two weeks of October, the month ended with some stations near average and others recording above-average precipitation. Weather stations reporting above-average rainfall were Spokane, Lewiston, and Coeur d'Alene. All other weather stations were near-to-below average precipitation. Daily operational weather forecasts ended on Friday, October 17. The last MM5 500 mb graphic (Figure 13) shows the change back to a fall-like weather pattern with a series of Pacific storms marching across the region. The upper-level high-pressure ridge was forced east by the strong, deep, and cold upper low and trough entering the Gulf of Alaska. This weather pattern generally remained the same through the rest of October.

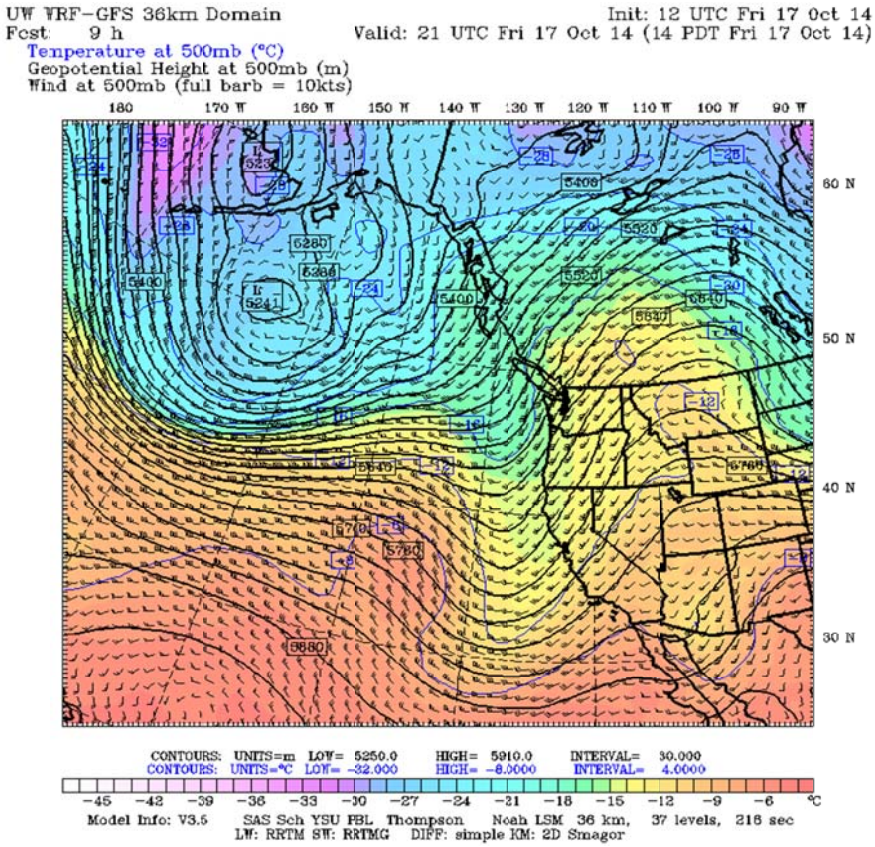


Figure 13. 500 mb temperature valid 21 UTC 17 October 2014.

Conclusions

During the summer 2014, we remained in an ENSO neutral weather pattern but did start to see an El Nino pattern develop in late September and October. The slow curing of wildland fuels brought on by a damp and cool June also impacted the curing of crops. As the lightning storms began in late June and July, fine fuels became receptive to wildfire. By early to middle of July, wildfires broke out throughout the Pacific Northwest as drier and much warmer weather became

prominent over northern Idaho. The wildfire activity near northern Idaho resulted in smoke intrusions from wildfire averaging to about eight days a month, which limited or severely impacted crop residue burning.

The 2014 agricultural burning season was slowed more by precipitation again in August as some airsheds north of I-90 were well above average precipitation. Other areas south of I-90 were below average for precipitation. Temperatures were well above average all summer and into the fall. Most growers completed or declined to complete their burning requirements. Bonners Ferry completed burning by late September.

Field coordinators and managers did an excellent job this year in overseeing field burning in their respective areas. The 2014 agricultural burning season was difficult over northern Idaho as a progressive upper-level weather pattern remained for much of the burn season. No request for a burn day analysis was received due to the excellent work of all the field coordinators.

Annual Weather Summary for the Smoke Dispersion Forecast Season for Southern Idaho, 2014

Prepared for the Idaho Department of Environmental Quality for Agricultural Field Burning in Southern Idaho.

Prepared by Jacob Wolf—Air Quality Meteorologist, Idaho Department of Environmental Quality

Operations

The 2014 Agricultural Field Burning Smoke Management program for southern Idaho began on August 4 with full operational forecasts. The Idaho Department of Environmental Quality (DEQ) manages the crop residue burning (CRB) program for southern Idaho and portions of northern Idaho. Smoke dispersion forecasts were e-mailed to DEQ recipients by 8 a.m. and 3 p.m. MDT each day of the forecast season. The delivery of forecasts via e-mail was followed by conference calls at 8:30 a.m. MDT each day. The morning conference calls were used to discuss the weather forecast for the burn day (i.e., for the current day). The conference call in the afternoon was discontinued this season; instead, a brief review of the previous day was held before the weather forecast discussion on the morning call.

Training for the burn coordinators and management staff was conducted during a preburn meeting held in Coeur d'Alene before the 2014 burn season. This training included burning techniques, meteorology for burn coordinators and management staff, and coordination discussions with all management agencies that were present. On-site visits to southern Idaho fields were again curtailed in 2014 due to the economy and timing of the preburn meeting. Visits to southern Idaho airsheds during the burning season are rare and difficult due to travel restrictions and forecast duties. These visits are used to aid coordinators with problem spots and to discuss optimum weather for burning in some of the more difficult fields. A meteorological program ensures all coordinators and operational personnel, including farmers, are on the same page meteorologically. In 2015, more burning areas may be visited before the crop residue burning season begins.

Burning Season Weather in Brief

July

While full operational forecasts had not yet started in July, the weather towards the end of the month set up the start of the season. The weather pattern before the last few days of July was similar to what was experienced for the entire month of July. An upper-level ridge pattern centered over eastern Idaho and the Continental Divide (Figure 1), promoting warm temperatures and dry skies.

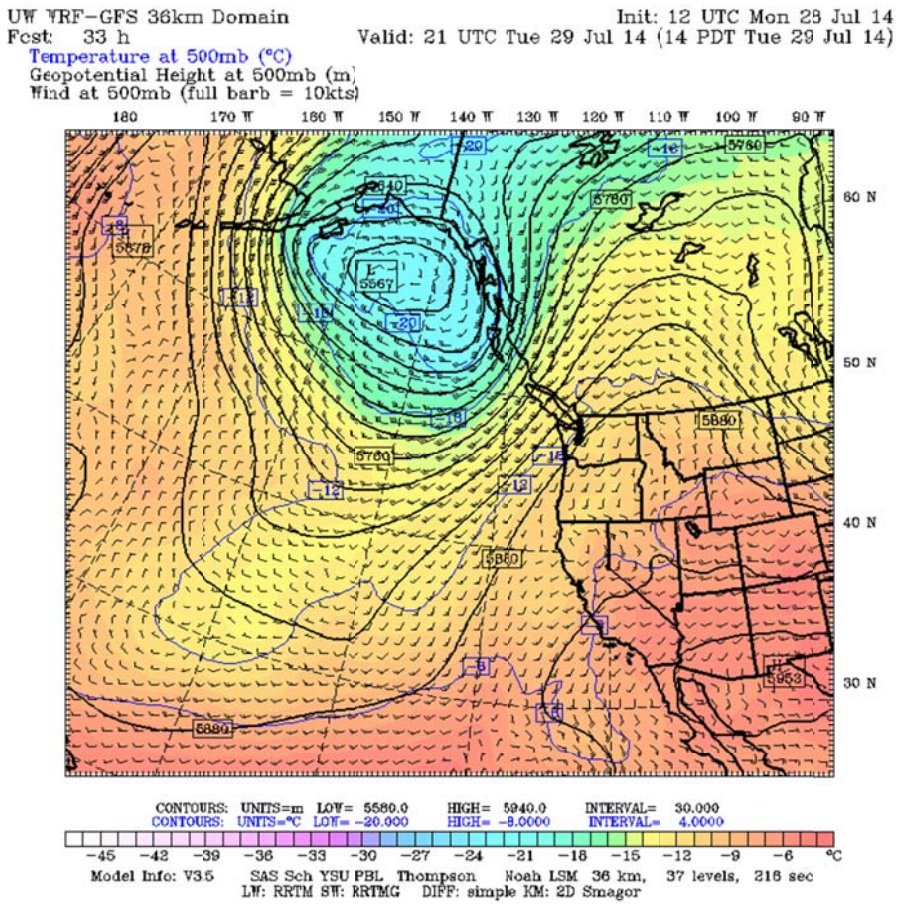


Figure 1. 500 mb temperature valid 21 UTC 29 July 2014.

July's climatologic data showed this pattern; Boise showed below-average precipitation; and Twin Falls, Pocatello, and Idaho Falls ranged between near-average to slightly above-average rainfall. The rainfall over the region was due to an influx of monsoon moisture from the desert southwest producing a few thunderstorms that invaded the Magic Valley and eastern Idaho. All climatic reporting stations in southern Idaho recorded above-average temperatures during July with 28 days of the month above 90°F in Boise. Early season wildfires began with thunderstorms producing an abundance of lightning strikes with little precipitation. These wildfires caused smoke and background smoke throughout the summer and early fall months.

August

The 2014 Agricultural Field Burning Smoke Management program for southern Idaho began on August 4 with full operational forecasts. The beginning of August saw a cut-off low off the California coast that steered monsoon moisture directly into southern Idaho (Figure 2). The moisture allowed for above-average precipitation totals for the month across all of southern Idaho, except in the southwest, where rain shadowing and system placement limited activity.

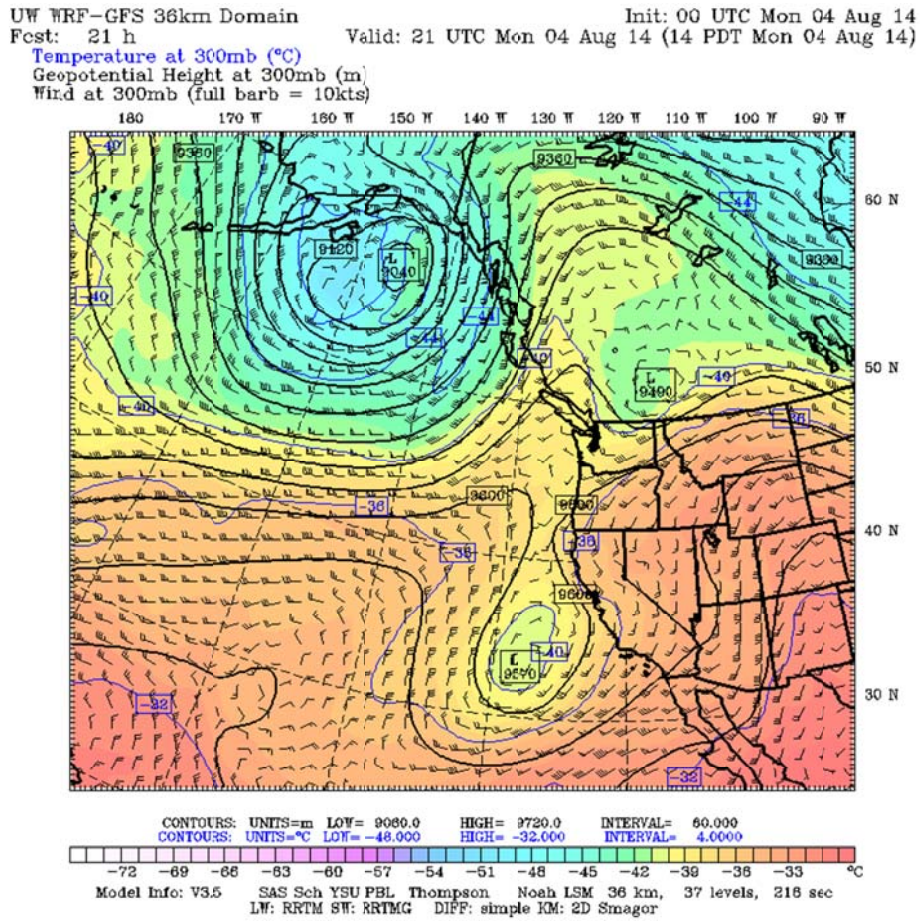


Figure 2. 300 mb temperature valid 21 UTC 04 August 2014.

This set up provided record amounts of precipitation to the Magic Valley on August 5 and 6 and brought plenty of rain to eastern Idaho. Jerome received 0.44 inches on August 5 and 1.97 inches on August 6. Twin Falls received 1.70 inches on August 5 and 2.00 inches on August 6, with a monthly total of 5.57 inches, which is 17.41 times more than normal for August (0.32 inches). This effectively limited burning in this area both in the short term as fuel moisture was too high and in the long term as fields began to green up. In eastern Idaho, Idaho Falls received 0.20, 0.18, and 0.49 inches of rain from August 4–6, respectively. The monthly total of 2.39 inches was 4.4 times more than the monthly average of 0.54 inches for the month. Eastern Idaho continued to see monsoon moisture, which provided plenty of rain over August 13–15 and 19–23.

The second week of August was marred by wildfire smoke and red-flag warnings across much of Idaho as the proximity of the Johnson Bar Complex provided ample smoke into the Clearwater, which drained towards McCall in the evenings. Smoke transported from fires in California due to the steering caused by a cut off low just off California impacted southern Idaho with light smoke across all of the airsheds (Figure 3).

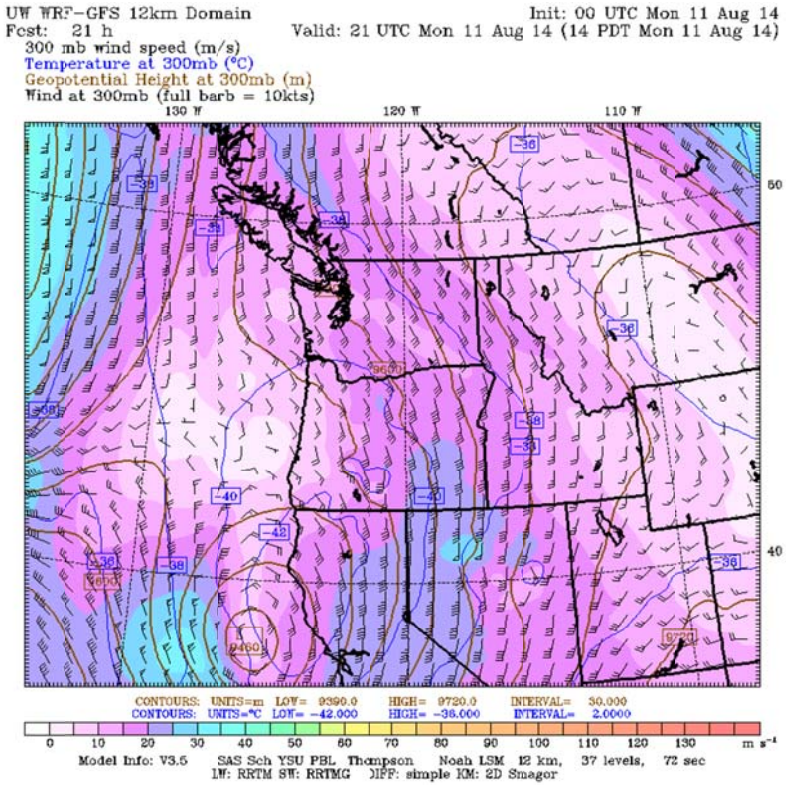


Figure 3. 300 mb wind speed valid 21 UTC 11 August 2014.

By August 15, conditions shifted as the transport winds had a stronger zonal component. Figure 4 depicts an upper-level low-pressure system moving across the US-Canada border. This position allowed for favorable development over southeastern Idaho, which falls under a region of development (the southeast quadrant of mature systems is the best location for unstable conditions to develop).

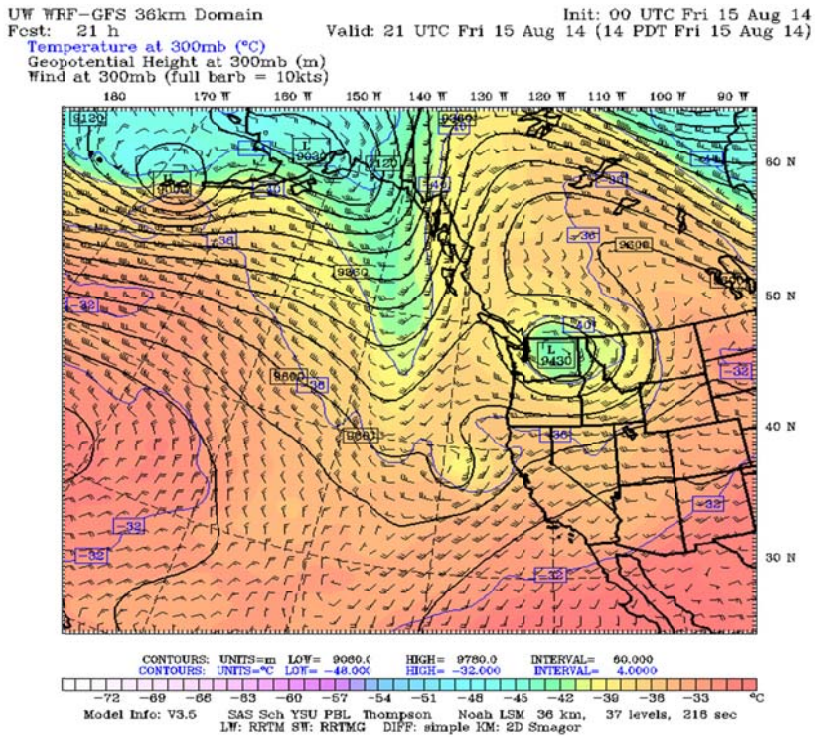


Figure 4. 300 mb temperature valid 21 UTC 15 August 2014.

On August 18, a cut off low over California began to entrain into the jet stream, bringing unstable weather and monsoon moisture into southern Idaho. This reduced the amount of wildfire smoke transported into Idaho but also caused unstable weather conditions to develop (Figure 5). From August 18–23, thunderstorms were a daily occurrence and brought plenty of rain to eastern Idaho while the southeast and southwest experienced drier storms or no storms at all in the case of the southwest. Rexburg received 2.07 inches of rain; Idaho Falls received 0.74 inches of rain; and Pocatello measured 0.68 inches of rain. Given the unsettled weather pattern for most of the month, temperatures were between 1–1.5°F cooler than normal except in Boise, which was 1°F higher than normal.

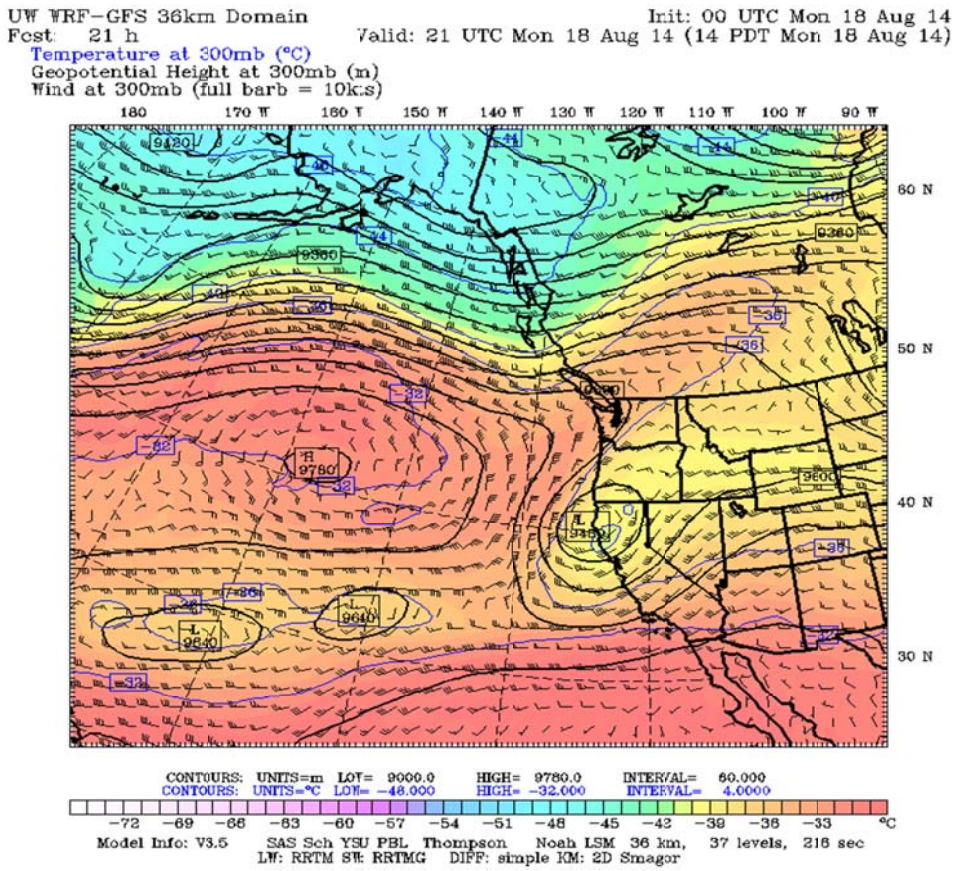


Figure 5. 300 mb temperature valid 21 UTC 18 August 2014.

During this time, a feature developed that persisted through much of August and September, hampering dispersion and altering burn windows. A midlevel warm *tongue* extended from the Great Basin and into southern Idaho (Figure 6). In the figure, this tongue is indicated by the orange swath extending from Nevada and Utah into southern Idaho running northeast into Montana. This feature provided a subsidence inversion that remained from 12 p.m. to 2 p.m. most days, effectively cutting the burn window in half on those days.

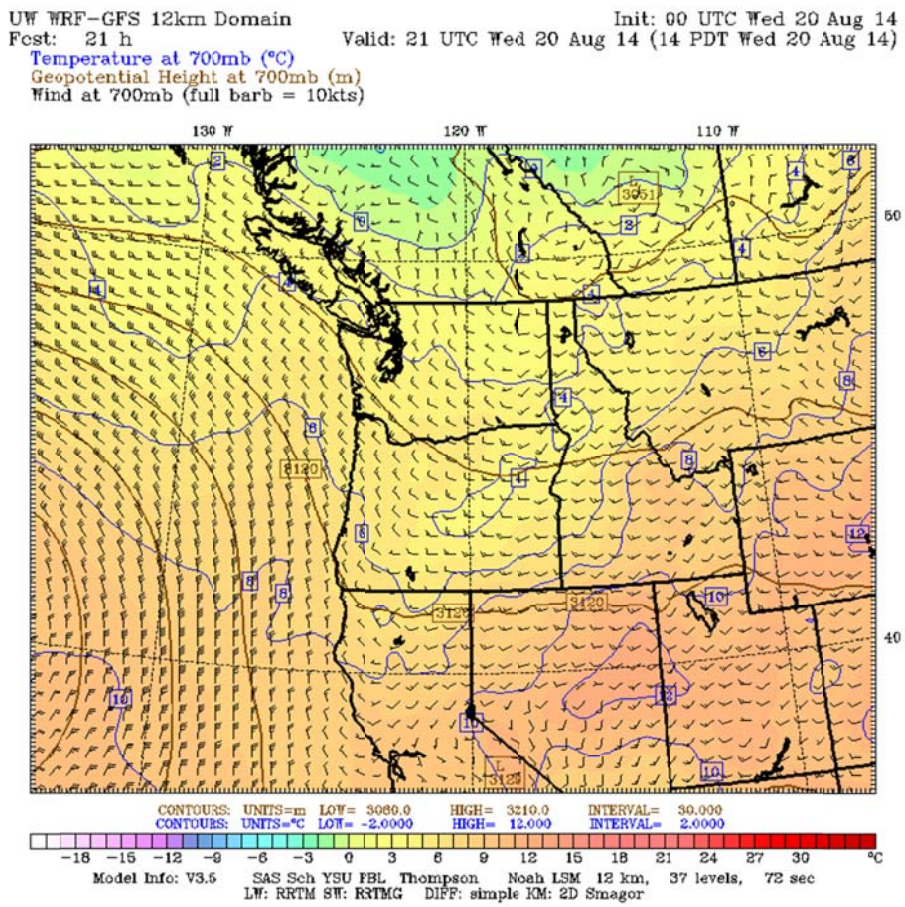


Figure 6. 700 mb temperature valid 21 UTC 20 August 2014.

A progressive pattern remained with afternoon thunderstorms through the end of the month as an upper-level trough swung through Idaho (Figure 7), and a zonal flow pattern developed (Figure 8). This pattern kept the door open for unstable, convectively driven storms to develop each afternoon across much of southern Idaho. The key feature with these storms was that they were dry and were responsible for surface wind speeds that ranged from 10–36 miles per hour (mph) sustained across southern Idaho during the last week of August.

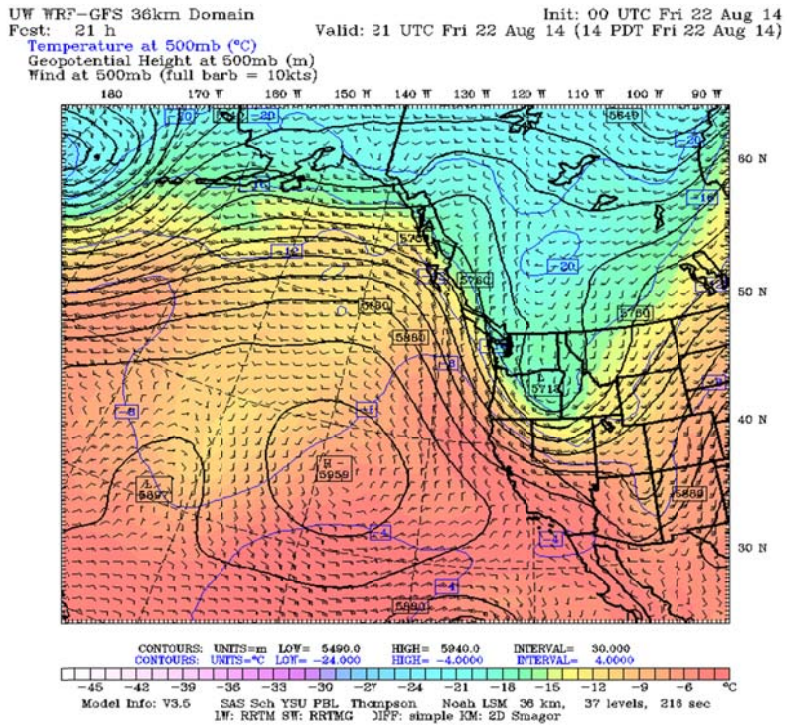


Figure 7. 500 mb temperature valid 21 UTC 22 August 2014.

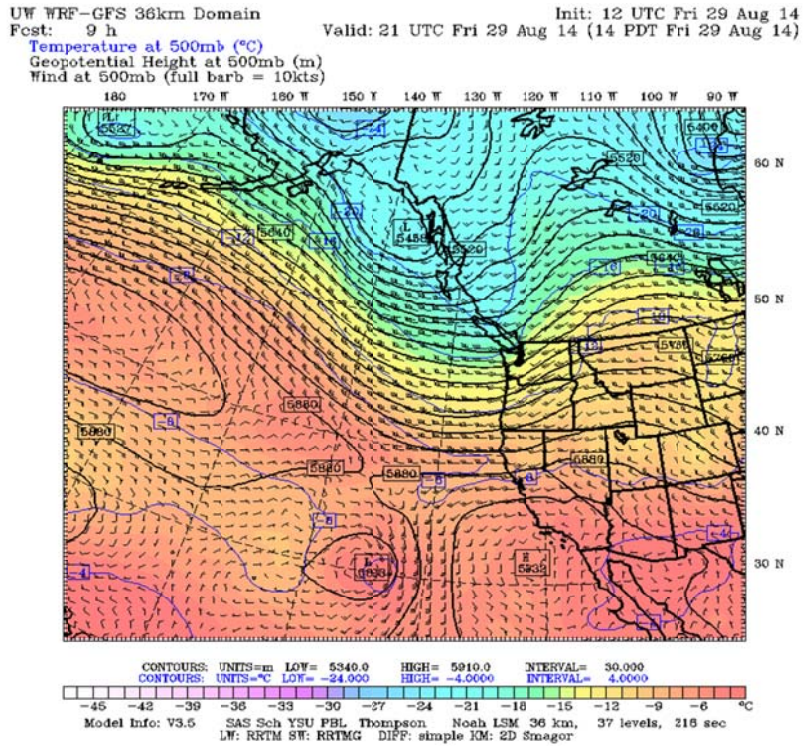


Figure 8. 500 mb temperature valid 21 UTC 29 August 2014.

September

September started cool yet dry as a series of upper-level troughs moved across the Intermountain West while an upper-level ridge system remained anchored just off the coast (Figure 9).

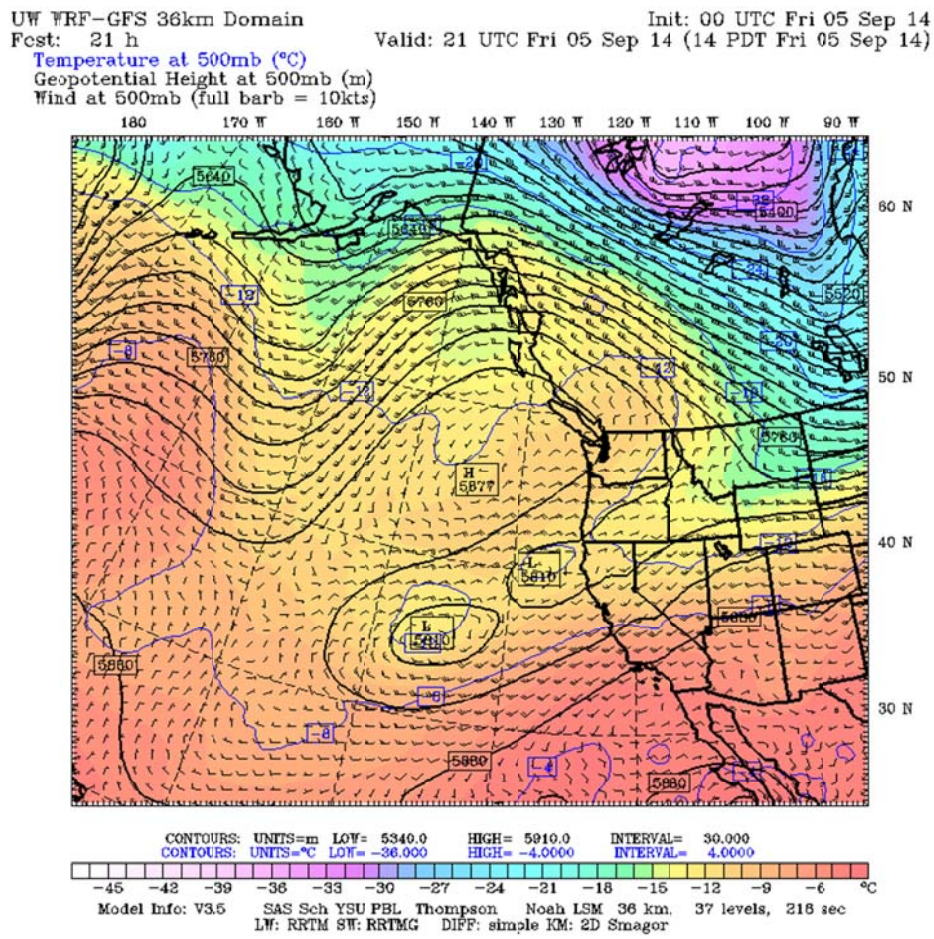


Figure 9. 500 mb temperature valid 21 UTC 05 September 2014.

The series of upper-level low-pressure systems off the California coast continued to funnel monsoon moisture into southeastern Idaho while a series of dry cold fronts provided gusty surface winds. By the middle of the month, the ridge offshore had shifted to the east and was centered over Idaho (Figure 10) as an upper-level low-pressure system dropped south and approached the California coast.

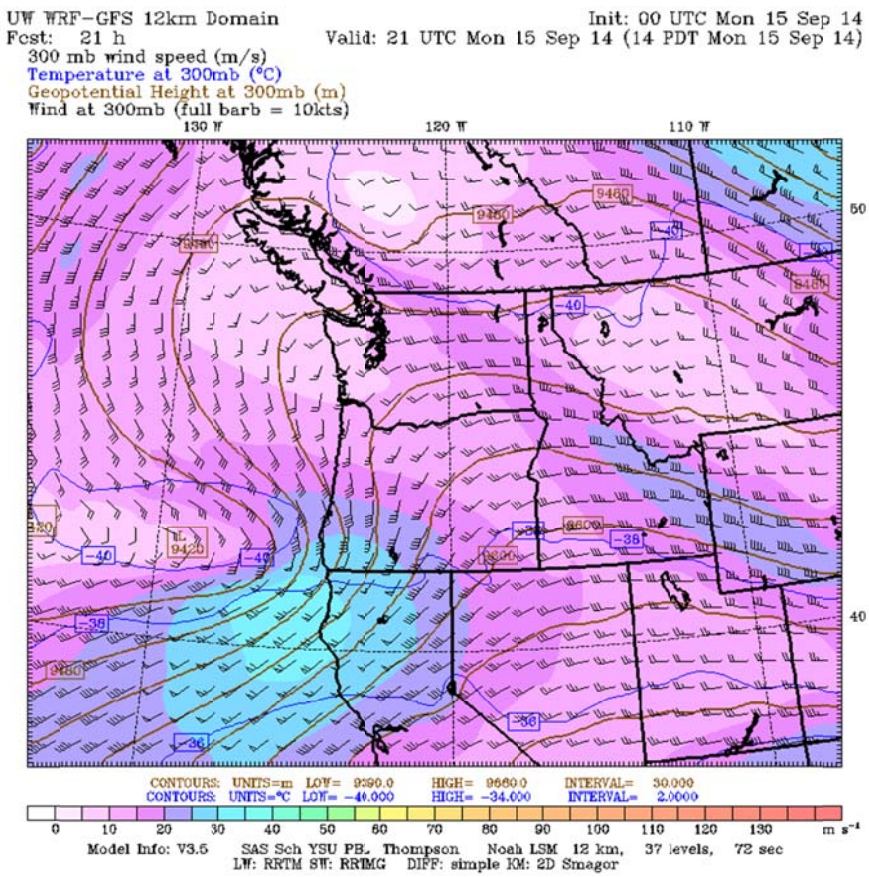


Figure 10. 300 mb temperature valid 21 UTC 15 September 2014.

This shift led to a stark contrast in weather between the first and second half of the month. The third week noted continued warm temperatures and dry conditions; however, the final week brought the first significant precipitation in much of southern Idaho with September 27, 28, and 29 receiving 0.14, 0.34, and 0.36 inches at Boise, respectively. Idaho Falls recorded 0.31, 0.98, and 0.88 inches on September 26, 27, and 28, respectively as an upper-level low-pressure system made landfall off the California coast (Figure 11).

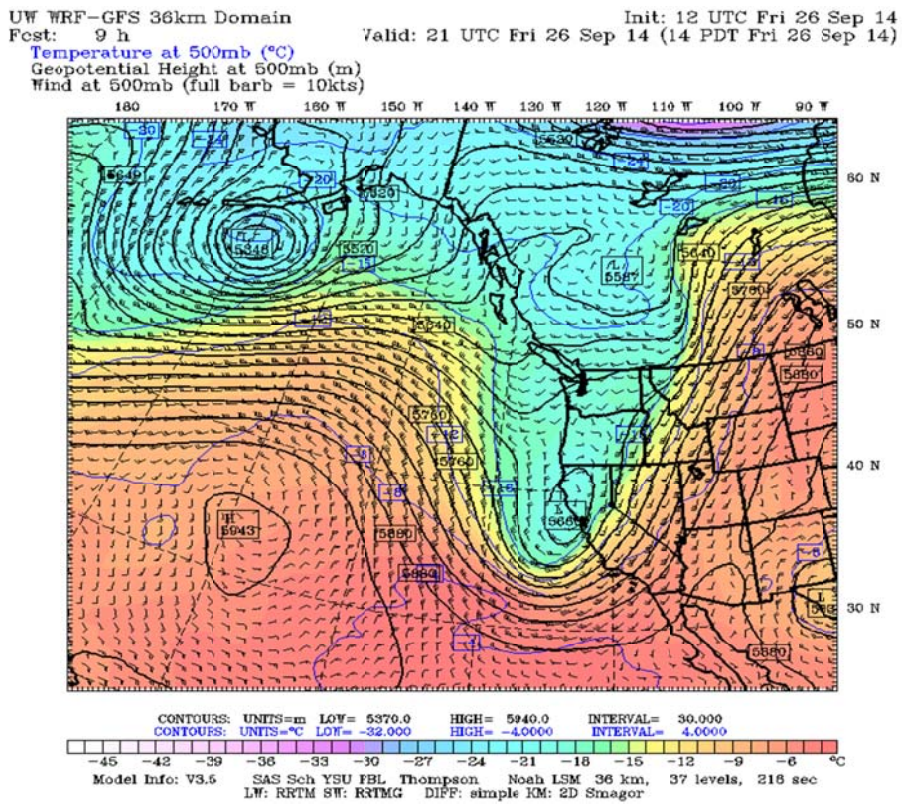


Figure 11. 500 mb temperature valid 21 UTC 26 September 2014.

This system was very moist as it tracked deep to the south and entrained monsoon moisture and remnants of tropical storm moisture over the South Pacific. September was around 2°F warmer than normal with the progressive pattern at the end of the month pushing precipitation values to above normal for the month.

October

October began with an upper-level ridge over the Idaho airsheds (Figure 12), which limited mixing heights and maintained the trend of a warm, midlevel air parcel that kept inversion breakout times late and limited the burn windows.

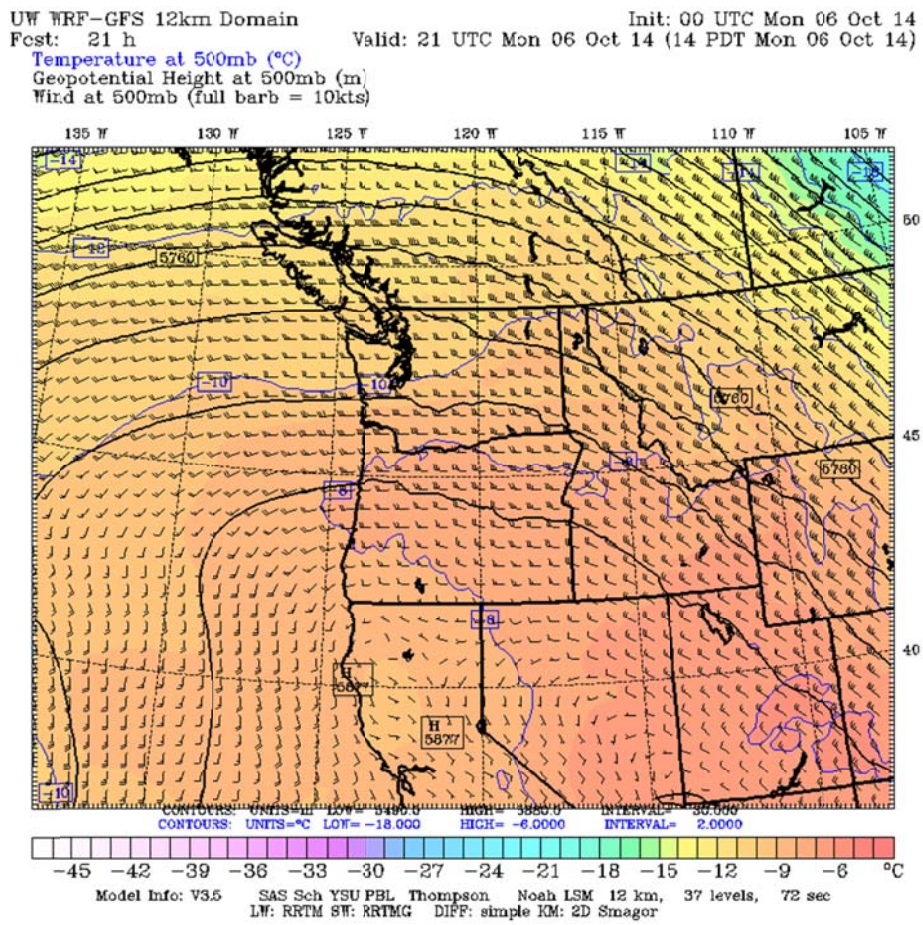


Figure 12. 500 mb temperatures valid 21 UTC 06 October 2014.

This ridge continued to build and provided dry and warm conditions with the average temperature for the month between 4–5°F above the climatological average. Ridge development at this time of year lowers the mixing heights as the overall air mass is cooler, which then limits the ventilation values. The pattern remained for most of October with temperatures again averaging above normal by about 5°F. There were multiple occasions of upper-level storm systems breaking down the ridge, which then allowed for gusty winds; however, these systems were quite dry with precipitation ranging around 50% of normal for the month. Figure 13 shows the ridge shifting to the east as an upper-level trough approached from the eastern Pacific.

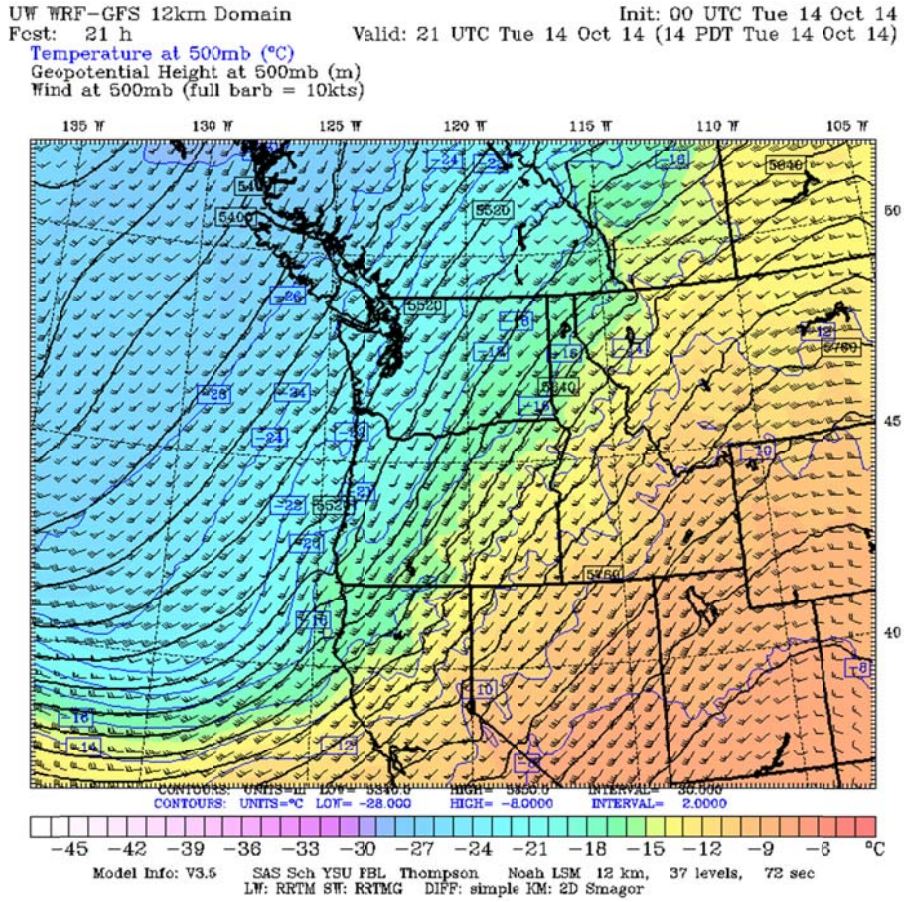


Figure 13. 500 mb temperature valid 21 UTC 14 October 2014.

As the season moved further into fall, the weather pattern became more progressive with upper-level trough systems making landfall every 5–7 days. This pattern resulted in a series of ridges and troughs located over the southern Idaho airsheds producing windy conditions when the upper-level troughs approached with warm and dry conditions and the ridge dominated the pattern. Figure 14 indicates the persistent midlevel warming that was a near constant phenomenon during the burn season.

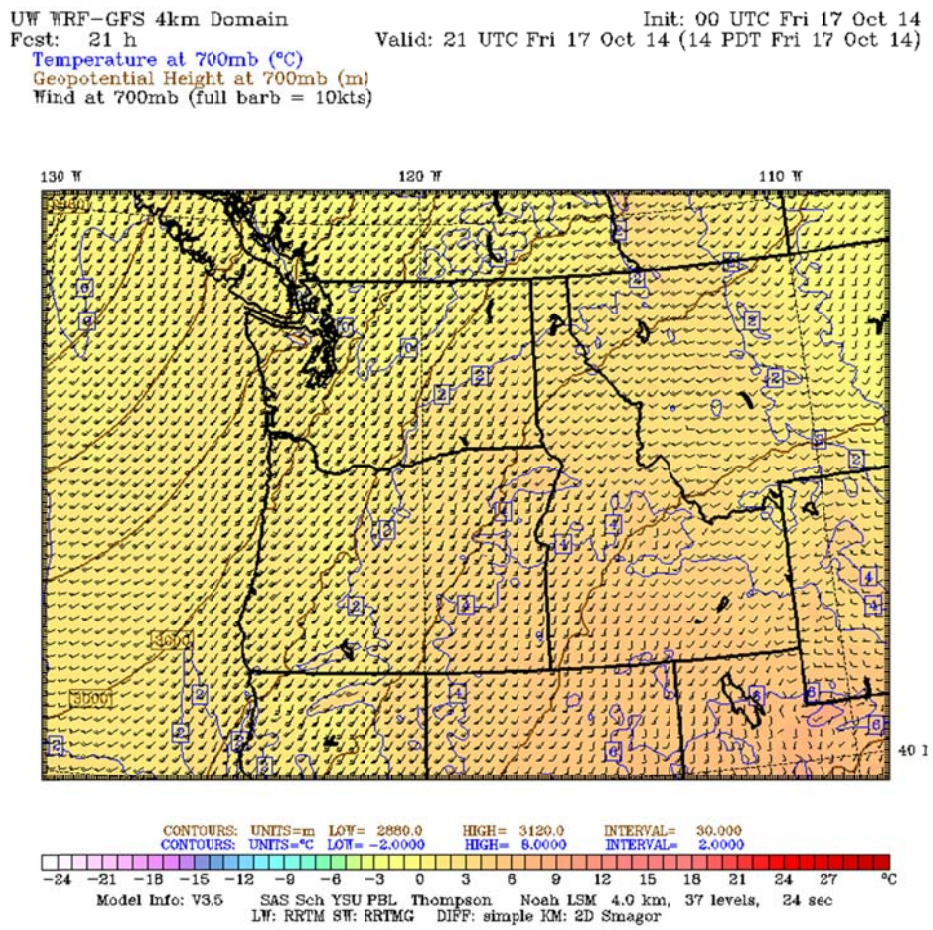


Figure 14. 700 mb temperature valid 21 UTC 17 October 2014.

The warm tongue under the ridge extended from Nevada and Utah into the northern Great Basin across southern Idaho into the Snake River Plain. The progressive pattern continued until October 20 when another upper-level trough approached the region as indicated in Figure 15.

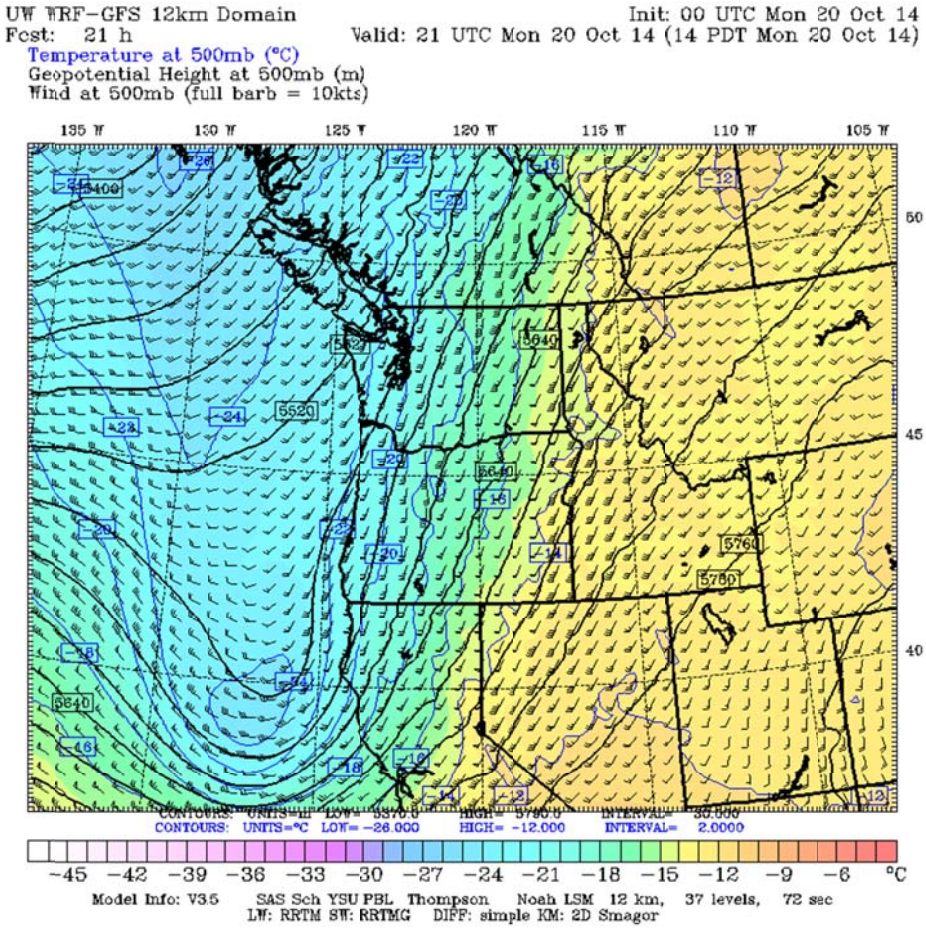


Figure 15. 500 mb temperature valid 21 UTC 20 October 2014.

This pattern continued through the end of October and into November with another upper-level ridge that strengthened over the area by the end of October as shown in Figure 16.

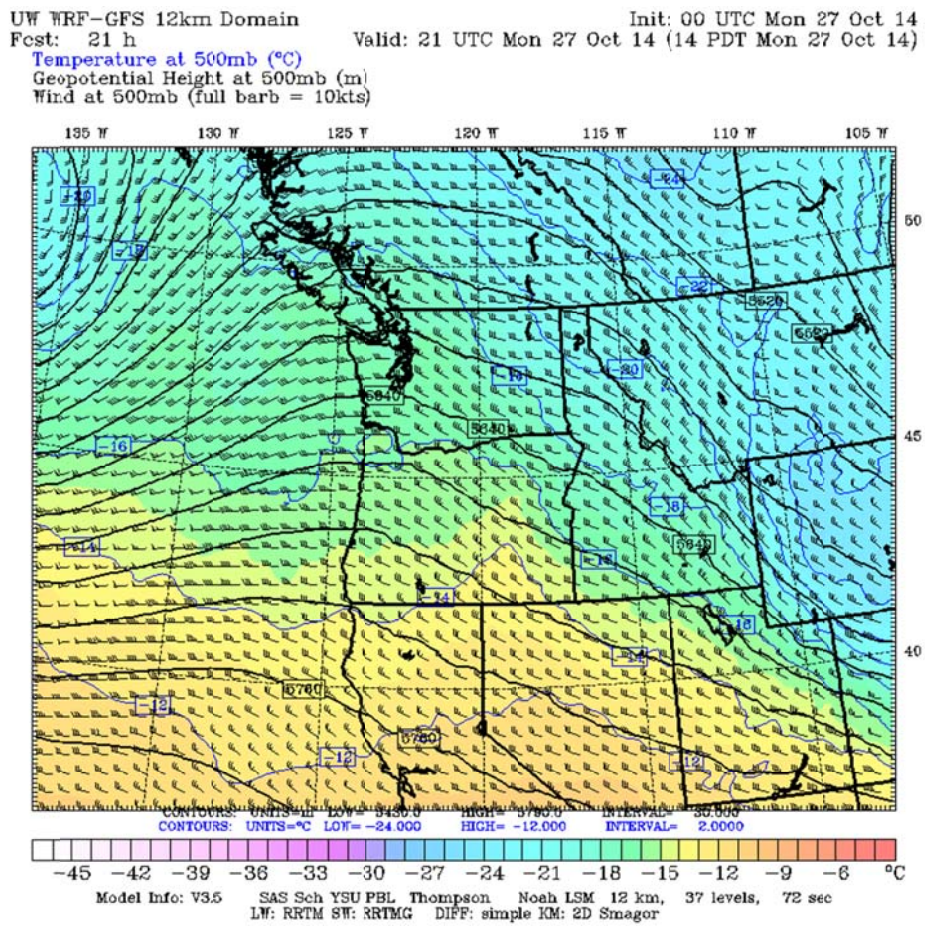


Figure 16. 500 mb temperatures valid 21 UTC 27 October 2014.

November

The first week of November proved to be the last of the 2014 burn season as daily operational forecasts ended on November 5. A series of oscillating upper-level ridges and troughs continued the trend seen towards the end of October and persisted until an unseasonable cold and strong system brought significant snowfall amounts to southern Idaho's valley floors on November 13 and 14. This effectively ended the 2014 burn season.

Conclusions

The 2014 crop residue burning season was hampered at times by wildfire smoke, especially during the early portion of the season as fires burned in the Boise National Forest. Heavy precipitation across the Magic Valley and Upper Snake River Plain hampered burning through August and September; however, the warm midlevel layer provided the most consistent and persistent hindrance of burning as it required most of the morning and early afternoon to break the nocturnally driven radiation inversion and the midlevel warm tongue inversion. Figure 17 shows the typical morning sounding at the Boise Airport (KBOI) that was observed during one of the previously described episodes.

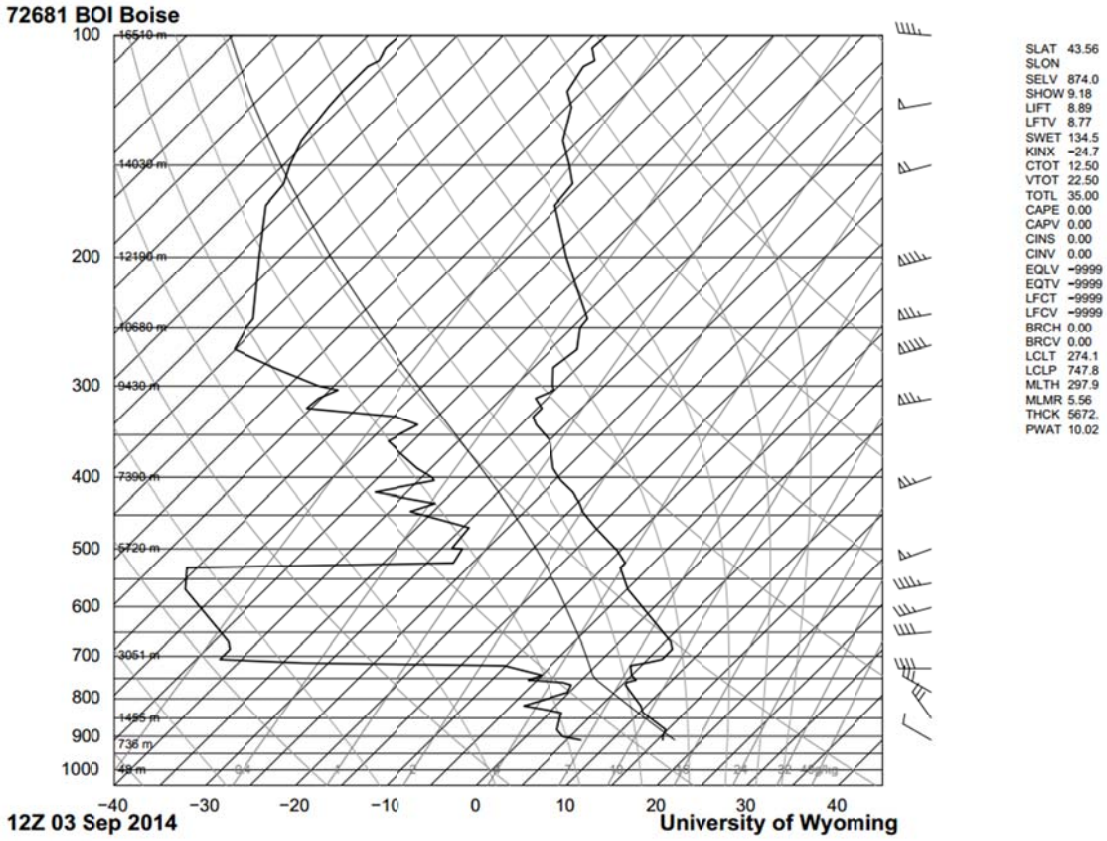


Figure 17. KBOI observed sounding at 12 UTC 03 September 2014.

This image shows the typical nocturnal radiation inversion (located at 890 mb) that normally eroded around 11 a.m. LST; however, also noticeable was the warm midlevel layer with a substantial inversion located between 650–700 mb. This consistently pushed the burn window to begin between 12 p.m. and 2 p.m. LST rather than the previous 11 a.m. LST window. The 2014 crop residue burning season ended with the last official dispersion forecast on November 5.

Forecast weather models especially from the ARW-WRF performed quite well during the 2014 crop residue burning season. Wind direction and speed forecasts need to be improved, as some forecasts were missed in relation to that category, mainly across the middle and Upper Snake River Plain. A burn day analysis report was developed for the Twin Falls Regional Office for a burn in Jerome County on September 8, 2014. The burn recommendation for that day was a “no burn” by the air quality meteorologist. Forecast conditions for that day were for west-north winds at 5–10 mph at the surface with temperatures between 83–85°F and an inversion breakout time of 1 p.m. LST at a temperature range between 78–80°F. Observed conditions at the Twin Falls airport (KTWF) during the afternoon were winds from the west to northwest with speeds of 6–9 mph and a maximum temperature of 84°F. Limited acres were approved and totals kept under 300 acres as suggested by the forecast weather conditions.

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Appendix C. Burn Decision Summary

Date	Acres	SMA
2/24/2014	6.5	Southwest Idaho
3/12/2014	13	Southwest Idaho
3/13/2014	175	Central
3/13/2014	10	Northern Magic Valley
3/13/2014	5.5	Southwest Idaho
3/14/2014	65	Southern Magic Valley
3/18/2014	10	Central
3/18/2014	125	Northern Magic Valley
3/18/2014	12	Southern Magic Valley
3/19/2014	16	Southern Magic Valley
3/21/2014	31	Northern Magic Valley
3/21/2014	81	Southern Magic Valley
3/21/2014	17	Weiser and Lower Payette Valleys
3/24/2014	219	Central
3/24/2014	235	Eastern Idaho
3/24/2014	140	Northern Magic Valley
3/24/2014	62	Southern Magic Valley
3/24/2014	31	Weiser and Lower Payette Valleys
3/24/2014	30	Southeast Idaho
3/25/2014	70	Southeast Idaho
3/25/2014	7	Southern Magic Valley
3/25/2014	4	Weiser and Lower Payette Valleys
3/25/2014	74	Central
3/25/2014	47	Eastern Idaho
3/26/2014	164	Central
4/2/2014	200	Boundary
4/3/2014	60	Central
4/7/2014	165	Boundary
4/7/2014	76	Southern Magic Valley
4/8/2014	28	Eastern Idaho
4/8/2014	110	Northern Magic Valley
4/8/2014	68	Southern Magic Valley
4/8/2014	150	Central
4/9/2014	65	Southern Magic Valley
4/9/2014	39	Southwest Idaho
4/9/2014	370	Boundary
4/10/2014	211	Boundary
4/10/2014	16	Southeast Idaho
4/10/2014	40	Central
4/11/2014	46	Southeast Idaho
4/11/2014	4	Southern Magic Valley
4/14/2014	60	Central
4/14/2014	318	Boundary

Date	Acres	SMA
4/14/2014	2	Southeast Idaho
4/14/2014	10	Southern Magic Valley
4/14/2014	27	Weiser and Lower Payette Valleys
4/15/2014	5	Central
4/16/2014	43.25	Southeast Idaho
4/17/2014	10	Southeast Idaho
4/17/2014	348	Central
4/21/2014	31	Southeast Idaho
4/21/2014	7	Southern Magic Valley
4/21/2014	240	Southeast Idaho
4/24/2014	76	Southeast Idaho
4/30/2014	0.5	Weiser and Lower Payette Valleys
4/30/2014	180	Southeast Idaho
5/1/2014	478	Southeast Idaho
5/1/2014	90	Southern Magic Valley
5/2/2014	277	Southeast Idaho
5/2/2014	55	Southern Magic Valley
5/13/2014	90	Central
5/14/2014	47	Eastern Idaho
5/15/2014	178	Southeast Idaho
5/16/2014	115	Central
5/19/2014	150	Central
5/23/2014	70	Southeast Idaho
5/27/2014	8	Southeast Idaho
6/11/2014	41	Custer and Lemhi Counties
6/23/2014	3	Southeast Idaho
7/7/2014	50	Central
7/23/2014	115	Southwest Idaho
7/24/2014	25	Weiser and Lower Payette Valleys
7/25/2014	64	Southwest Idaho
7/28/2014	56	Southwest Idaho
7/28/2014	100	Central
7/30/2014	49	Southern Magic Valley
7/31/2014	52	Southern Magic Valley
7/31/2014	54	Central
8/5/2014	43	Northern Magic Valley
8/5/2014	157	Southwest Idaho
8/5/2014	8	Weiser and Lower Payette Valleys
8/7/2014	16	Southwest Idaho
8/7/2014	33	Weiser and Lower Payette Valleys
8/8/2014	82	Southwest Idaho
8/11/2014	280.1	Southern Magic Valley
8/11/2014	159	Southwest Idaho
8/11/2014	115	Northern Magic Valley
8/11/2014	186	Southern Magic Valley

Date	Acres	SMA
8/11/2014	173	Eastern Idaho
8/13/2014	169	Eastern Idaho
8/14/2014	4	Southwest Idaho
8/15/2014	78	Southwest Idaho
8/15/2014	12	Southern Magic Valley
8/15/2014	415	Northern Magic Valley
8/18/2014	220	Boundary
8/18/2014	207	Eastern Idaho
8/18/2014	2	Northern Magic Valley
8/18/2014	40	Southern Magic Valley
8/18/2014	158	Southwest Idaho
8/18/2014	98.5	Weiser and Lower Payette Valleys
8/19/2014	200	Southeast Idaho
8/19/2014	42	Blaine and Camas Counties
8/19/2014	194	Eastern Idaho
8/19/2014	99	Northern Magic Valley
8/19/2014	83	Southern Magic Valley
8/20/2014	48	Southern Magic Valley
8/20/2014	467.5	Northern Magic Valley
8/20/2014	28	Southwest Idaho
8/21/2014	1007	Central
8/25/2014	178	Central
8/25/2014	205	Boundary
8/25/2014	782	Central
8/26/2014	1102	Central
8/26/2014	67	Eastern Idaho
8/27/2014	67	Central
8/27/2014	860	Boundary
8/27/2014	1441.5	Central
8/27/2014	76	Eastern Idaho
8/27/2014	659.5	Northern Magic Valley
8/27/2014	70	Southern Magic Valley
8/28/2014	40	Central
8/28/2014	70	Blaine and Camas Counties
8/29/2014	90	Central
8/29/2014	166	Eastern Idaho
8/29/2014	309	Northern Magic Valley
8/29/2014	51	Southwest Idaho
9/2/2014	1020	Central
9/2/2014	18	Eastern Idaho
9/2/2014	135	Northern Magic Valley
9/2/2014	190	Eastern Idaho
9/2/2014	162	Northern Magic Valley
9/2/2014	80	Southeast Idaho
9/2/2014	67	Southern Magic Valley

Date	Acres	SMA
9/2/2014	58	Southwest Idaho
9/4/2014	727	Central
9/4/2014	523	Eastern Idaho
9/4/2014	147	Southeast Idaho
9/4/2014	176	Northern Magic Valley
9/4/2014	20	Southern Magic Valley
9/5/2014	69	Southeast Idaho
9/5/2014	105	Blaine and Camas Counties
9/5/2014	130	Central
9/5/2014	89	Northern Magic Valley
9/5/2014	50	Boundary
9/5/2014	85	Northern Magic Valley
9/8/2014	282.5	Central
9/8/2014	88	Kootenai County
9/8/2014	193	Eastern Idaho
9/8/2014	116	Southeast Idaho
9/8/2014	338	Northern Magic Valley
9/9/2014	318.5	Central
9/10/2014	219	Central
9/10/2014	170	Southeast Idaho
9/10/2014	51	Southwest Idaho
9/11/2014	1248	Boundary
9/11/2014	1181	Central
9/11/2014	59	Eastern Idaho
9/11/2014	413	Northern Magic Valley
9/11/2014	401	Southeast Idaho
9/11/2014	289	Southern Magic Valley
9/11/2014	75	Southwest Idaho
9/12/2014	240	Southeast Idaho
9/12/2014	65	Eastern Idaho
9/12/2014	4	Northern Magic Valley
9/12/2014	30	Southern Magic Valley
9/15/2014	370	Boundary
9/15/2014	314	Eastern Idaho
9/15/2014	318	Southeast Idaho
9/15/2014	78	Southwest Idaho
9/16/2014	72	Southeast Idaho
9/16/2014	141	Eastern Idaho
9/16/2014	50	Southwest Idaho
9/16/2014	5	Northern Magic Valley
9/17/2014	225	Southeast Idaho
9/17/2014	12	Southwest Idaho
9/17/2014	107	Eastern Idaho
9/18/2014	220	Southeast Idaho
9/19/2014	65	Northern Magic Valley

Date	Acres	SMA
9/19/2014	209	Eastern Idaho
9/22/2014	95	Boundary
9/23/2014	45	Eastern Idaho
9/23/2014	24	Southwest Idaho
9/24/2014	1282.5	Central
9/24/2014	418.7	Eastern Idaho
9/24/2014	118	Southeast Idaho
9/25/2014	3557.7	Central
9/25/2014	120	Southeast Idaho
9/25/2014	6	Southwest Idaho
9/26/2014	358	Central
9/26/2014	100	Boundary
9/26/2014	387	Eastern Idaho
9/26/2014	20	Northern Magic Valley
10/2/2014	2938.5	Central
10/6/2014	451	Eastern Idaho
10/7/2014	580	Central
10/7/2014	91	Boundary
10/7/2014	183.6	Eastern Idaho
10/8/2014	80	Central
10/8/2014	0.5	Northern Magic Valley
10/8/2014	260.9	Eastern Idaho
10/9/2014	31	Central
10/9/2014	60	Eastern Idaho
10/9/2014	25	Southeast Idaho
10/10/2014	12.75	Central
10/10/2014	62.6	Eastern Idaho
10/10/2014	8	Southwest Idaho
10/10/2014	30	Eastern Idaho
10/14/2014	2	Southeast Idaho
10/14/2014	38	Central
10/14/2014	30	Northern Magic Valley
10/14/2014	3	Southwest Idaho
10/16/2014	10	Southern Magic Valley
10/16/2014	21	Weiser and Lower Payette Valleys
10/16/2014	150	Eastern Idaho
10/17/2014	95	Eastern Idaho
10/17/2014	10	Shoshone
10/17/2014	8	Southern Magic Valley
10/20/2014	110	Eastern Idaho
10/20/2014	346	Central
10/20/2014	42	Southern Magic Valley
10/20/2014	16	Southwest Idaho
10/22/2014	10	Central
10/22/2014	227	Eastern Idaho

Date	Acres	SMA
10/22/2014	2	Southern Magic Valley
10/23/2014	3	Eastern Idaho
10/23/2014	258.79	Southeast Idaho
10/24/2014	4	Eastern Idaho
10/28/2014	25	Southern Magic Valley
10/29/2014	428	Central
10/29/2014	25	Southeast Idaho
10/30/2014	5	Southeast Idaho
10/30/2014	44	Southern Magic Valley
10/30/2014	16	Southwest Idaho
10/31/2014	4	Central
10/31/2014	50	Southeast Idaho
10/31/2014	20	Southern Magic Valley
11/4/2014	5	Southern Magic Valley
11/6/2014	2	Southern Magic Valley
11/7/2014	85	Central
11/7/2014	8	Southern Magic Valley
11/10/2014	10	Southeast Idaho