

JEFFERSON COUNTY SMOKE MANAGEMENT PIBALL OBSERVATIONS, 2002

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Abstract

The 2002 season was the fourth year for the piball project to track local wind direction and speed to assist the smoke management coordinator in the decision-making process. Incorporation of piball data into the daily decision to allow open-field burning has increased over the years. This season, piball releases at potential burn sites were increased, allowing for more accurate decisions under marginal conditions when errors are most likely to occur.

Introduction

The Pilot Balloon (piball) program continued to focus on incorporating the weather balloon information into the daily routine of the Jefferson County Smoke Management Program. Emphasis was put on burning more acres on the better burn days and not allowing burning on the marginal days.

Materials and Methods

Balloon releases occurred in the morning between 10:30 and 11:30 and, at the request of the smoke management coordinator, in the afternoon generally between 1:00 and 2:00. The piball was used to verify the burn forecast for upper level wind direction and speed and provide an indication of the mixing height. The wind directions and speeds were faxed to the smoke coordinator, who then used these data in conjunction with the aircraft soundings and the Oregon Department of Agriculture (ODA) burn forecast to determine the field burning status for the day.

Wind directions and speeds were determined at 1-minute intervals for a period of 10 minutes during each balloon release using an observation Theodolite System and 26-inch-diameter helium-filled balloons. Each minute corresponds with the following above-ground-level elevations in feet: 709, 1,358, 2,008, 2,628, 3,248, 3,839, 4,429, 5,020, 5,610, and 6,201. Air temperature, relative humidity, surface wind direction and speed were documented for each day at the time of the balloon release using the weather station at the Central Oregon Agricultural Research Center (COARC).

Results

The 2002 weather patterns provided for a somewhat challenging burn season. The open field burning season was 43 days. Burn days with no restrictions were declared for 30 percent of the days, marginal days (those with restrictions) occurred 49 percent of the time, and no open field burning was allowed 21 percent of the time. Releasing the balloons in the late morning worked well to refine the weather forecast and to minimize adverse smoke impacts on local communities. In addition to the daily balloon releases at

the COARC, balloon releases were made on 10 days in the Culver area in an attempt to prevent smoke intrusion to the Crooked River Ranch and yet allow growers to burn their fields in a timely manner.

The piball was also a valuable tool for determining the mixing height for the smoke during the optimal burn times. There was an inversion layer extending from the surface up to as high as 5000 ft on 77 percent of the mornings, as indicated by the temperature readings provided by the airplane flights. A counter-clockwise direction of travel by the piball would indicate an inversion or stable air layer. The morning balloon releases indicated that 37 percent of the time the inversion layer had lifted to a minimum of 3200 ft, 9 percent of the time the inversion had lifted to 3800 ft and 2 percent of the time to 5600 ft. The morning piball showed a significant difference in the transport wind direction 58 percent of the time and significantly higher transport wind speeds 51 percent of the time. The afternoon piballs showed a significant difference in the predicated directions 81 percent of the days and higher wind speeds 62 percent of the time on days that a second piball was released.

The piball program was useful as a daily indicator of real-time, on-site conditions and complimented the weather forecast provided by the ODA meteorologist in Salem. However, it was particularly helpful on marginal days to assist the program coordinator in making the decision to allow burning when conditions were changing or hard to discern. These marginal days, where the conditions are unclear, create the most risk for smoke intrusion into populated areas. To have the piball available for release at the site of the potential burn prior to making a final decision has proved to be a valuable tool.