

Meteorological Conditions

Open field burning, propane flaming, and stack burning are dependent upon weather conditions.

Wind Direction

The direction of smoke transport is the key element in determining areas in which burning may occur and the determination of northerly or southerly flow is required for certain burn decisions. Wind direction data is obtained from upper air and surface National Weather Service (NWS) observing stations at Salem and Medford. Surface wind measurements are received from NWS stations as well as DEQ meteorological stations. Pilot balloon tests performed by Oregon Department of Agriculture (ODA) personnel are used to help build a comprehensive picture of the transport wind pattern in the Willamette Valley. Wind information from the NWS is transmitted to the ODA by modem communications. Surface winds from DEQ stations are available on a near real-time basis through use of their Data Acquisition System.

Wind Speed

Wind speed data is available throughout the valley. Wind speeds that are light at the surface but increasing substantially as you go higher are optimal for good plume rise and smoke transport. Light winds aloft do not provide adequate transport, thus downward mixing may reintroduce smoke to the surface layer.

Experience indicates surface winds below 10 mph do not inhibit plume rise appreciably. Wind speeds between 10 mph and 15 mph sometimes hinder plume rise by entrainment of colder ambient air. Very little burning may be accomplished when higher wind speeds occur due to difficulties in fire control and turbulent transport of smoke back to the surface.

Mixing Height

The depth of the mixed layer normally grows throughout the day and collapses rather quickly in the evening in response to surface heating effects. The mixing height is calculated by the ODA meteorologist from an accurate maximum temperature forecast applied to the morning temperature sounding taken by the NWS. The mixing height as calculated from the pseudo-adiabatic chart represents a minimum estimate of atmospheric mixing. Buoyant or high velocity plumes can often, through their own energy, overcome atmospheric limitations to vertical dispersion and effectively increase the mixing height.

To better ascertain actual atmospheric mixing capabilities, the Smoke Management Program personnel observe and measure plume rise from test fires or general burning as part of the routine observations. The maximum plume rise attained by these test burns is more representative of actual dispersion capabilities.

Rainfall

Rainfall is measured at NWS observation stations. This information is used to identify how wet yields may be and how well they will burn.

Weather Forecasts

Forecast briefings are received from the National Weather Service office in Portland at least twice each day at 7:30 a.m. and 12:30 p.m. Meteorological patterns and forecasts are developed by the meteorologist and discussed to determine the possibility of burning. During these briefings the NWS provides forecasts of maximum temperature, minimum relative humidity, and surface and upper level winds. Variations in regional wind flow fields (development of marine air intrusions, thermal troughs, etc.) due to daily heating patterns are discussed. These briefings provide the basis for early morning grower briefing and selection of test fire sites.