Broadacre burn-off smoke management guideline

A guideline on management of smoke for the grain and winegrape industries

Government of South Australia
Department of Primary Industries and Regions

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Disclaimer

Acknowledgement

Front cover photograph kindly provided by Professor Kerry Wilkinson, University of Adelaide.

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Purpose

The purpose of this smoke management guideline is to capture the agreed winegrape and grain industry approach to the best possible management of smoke from broadacre stubble burns to mitigate risk of damage to smoke sensitive unharvested winegrapes. This approach has been developed within the context of existing legislative frameworks, available resources and the policy position as set out in SA Country Fire Service (SACFS) Smoke Management Policy document.

This guideline has been developed by the Department of Primary Industries and Regions (PIRSA) in collaboration with industry representative organisations Grain Producers SA, Wine Grape Council of South Australia, South Australian Wine Industry Association Inc and various regional grape and wine associations and their respective grain and winegrape grower members and in consultation with the State Bushfire Coordination Committee (SBCC) and South Australian Country Fire Service (SACFS).

Relevant documents

- Broad Acre Burning Code of Practice (April 2015)
- SACFS Smoke Management Policy 2023

Scope

This guideline applies to grain and winegrape growers in South Australia.

Objectives

This guideline will:

- Provide information on smoke management to ensure that grain and winegrape growers are well informed of the benefits and risks being managed in broadacre burning.
- Provide clear information on planning considerations to manage a burn-off, who may be affected and how potential impacts can be mitigated.
- Contribute to increased levels of efficiency and productivity in both sectors.
- Improve communication between the sectors and provide an environment where grain and winegrape sectors can work together.

Details

Background

These guidelines have been prepared in support of the South Australian Country Fire Service (SACFS) document, Smoke Management Policy (the policy). The SACFS Broad Acre Stubble Burning Code of Practice (the code) serves as a guide to the South Australian farming community to assist safe broadacre stubble burning practice to manage risk of fires escaping into unburnt neighboring land.

This guideline should be read in conjunction with both the policy and the code.

Why grain growers burn stubble

Grain growers are increasingly recognising the value of retaining stubble to protect soil from erosion. Retaining stubble also increases soil organic carbon, which improves soil structure, moisture retention and fertility. Broad acre burning refers to the complete (blanket) burning of standing stubble and may still be necessary:

- as part of paddock preparation, removing excessive stubble volumes that can cause seeding machinery blockages that slows progress of crop seeding
- to reduce disease and weed seed banks (particularly for weed populations with herbicide resistance)
- to reduce populations of pests, particularly snails as a part of a producer's snail management program for reducing this serious contamination threat to grain export markets.

A combination of weather parameters is required to produce a burn that is consistent and doesn't leave patchy or unburnt areas, which is particularly important for pest snail control. Broadacre burning is a farm management practice that can produce significant fire risk every summer and autumn if not carefully planned and implemented with caution.

Many grain growers are now opting to avoid blanket burns on paddocks where possible. Grain growers now often slash stubble into windrows for burning or only burn header waste rows, retaining some standing stubble in between. The same principles of smoke management of this guideline apply for these grain paddock burning practices.

Smoke taint and grapevines

Smoke taint is an important issue to the wine industry. When winegrapes are exposed to smoke, the smoke binds to compounds in the grapes, giving the wine a smoky and undesirable characteristic that can make the wine unsaleable.

South Australia has 18 wine regions spread across the state. Clare Valley and Barossa Valley, and Riverland regions are closest to grain cropping districts and may be at increased risk of smoke incursions.

Grapevines exposed to smoke during sensitive growing periods could negatively impact the quality of grapes used in wine production. The extent to which a grapevine is susceptible to smoke exposure is related to the growth stage. The period up to flowering has the lowest potential for smoke taint of grapes. The risk of smoke uptake increases significantly from pea size berries to the highest risk when the grapes soften and ripen through to harvest.

Research conducted by the University of Adelaide on the impact of stubble burn smoke on winegrape quality reports that development of smoke taint in grapes depends on smoke intensity and length of exposure. Heavy smoke exposure for a period of up to 30 minutes during susceptible growth phases could be sufficient to result in smoke taint, particularly with higher density fresh smoke.

Strategies to reduce smoke impacts

Seasonal conditions and timing of vintage

Most years, grape harvest is completed before grain growers begin stubble burning. However, when cooler summer weather delays the ripening of winegrapes, the grape harvest and start of stubble burning may overlap.

A large grain harvest in the previous season leaving a large stubble residue, or a wet winter increasing snail breeding, increase the likelihood of stubble burning operations. The highest risk of potential smoke impacts on unharvested grapes is when a large stubble burning program coincides or overlaps with a delayed grape harvest.

The table below highlights the normal grape harvest period for each wine region. The grape processing period may extend beyond these times.

Region	January	February	March	April	May	June
Riverland						
Adelaide Plains						
Barossa Valley and Eden Valley						
Clare Valley						
McLaren Vale and Southern Fleurieu						
Langhorne Creek						
Adelaide Hills						
Limestone Coast						
Kangaroo Island						

Consider weather, stubble fuel conditions and surface temperature inversions

Burn only after the fuel has sufficiently dried out and do not burn too early in the day to reduce smoke production. Large amounts of green fuels do not combust readily and will cause a smoke management problem.

Before conducting a broadacre burn, identify wind direction and proximity of unharvested vineyards. Ensure the forecast wind direction is such that it will not cause smoke to carry over the vineyard.

Another contributing factor to smoke causing adverse effects is surface temperature inversion layers trapping smoke in lower layers of the atmosphere. Inversions are caused by a layer of cool, still air trapped below warm air and are generally more prevalent from late afternoon (after 4:00 pm) until several hours after sunrise.

Best times for burning

Conduct burns between 10:00 am and 4:00 pm when fuel moisture has decreased sufficiently, therefore producing less smoke. This also avoids the period when atmospheric inversion conditions are more likely to cause smoke to settle.

Conducting burns between 10 am and 4 pm allows for fuel moisture to decrease sufficiently resulting in less smoke during burning, and generally avoids the period when atmospheric inversion conditions are more likely to cause smoke to settle and affect sensitive sites.

Weather: forecast and observation tools

The Bureau of Meteorology (BOM) provides a forecast service for predicting surface temperature inversions at individual locations. This can be accessed via the BOM MetEye website, under the Wind Forecast, select the Mixing Height search tool from the menu. Mixing Heights below 500m are an indication of elevated risk of inversions forming. This information may assist in planning and managing the risk of smoke affecting sensitive sites when conducting broadacre burning.

Signs of temperature inversions

- mist, fog, dew or a frost
- smoke or dust hangs in the air and moves sideways, just above the ground surface
- cumulus clouds built up during the day collapse towards evening
- wind speed is constantly less than 11 kilometres per hour in the evening and overnight
- cool off-slope breezes develop during the evening and overnight
- distant sounds become clearer and easier to hear
- aromas become more distinct during the evening than during the day.

For further Information see Hazardous surface temperature inversion.

Grain growers should also use weather observations prior to starting a burn to check that conditions align with the forecast and remain suitable for the burn.

Many grain growers have private on-farm weather stations or may have access to several publicly available weather station networks, such as the Mid North, Riverland and Mallee Mesonet networks. These provide growers with key information on current conditions for burning including wind direction and presence or risk of temperature inversions. A subscription may be required to access some public mesonet information, which assists operators to meet ongoing maintenance costs for these systems.

Check for signs of an increased risk of temperature inversion (listed in the above box) before lighting a burn. For further Information on inversions see Hazardous surface temperature Inversion. September 2022, available from Grain Research Development Corporation website www.grdc.com.au.

Unharvested grapevine crops

To help avoid the threat of smoke affecting unharvested grapevines, communications strategy are provided below where local grape and wine organisations provide regular updates on the status of harvested and unharvested grapevine crops in their region. Grain growers should use this information to understand the potential for smoke to impact unharvested grapes as part of their planning for a broadacre stubble burn and the final decision to proceed with a burn.

Practices to reduce the risk of unharvested grapevine crops being affected by smoke from broadacre burning include:

- vineyard owners/managers providing regular updates on the status of unharvested grapevine crops and notifying the regional wine grape association when harvest is complete
- grain growers planning a burn should ensure prevailing winds (current and forecast) will not carry the smoke towards nearby unharvested grapevines before lighting a broadacre burn
- conducting the broadacre burn between 10:00 am and 4:00 pm (or when inversion conditions are not forecast).

Communications strategies

Communication between grain and winegrape growers at a personal level and more broadly through websites and media will minimise the risk of winegrapes being exposed to smoke from broadacre burning of stubbles.

Information that should be shared includes the harvest status of grapevines, made available through various communication systems for example, websites and media, that are easy for grain growers to access.

Grain growers should use this information in planning a broadacre stubble burn, so they are aware of the location of unharvested grapes and using the above smoke management strategies to avoid smoke impacts on unharvested vineyards.

Grain growers have a responsibility to seek information on the grape harvest in their region before burning, just as winegrape growers should be providing regular updates on the status of their grape harvest.

Owners of neighbouring properties producing wine grapes and grains are encouraged to establish direct relationships permitting easy communication for sharing grape harvest and stubble burning information.

Progress of grape harvest in a region should be made readily available through media such as websites or promoted through local media channels. Information sources should be widely promoted through grain grower networks, and the need for regularly updated grape harvest status information promoted through wine grape grower networks.

Where an arrangement exists between grain growers and the local council especially at times where burn permits are required during the fire danger season, council officers may make growers aware of the availability of this information and suggest checking the wine grape association for grape harvest information updates before lighting the burn.

Examples of best practice communications include:

- local grape and wine organisations publishing regular updates on the status of grape harvest across their region, most importantly reporting when harvest is complete
- some local government Authorised Officers may provide copies of the policy and guidelines when issuing burn permits. They may also suggest to a grain grower issued a permit that they should consider contacting nearby grape growers or their local wine association for information of grape harvest status before proceeding with a burn.
- local councils may consider mapping permitted stubble burns to avoid excessive concentrations of fires at one location.

Smoke hazard signage warning for road users

If the area to be burnt is adjacent to a regularly used road and smoke is likely to blow over the road, impairing the vision and safety of drivers, you must place approved smoke hazard signs on both sides of the road. These signs should be placed on the shoulder of the road so they can be seen by drivers before they encounter smoke. They may be temporarily fixed to a rigid guidepost but should not be fixed to other road signs or displayed in such a way as to impact traffic. If stands are used, they need to be capable of remaining upright and in place under windy conditions.

When placing signs on roads maintained by the Department for Infrastructure and Transport, you should notify the Traffic Management Centre on 1800 018 313 of the times they are going to be displayed as per requirements under the *Road Traffic Act 1961*, Section 17 (Installation of traffic control devices).

Refer to the Broad Acre Burning Code of Practice and the Department for Infrastructure and Transport for further information on traffic management requirements.

Checklist for a paddock broadacre burn

1. **Planning for a burn (grain grower)**

   ☐ Check the policy and guideline for guidance on smoke management as part of planning a stubble burn in areas with grapevines that could be impacted by the smoke plume.

   ☐ Ensure your broadacre burn is compliant with the Broad Acre Burning Code of Practice, such as checking Fire Danger Season dates, ensuring any required permits are obtained if the burn is planned before the end of the Fire Danger Season and meeting road signage requirements.

   ☐ Identify heightened risk of smoke taint in the region from seasonal conditions. Heightened risk occurs when grape harvest has been delayed due to a cool summer in the region. A large grain crop will produce more stubble residue following harvest, increasing potential stubble burn activity.

   ☐ As part of planning a burn routinely check the weather forecast for wind speed and direction, and for the risk of inversions.

   ☐ Check with your local wine industry association and your local grape growers for presence of unharvested grapes in the region. Assistance with who to contact may be available from industry bodies listed at the end of this document.

   ☐ Identify vineyards where, according to forecast conditions, the smoke plume is likely to move and communicate your intention to burn to those grape growers, giving them opportunity to update the grain grower on their grape harvest.

2. **Planning grape harvest (grape grower and local association)**

   ☐ When monitoring the stage of grape development and possible vintage date, check in with local grape and wine associations and keep them updated on the progress of your grape harvest.

   ☐ Once vintage is finished let your local association know so they have up-to-date information on progress in their region. This can be posted on their website and provided to grain growers as part of their planning for stubble burning operations.

   ☐ The grower association and state associations provide regularly updated information on their website on the progress of vintage across the grape growing regions.

3. **On the day of a burn**

   ☐ Check weather observations verify the forecast conditions and understand likely smoke behaviour.

   ☐ Check whether smoke is likely to be carried over nearby unharvested grapes.

   ☐ Check for signs of increased risk of temperature inversion development.

   ☐ Check that fuel loads are dry and not heaped to reduce the production of smoke volume and persistent smoldering after the burn.

Attachment A: Contact details

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