Wine grapes, smoke and bushfire mitigation in the Adelaide hills

Smoke affecting wine grapes is a recognised issue following smoke exposure from bushfire events in wine grape growing regions of Australia. Prescribed burning is undertaken to reduce bushfire risk, but concerns have been raised about smoke from prescribed burning causing the same issue.

The Department for Environment and Water (DEW) uses prescribed burning to reduce fire fuel hazards, manage native vegetation and protect biodiversity in strategic areas in South Australia.

Smoke impacts from prescribed burning have been successfully managed by DEW in the past and, as far as we are aware, smoke taint has not occurred as a result of DEW's prescribed burning program.

DEW staff will always work to reduce the risk of smoke taint but must balance this with the need to reduce the bushfire risk to the community. This includes reducing the risk of an uncontrolled bushfire impacting on grape growers and other primary producers.

Grape growers are encouraged to contact DEW if they have concerns about prescribed burns near them (refer overleaf).

Background

Issue

Grapevines exposed to smoke from bushfires or prescribed burning, during sensitive growing periods, may produce wine that displays smoke-like aromas that can render the wine unfit for sale and consumption. The exposure of grapes to smoke can therefore result in significant financial losses when growers produce grapes for the wine industry.

Vineyards near Parks and Reserves

Vineyards occur predominantly in the Adelaide Hills, Riverland, South East, Clare Valley, McLaren Vale, Barossa Valley, Fleurieu Peninsula and parts of Kangaroo Island. Prescribed burning in the Adelaide Hills poses the greatest risk to vines due to the frequency of burns and proximity to vineyards.

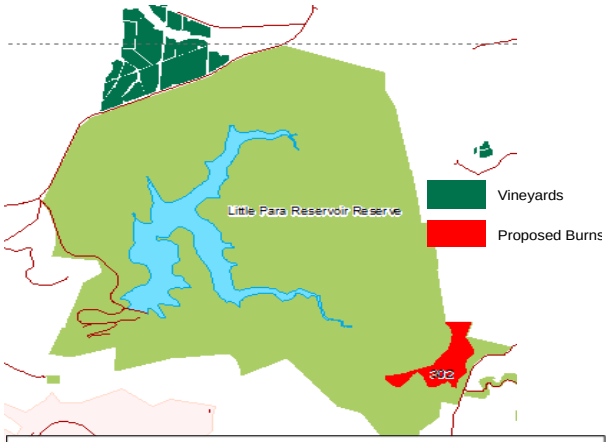
Components of smoke

Smoke is comprised of a variety of gases, and airborne solid and liquid particulates. The main compounds resulting in smoke tainting in grapes are volatile phenols such as guaiacol, 4-methylguaiacol and cresols. Some grape varieties may be more susceptible to these compounds than others.

DEW's Risk Reduction Strategy

DEW is committed to reducing the risk of smoke taint resulting from prescribed burning through the following measures:

- DEW staff identify prescribed burns which may impact neighbouring vineyards (Figure 1)
- We then liaise with Vinehealth and Wine Industry Groups regarding the status of the grape harvest
- If neighbouring vineyards have not been harvested we choose a day with favourable wind conditions to avoid smoke exposure
- We liaise with the Bureau of Meteorology which uses smoke modelling tools to predict smoke dispersion
- We also assess any potential impacts from smoke drift or inversion layers
- We will reschedule a burn if the conditions are not favourable
- We monitor weather conditions during the burn and may change the lighting pattern or postpone the burn if conditions become unsuitable.



One Tree Hill Detailed Forecast
Friday 17 March 2017

	9:30 AM	12:30 PM	3:30 PM	6:30 PM	9:30 PM
Air temperature (°C)	16	20	23	16	11
Wind speed km/h	7	11	11	7	9
Wind direction	NNE	NNW	NW	NW	WNW
Relative humidity (%)	64	46	39	51	73
Forest fuel dryness factor	10	10	10	10	10
Mixing height (m)	1039	1993	2105	1900	1885

Figure 1: Map showing location of vineyards and a detailed forecast leading up to a prescribed burn.

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Why Prescribed burning is important

Fire is a natural part of the South Australian landscape and even the best fire prevention activities cannot stop bushfires occurring during extreme fire weather events. However, reducing fuel loads has been proven to reduce the speed and intensity at which a bushfire burns, which can reduce the risk to lives, homes, assets and the environment.

DEW's prescribed burn program is strategically executed with careful planning and management. Areas to burn are identified in Fire Management Plans and undergo rigorous environmental assessment processes prior to being added to a rolling three year prescribed burning program. Each year DEW undertakes between 50 and 60 burns in the Adelaide and Mt Lofty Ranges Region covering approximately 1,000ha.

Once a burn is on the program further planning is undertaken to ensure it does not escape, rekindle or adversely affect surrounding properties and critical infrastructure. Smoke is always a consideration, especially when burning close to vulnerable communities such as nursing homes, hospitals and schools, and primary producers such as orchards and vineyards.

On the day of the burn the right combination of fuel load, fuel moisture, temperature, relative humidity and wind speed is needed to ensure the burn is conducted safely and effectively. This limits prescribed burning to short periods during spring and autumn, and only on certain days when conditions are suitable. For this reason it can be difficult to avoid overlap in the timing of grape ripening and prescribed burning, particularly when grape harvest is delayed.

Grape growers should be aware that burns are also carried out by private landowners and ForestrySA, which may produce smoke during autumn. If you are concerned about smoke from other sources please contact your local council (who are responsible for issuing permits for burning during the fire danger season) or the Environment Protection Authority.

Risk to Vines

Smoke as a result of fire can negatively impact the quality of grapes used in wine production. The level to which a grapevine is susceptible to smoke exposure is related to the growth stage, particularly from just prior to veraison onwards (the onset of ripening).

As shown in Figure 2, the period up to flowering has the lowest potential for smoke taint of grapes. However, the risk of smoke uptake increases significantly from pea-size berries through to veraison. The period from seven days post veraison to harvest has the highest potential for smoke uptake.

Grapevine growth stage		Potential for smoke uptake
	Shoots 10 cm long	Low
	Flowering	Low
	Pea-size berries	Variable (low to medium)
	Beginning of bunch closure	Variable (low to medium)
	Onset of veraison to three days post-veraison	Variable (low to medium)
 	From seven days post-veraison to Harvest	High

Figure 2: The key stages of grapevine development and sensitivity to smoke exposure (extracted from Brodison, K, 2013).

Repeated smoke exposures and exposure for a long period of time have also been found to result in an accumulation of smoke compounds in grapes and resulting wines. However, a carry-over effect from one growing season to the next has not been found in grapevines that have been exposed to smoke.

What to Expect this Autumn

DEW staff will continue to liaise with Vinehealth and Wine Industry Groups to keep track of the location of vineyards and their growth stages in areas of proposed prescribed burns.

Keep track of DEW's planned prescribed burns in your region on our interactive prescribed burns webpage: http://www.environment.sa.gov.au/managing-natural-resources/fire-management/upcoming-prescribed-burns

More information

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https://www.environment.sa.gov.au/topics/fire-management