Wine grapes, smoke and bushfire mitigation in the Adelaide Hills

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Smoke exposure can affect wine grapes following bushfires in wine grape growing regions of Australia. And although prescribed burning is conducted to reduce this bushfire risk, the issue is the same.

National Parks and Wildlife Service South Australia (NPWSSA) uses prescribed burning to reduce the likelihood and severity of bushfire on communities and the environment as well as enhance biodiversity.

Smoke impacts from prescribed burns are managed carefully, and due to strategic steps taken to reduce the risk of smoke taint, it has not occurred as a result of the prescribed burn program.

Fire Management Officers always work to reduce the risk of smoke taint, along with balancing the need to reduce the risk of bushfire on the community, including grape growers and other primary producers.

The issue

Grapevines exposed to smoke during sensitive growing periods, from bushfires or prescribed burning, may produce wine that displays smoke-like aromas which can render wine unfit for sale and consumption.

This can result in significant financial loss for wine grape growers.

What is smoke made of?

Smoke is comprised of a variety of gases, and airborne solid and liquid particulates. The main compounds resulting in smoke taint in grapes are volatile phenols such as guaiacol, 4-methylguaiacol and cresols.

Some grape varieties may be more susceptible to these compounds than others.

Vineyards near parks

In South Australia, 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.

Reducing the risk of smoke taint

NPWSSA is committed to reducing the risk of smoke taint by following these steps:

- identifying prescribed burns which may impact neighbouring vineyards (see Figure 1)
- liaising with Vinehealth and wine industry groups regarding the status of the grape harvest
- choosing a day with favourable wind conditions to avoid smoke exposure to neighbouring vineyards which have not been harvested
- contacting the Bureau of Meteorology for its smoke modelling tools to help predict smoke dispersion
- assessing potential impacts from smoke drift or inversion layers
- monitoring weather conditions during the burn, and changing the lighting pattern or postponing the burn, if conditions become unsuitable
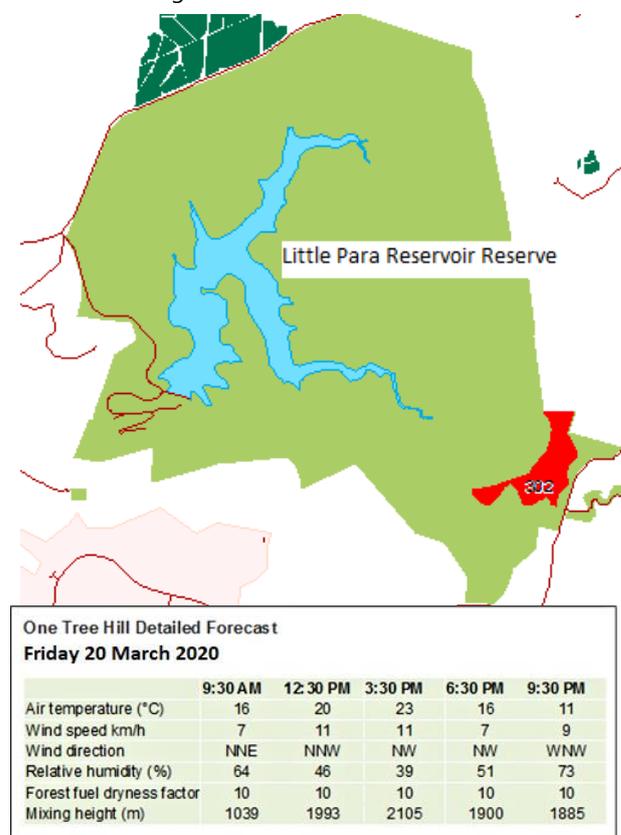- rescheduling a burn if conditions are not favourable.

One Tree Hill Detailed Forecast Friday 20 March 2020	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: An example map showing vineyard location and forecast data leading up to a prescribed burn, which helps minimise smoke taint

Government of South Australia

National Parks and Wildlife Service

Why prescribed burning is important

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

Before an area is considered for a burn a huge amount of planning and assessment is done, including looking at the big picture.

Each year between 50 and 60 burns in the Adelaide and Mount Lofty Ranges region are undertaken, covering approximately 1000 hectares.

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.

To minimise this impact, before a burn is scheduled NPWSSA will consult with the CFS, local councils, private landholders and agricultural groups.

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 safe and effective. 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 an overlap with grape ripening, particularly when grape harvest is delayed.

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 its growth stage, particularly just prior to veraison and onwards (the onset of ripening).

As you can see in Figure 2, the period up to flowering has the lowest potential for smoke taint. However, the risk 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.

Repeated smoke exposure, and exposure over a long period, have both 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.

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: Key stages of grapevine development and sensitivity to smoke exposure (extracted from Brodison, K, 2013)

What to expect in autumn

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

NPWSSA will continue to liaise with Vinehealth and wine industry groups for vineyard locations, and their growth stages, in proposed burns areas.

Explore upcoming prescribed burns in your area with NPWSSA's interactive map, and sign up for updates straight to your inbox, on the website below.

More information

Fire Management Adelaide and Mount Lofty Ranges

P: (08) 8336 0901

environment.sa.gov.au/topics/fire-management

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