Recommendations for best practice management of fire damaged vineyards

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Immediately after the South Australian Cudlee Creek bushfire, on 20th December 2019, vineyard owners and managers with moderate to severe damage were faced with three choices.

1. Begin recovery immediately.
2. Wait until dormancy to review vine recovery from fire damage before commencing remedial action.
3. Remove damaged vines and re-establish new plantings.

Demonstration trials were established to provide data to determine:

The optimal time to begin vine recovery (immediately after the fire or once dormant). and The best method for winter pruning (spur, cane or trunk renewal) for recovering vineyards.

The image at top right shows mild damage, leaf scorching and minimal damage to canes and bunches. The image at bottom right shows moderate damage, leaf, cane and bunch scorching.





TIMING OF TRUNK RENEWAL

Where damage is moderate to severe, trunk renewal is the best option as the bulk of vine roots are undamaged. Two options for trunk renewal were compared.

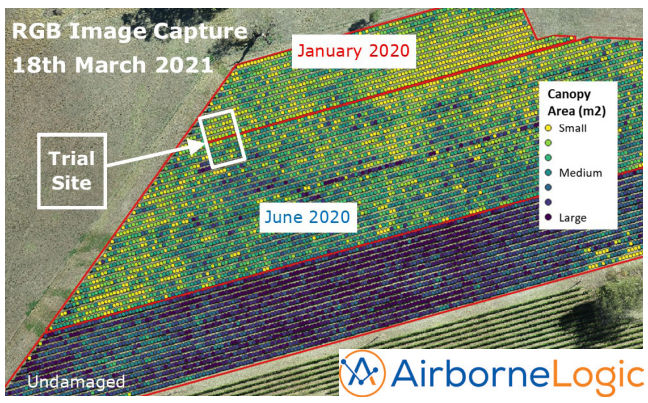
Trunk renewal in summer (year 0) within 2-3 weeks of the fire, where damage was assessed as being moderate to severe (see images above right). and Trunk renewal at dormancy (year 1) providing the advantage of assessing the nature of regrowth as well as a review of the advantages of trunk renewal (e.g. removal of *Eutypa* infection).

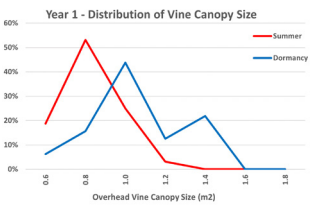
YEAR 1

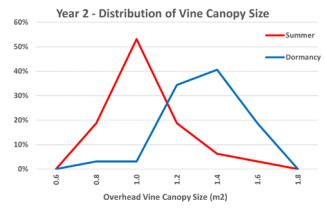
Pinot Gris: Trunk removal undertaken to 20% of area in January 2020 (summer) and the balance in June 2020 (during dormancy). Adjacent plots of 32 vines (4 rows x 8 vines) were measured from each treatment.

No commercial crop was produced in year 1 after treatment.

Vine canopy size was calculated using high resolution drone imagery, with results shown in the RGB image capture.







Chardonnay: A section of a block had trunk removal in summer (January 2020) with the adjacent section left intact. The balance had trunk removal at dormancy, resulting in adjacent plots of 32 vines (4 rows x 8 vines) measured for each treatment.

No commercial crop was produced in year 1 after treatment.

YEAR 2 - TRUNK RENEWAL GRAPE PRODUCTION

Pinot Gris	kg/m	Bunches/m	Bunch Wt (g)	°Brix	Wt/Berry (g)
Summer	4.58	25.0	183	20.7	1.3
Dormancy	4.88	25.3	187	21.4	1.3
Change	*7%*	*1%*	*2%*	*3%*	*0%*

There was a slightly higher yield and advanced maturity for dormancy trunk removal (not ruling out site variability being a key driver of production).

Chardonnay	kg/m	Bunches/m	Bunch Wt (g)	°Brix	Wt/Berry (g)
Summer	2.23	18.3	122	19.4	1.7
Dormancy	2.00	18.6	108	19.4	1.7
Change	*-10%*	*2%*	*-11%*	*0%*	*0%*

There was a yield advantage for summer trunk removal, driven by bunch size (not ruling out the influence of adjacent mature vines and management practices on the performance of the dormancy treatment).

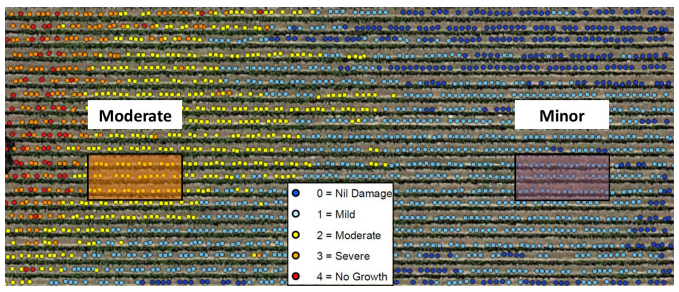
COMPARISON OF PRUNING METHODS POST FIRE, MILD VERSUS MODERATE DAMAGE

Apart from vineyards suffering severe damage throughout, a large proportion of vineyards had variable damage providing opportunity to get vines with damage ranging from nil/minor to moderate back into production in year 1 after the fire.

A trial site was established to compare pruning method against damage levels rates.

Minor damage was defined as vines having basal leaf scorching due to low intensity fire with minimal cane damage (see above right, top image).

Moderate damage was defined as vines having significant canopy loss due to a high intensity fire (e.g., where drip lines have begun to melt, see above right, bottom image).



	Damage and Treatment					
	Nil/Minor			Moderate		
Yield kg/m	Spur	Cane	Trunk	Spur	Cane	Trunk
Year 1	3.79	3.22	0	0.47	0.15	0
% of Spur		*-15%*			*-68%*	
Year 2	2.56	2.56	3.10	2.27	4.04	3.82
% of Spur		0.0%	21.1%		78.0%	68.3%
Accumulative	6.35	5.78	3.10	2.74	4.19	3.82
% of Spur		*9%*	*51%*		53%	39%

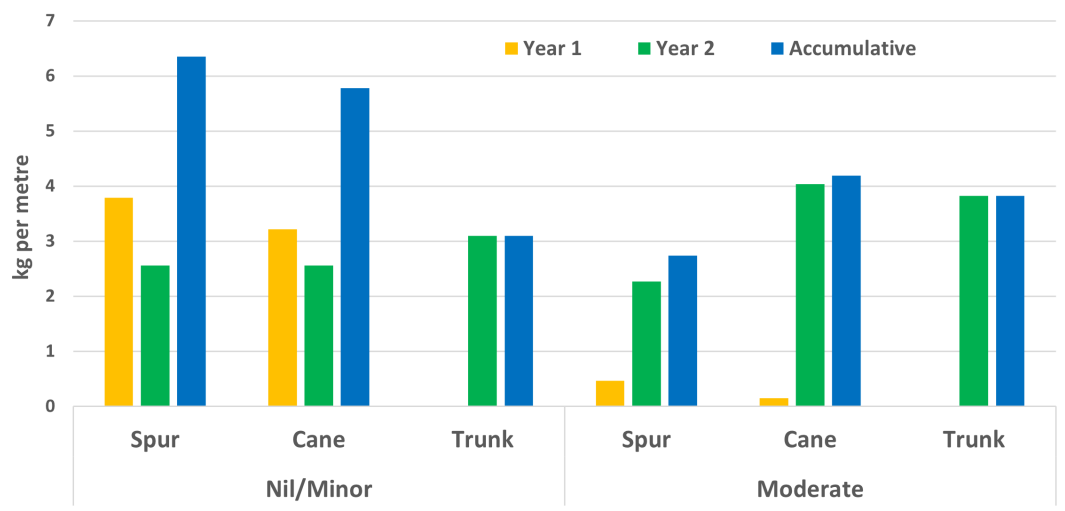
Three treatments were applied:

Spur = conventional two-bud spurs consistent with previous practice.

Cane = removal of old cordon, retain three canes from crown of vine (similar bud numbers to spur pruned).

Trunk = trunk cut (30cm above ground) and a new water shoot trained to replace the vine.

Pruning treatment and damage severity - impact on vine production



What should I do after a fire?

Reinstate **Irrigation** as soon as possible

Wait - **Observe** vine regrowth after the fire

Wait - **Review** long-term plans and other production issues (e.g. block comparative performance, varietal desirability, Eutypa infection, etc.

Wait - **Don't remove any regrowth,** let the vines store as much carbohydrate as possible at dormancy

Why wait?

Some growers regretted acting too fast and spending money inadvisably.

Summer trunk removal vines which were trained to single trunks were weaker after year 1 (due to reduced carbohydrate storage)

Neither treatment produced grapes in year 1.

Similar levels of grape production of Pinot Gris (19 t/ha) for summer and dormancy treatment in year 2.

Minor Fire Damage?

Ongoing spur pruning is a reasonable option

Conversion to cane or trunk renewal are only necessary if there are other advantages

Moderate Fire Damage?

Cane pruning did not overcome damaged spur positions in year 1

Spur pruning had a lower yield performance in year 2, higher spur bud numbers (150%) would counter this

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