



**Severe
damage**

**Minor – moderate
damage**

**No visible
damage**

A

B

C

Figure S1. Classification of fire damage to vines. (A) Severe damage, (B) Minor-moderate damage and (C) No visible damage.

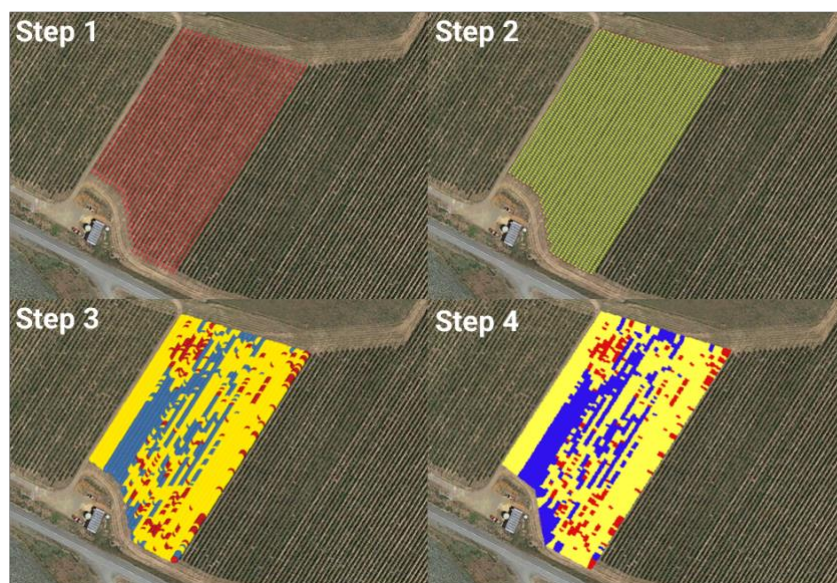


Figure S2. The outputs from each step of the fire damage data conversion process. The ground truthing colours are red, yellow and blue to indicate severe, minor-moderate damage and no visible damage.

Table S1. Fire damage assessments at vineyard block level.

Site	Fire Damage Class	% damage
A	No visible damage	25.93
	Minor to moderate damage	65.23
	Severe damage	8.84
	Missing vines	0
B	No visible damage	33.43
	Minor to moderate damage	60.96
	Severe damage	5.49
	Missing vines	0.12
C	No visible damage	55.18
	Minor to moderate damage	30.48
	Severe damage	13.98
	Missing vines	0.37
D	No visible damage	18.26
	Minor to moderate damage	78.33
	Severe damage	1.96
	Missing vines	1.45
E	No visible damage	2.78
	Minor to moderate damage	85.78
	Severely damage	3.72
	Missing vines	7.72
J	No visible damage	0
	Minor to moderate damage	51.83
	Severely damage	25.3
	Missing vines	22.87

Table S2. Satellite imagery details from each of the study sites.

Site	Pre-fire date	Pre-fire satellite details	Post-fire date	Post-fire satellite data
A	18/12/2019	WorldView-2 (0.48m)	28/12/2019	GeoEye-1 (0.41m)
B	18/12/2019	WorldView-2 (0.48m)	28/12/2019	GeoEye-1 (0.41m)
C	18/12/2019	WorldView-2 (0.48m)	29/02/2020	WorldView-3 (0.34m)
D	18/12/2019	WorldView-2 (0.48m)	28/12/2019	GeoEye-1 (0.41m)
E	18/12/2019	WorldView-2 (0.48m)	28/12/2019	GeoEye-1 (0.41m)
F	18/12/2019	WorldView-2 (0.48m)	29/12/2019	GeoEye-1 (0.41m)
G	18/12/2019	WorldView-2 (0.48m)	29/12/2019	WorldView-2 (0.48m)
H	18/12/2019	WorldView-2 (0.48m)	28/12/2019	GeoEye-1 (0.41m)
I	18/12/2019	WorldView-2 (0.48m)	28/12/2019	GeoEye-1 (0.41m)
J	18/12/2019	WorldView-2 (0.48m)	28/12/2019	GeoEye-1 (0.41m)

Collins, C., Ritchie, M., James, A., O'Brien, P., Ma, S., De Bei, R., & Clarke, A. (2022). Grapevine recovery after fire and a first look at rapid damage assessment with satellite imagery: This article is published in cooperation with Terclim 2022 (XIVth International Terroir Congress and 2nd ClimWine Symposium), 3-8 July 2022, Bordeaux, France. *OENO One*, 56(2). <https://doi.org/10.20870/oeno-one.2022.56.2.5444>

Table S3. Inflorescence primordia number and area measures of buds from vines of different fire damage in two seasons following fire damage, 2020/21 and 2021/22, Adelaide Hills, South Australia.

Site	Level of fire damage	Variable					
		Inflorescence primordia number			Inflorescence primordia area (µm)		
		2020/2021	2021/2022	<i>p</i> value	2020/2021	2021/2022	<i>p</i> value
A	No visible damage	1.593a	1.092bc	<0.0001(D)	0.066a	0.063a	0.014(D)
	Minor-moderate	1.354ab	1.216bc	<i>ns</i> (S)	0.065a	0.067a	<0.0001(S)
	Severe	0.526d	1.057c	<0.0001(DxS)	0.027b	0.074a	<0.0001(DxS)
	Season	1.157	1.22		0.053b	0.068a	
B	No visible damage	1.747a	1.260cd	<0.0001(D)	0.094a	0.055b	<0.0001(D)
	Minor-moderate	1.533ab	1.450bc	0.009(S)	0.105a	0.063b	0.012(S)
	Severe	0.157e	1.211d	<0.0001(DxS)	0.011c	0.062b	<0.0001(DxS)
	Season	1.146b	1.307a		0.070a	0.060b	
C	No visible damage	1.905a	1.769a	<0.0001(D)	0.131a	0.115a	<0.0001(D)
	Minor-moderate	1.580b	1.862a	0.012 (S)	0.125a	0.111a	<i>ns</i> (S)
	Severe	0.340c	1.321b	0.004 (DxS)	0.032c	0.076b	0.024 (DxS)
	Season	1.273b	1.650a		0.096	0.101	
D	No visible damage	0.908b	1.640a	<i>ns</i> (D)	0.074bc	0.085ab	<i>ns</i> (D)
	Minor-moderate	0.873b	1.681a	<0.0001(S)	0.068c	0.087ab	<0.0001(S)
	Severe	0.611c	1.508a	0.033(DxS)	0.050d	0.097a	0.003(DxS)
	Season	0.797b	1.610a		0.064b	0.089a	
E	No visible damage	0.905c	1.623ab	<i>ns</i> (D)	0.087a	0.070a	0.050(D)
	Minor-moderate	0.692cd	1.736a	<0.0001(S)	0.072a	0.075a	<i>ns</i> (S)
	Severe	0.532d	1.480b	0.010(DxS)	0.050b	0.073a	0.008(DxS)
	Season	0.709b	1.613a		0.070	0.073	
F	No visible damage	1.500a	0.867b	<0.0001(D)	0.115a	0.081b	<0.0001(D)
	Minor-moderate	0.817b	1.333a	<0.0001(S)	0.081b	0.082b	<i>ns</i> (S)
	Severe	0.000c	1.492a	<0.0001(DxS)	0.000c	0.083b	<0.0001(DxS)
	Season	0.772b	1.231a		0.065	0.068	
G	No visible damage	0.492a	na	<0.0001(D)	0.040a	na	<0.0001(D)
	Minor-moderate	0.108b	na	<i>vineyard</i>	0.008b	na	<i>vineyard</i>
	Severe	0.008b	na	<i>removed</i>	0.001b	na	<i>removed before harvest</i>
	Season			<i>before harvest</i>			<i>harvest</i>
H	No visible damage	1.47	1.50	<i>ns</i> (D)	0.078	0.073	<i>ns</i> (D)
	Minor-moderate	1.61	1.43	<i>ns</i> (S)	0.082	0.070	0.008 (S)
	Severe	1.56	1.34	<i>ns</i> (DxS)	0.090	0.074	<i>ns</i> (DxS)
	Season	1.55	1.42		0.083a	0.072b	
I	No visible damage	1.397a	na	<0.0001(D)	0.090a	na	<0.0001(D)
	Minor-moderate	0.767b	na	<i>one season</i>	0.066b	na	<i>one season</i>
	Severe	0.025c	na	<i>vineyard</i>	0.002c	na	<i>vineyard</i>
	Season			<i>removed</i>			<i>removed</i>
J	No visible damage	1.420a	na	<0.0001(D)	0.108a	na	<0.0001(D)
	Minor-moderate	0.963b	na	<i>one season</i>	0.062b	na	<i>one season</i>
	Severe	0.650b	na	<i>vineyard</i>	0.043b	na	<i>vineyard</i>
	Season			<i>removed</i>			<i>removed</i>

*na = not applicable, ns = not significant, D = fire damage assessment, S = season, DxS = fire level damage x season. Fire damage assessment and season effects and their interactions were analysed using a two-way ANOVA and the means separated with Tukey's test. Where vines were removed a one-way ANOVA was performed. Means followed by different letters are different at $p < 0.05$.

Table S4. Bunch number per shoot and bunch weight measures of vines of different fire damage in two seasons following fire damage, 2020/21 and 2021/22, Adelaide Hills, South Australia.

Site	Level of fire damage	Variable					
		Bunch number/shoot			Bunch weight (g)		
		2020/2021	2021/2022	<i>p</i> value	2020/2021	2021/2022	<i>p</i> value
A	No visible damage	1.534a	1.113b	<0.0001(D)	147.6a	59.5c	ns (D)
	Minor-moderate	1.520a	1.159b	0.008(S)	135.8a	58.9c	<0.0001(S)
	Severe	0.546c	1.075b	<0.0001(DxS)	99.6b	66.8c	0.007(DxS)
	Season	1.200a	1.116b		127.6a	61.7b	
B	No visible damage	1.815a	1.231b	<0.0001(D)	94.9a	76.8b	<0.0001(D)
	Minor-moderate	1.654a	1.321b	ns (S)	69.9b	69.9b	0.019(S)
	Severe	0.285c	1.116b	<0.0001(DxS)	20.1d	53.4c	<0.0001(DxS)
	Season	1.251	1.235		54.9	66.7	
C	No visible damage	1.862a	1.810a	<0.0001(D)	65.1a	57.2a	0.0008(D)
	Minor-moderate	1.512b	1.853a	0.032(S)	55.3a	43.3b	ns (S)
	Severe	0.451c	1.212b	0.004 (DxS)	36.0b	42.1b	0.004 (DxS)
	Season	1.275b	1.625a		52.1	47.5	
D	No visible damage	0.888b	1.545a	<0.0001(D)	43.5	77.6	ns (D)
	Minor-moderate	0.835b	1.610a	<0.0001(S)	44.8	86.1	<0.0001(S)
	Severe	0.582c	1.510a	<0.0001(DxS)	61.9	76.0	ns (DxS)
	Season	0.768b	1.555a		50.0b	79.9a	
E	No visible damage	0.912c	1.677a	<0.0001(D)	39.6	82.9	ns (D)
	Minor-moderate	0.721c	1.712a	<0.0001(S)	39.8	86.1	<0.0001(S)
	Severe	0.433d	1.399b	<0.0001(DxS)	47.4	83.8	ns (DxS)
	Season	0.689b	1.598a		42.3b	84.2a	
F	No visible damage	1.521a	1.012b	<0.0001(D)	114.9a	68.6b	ns (D)
	Minor-moderate	0.912b	1.392a	0.0008(S)	73.8b	79.4b	0.037(S)
	Severe	0.000c	1.451a	<0.0001(DxS)	84.2b	78.5b	0.012(DxS)
	Season	0.811b	1.285a		91.0a	75.5b	
G	No visible damage	na	na	vineyard	na	na	vineyard
	Minor-moderate	na	na	removed before	na	na	removed before
	Severe	na	na	harvest	na	na	harvest
	Season						
H	No visible damage	1.512	1.451	ns (D)	107.5a	78.5b	0.008(D)
	Minor-moderate	1.621	1.563	ns (S)	115.0a	54.6b	0.0001(S)
	Severe	1.593	1.421	ns (DxS)	75.2b	57.5b	0.039(DxS)
	Season	1.574	1.484		99.2a	63.5b	
I	No visible damage	1.456a	na	<0.0001(D)	119.2a	na	<0.0001(D)
	Minor-moderate	0.751b	na	one season	84.2b	na	one season
	Severe	0.036c	na	vineyard	13.3c	na	vineyard
	Season			removed			removed
J	No visible damage	1.399a	na	<0.0001(D)	105.6a	na	<0.0001(D)
	Minor-moderate	0.914b	na	one season	67.2b	na	one season
	Severe	0.613c	na	vineyard	30.1c	na	vineyard
	Season			removed			removed

*na = not applicable, ns = not significant, D = fire damage assessment, S = season, DxS = fire level damage x season. Fire damage assessment and season effects and their interactions were analysed using a two-way ANOVA and the means separated with Tukey's test. Where vines were removed a one-way ANOVA was performed. Means followed by different letters are different at $p < 0.05$.

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Table S5. Berry number per bunch and berry weight measures from bunches of vines of different fire damage in two seasons following fire damage, 2020/21 and 2021/22, Adelaide Hills, South Australia.

Site	Level of fire damage	Variable					
		Berry number per bunch			Berry weight (g)		
		2020/2021	2021/2022	<i>p</i> value	2020/2021	2021/2022	<i>p</i> value
A	No visible damage	125.1a	93.7bc	<i>0.010(D)</i>	1.143b	0.637c	<i>0.014(D)</i>
	Minor-moderate	111.6ab	85.7c	<i>0.05(S)</i>	1.193b	0.678c	<i><0.0001(S)</i>
	Severe	74.9c	89.2bc	<i>0.023(DxS)</i>	1.268a	0.704c	<i>ns (DxS)</i>
	Season	<i>103.8a</i>	<i>89.5b</i>		<i>1.201a</i>	<i>0.673b</i>	
B	No visible damage	91.2a	106.3a	<i><0.0001(D)</i>	0.997a	0.696b	<i><0.0001(D)</i>
	Minor-moderate	61.7b	91.8a	<i><0.0001(S)</i>	1.131a	0.733b	<i>ns (S)</i>
	Severe	20.6c	97.9a	<i><0.0001(DxS)</i>	0.407c	0.506c	<i><0.0001(DxS)</i>
	Season	<i>50.9b</i>	<i>98.7a</i>		<i>0.709</i>	<i>0.645</i>	
C	No visible damage	72.3a	115.5a	<i>0.026(D)</i>	0.734a	0.492c	<i>0.007(D)</i>
	Minor-moderate	81.7a	91.6b	<i>0.045(S)</i>	0.752a	0.485c	<i>0.002(S)</i>
	Severe	58.6b	86.6b	<i>0.011(DxS)</i>	0.566b	0.432c	<i>0.004(DxS)</i>
	Season	<i>70.9b</i>	<i>97.9a</i>		<i>0.683a</i>	<i>0.469b</i>	
D	No visible damage	77.7c	133.7a	<i>ns (D)</i>	0.665ab	0.580bc	<i>0.016(D)</i>
	Minor-moderate	76.0c	125.4ab	<i><0.0001(S)</i>	0.558c	0.662ab	<i>ns (S)</i>
	Severe	61.3c	105.1b	<i>0.050(DxS)</i>	0.734a	0.672ab	<i>0.013(DxS)</i>
	Season	<i>76.0b</i>	<i>125.3a</i>		<i>0.652</i>	<i>0.638</i>	
E	No visible damage	80.1b	115.4a	<i>0.034(D)</i>	0.698a	0.681a	<i>0.004(D)</i>
	Minor-moderate	51.7c	96.3a	<i><0.0001(S)</i>	0.711a	0.651a	<i>ns (S)</i>
	Severe	52.6c	115.7a	<i><0.0001(DxS)</i>	0.512b	0.684a	<i><0.0001(DxS)</i>
	Season	<i>61.7b</i>	<i>109.1a</i>		<i>0.640</i>	<i>0.672</i>	
F	No visible damage	121.8a	93.6bc	<i>ns (D)</i>	0.915b	0.725cd	<i>ns (D)</i>
	Minor-moderate	78.8c	110.3ab	<i>ns (S)</i>	0.878bc	0.711d	<i><0.0001(S)</i>
	Severe	74.0c	111.5ab	<i>0.001(DxS)</i>	1.087a	0.675d	<i>0.05(DxS)</i>
	Season	<i>91.5</i>	<i>105.1</i>		<i>0.960a</i>	<i>0.704b</i>	
G	No visible damage	na	na	<i>vineyard</i>	na	na	<i>vineyard</i>
	Minor-moderate	na	na	<i>removed</i>	na	na	<i>removed before</i>
	Severe	na	na	<i>before harvest</i>	na	na	<i>harvest</i>
	Season						
H	No visible damage	88.7	95.7	<i>ns (D)</i>	1.148ab	0.781c	<i>ns (D)</i>
	Minor-moderate	93.7	67.8	<i>ns (S)</i>	1.311a	0.759c	<i><0.0001(S)</i>
	Severe	86.1	77.2	<i>ns (DxS)</i>	0.920bc	0.742c	<i>ns (DxS)</i>
	Season	<i>89.5</i>	<i>80.2</i>		1.126a	0.766b	
I	No visible damage	122.8a	na	<i><0.0001(D)</i>	0.984a	na	<i>0.0002(D)</i>
	Minor-moderate	90.3b	na	<i>one season</i>	1.116a	na	<i>one season</i>
	Severe	21.3b	na	<i>vineyard</i>	0.451b	na	<i>vineyard</i>
	Season			<i>removed</i>			<i>removed</i>
J	No visible damage	113.6a	na	<i><0.0001(D)</i>	0.906a	na	<i><0.0001(D)</i>
	Minor-moderate	76.3b	na	<i>one season</i>	0.707b	na	<i>one season</i>
	Severe	18.8c	na	<i>vineyard</i>	0.541c	na	<i>vineyard</i>
	Season			<i>removed</i>			<i>removed</i>

*na = not applicable, ns = not significant, *D* = fire damage assessment, *S* = season, *DxS* = fire level damage x season. Fire damage assessment and season effects and their interactions were analysed using a two-way ANOVA and the means separated with Tukey's test. Where vines were removed a one-way ANOVA was performed. Means followed by different letters are different at *p* < 0.05.

Table S6. Bud and cane starch concentrations from vines of different fire damage in two seasons following fire damage, 2020/21 and 2021/22, Adelaide Hills, South Australia.

Site	Level of fire damage	Variable					
		Bud Starch (mg/g)			Cane Starch (mg/g)		
		2020/2021	2021/2022	<i>p</i> value	2020/2021	2021/2022	<i>p</i> value
A	No visible damage	91.7bc	168.3a	<i>ns (D)</i>	96.9	205.2	<i>ns (D)</i>
	Minor-moderate	65.7cd	129.6ab	<i><0.0001 (S)</i>	90.8	160.4	<i><0.0001 (S)</i>
	Severe	42.9d	113.1b	<i>0.002 (DxS)</i>	85.6	156.6	<i>ns (DxS)</i>
	Season	<i>66.7b</i>	<i>137.1a</i>		<i>91.1b</i>	<i>174.1a</i>	
B	No visible damage	43.2c	86.8ab	<i>0.005 (D)</i>	130.4bc	173.8a	<i><0.0001 (D)</i>
	Minor-moderate	49.9c	108.2a	<i><0.0001 (S)</i>	103.3c	176.5a	<i><0.0001 (S)</i>
	Severe	16.8d	79.9b	<i>0.003 (DxS)</i>	33.2d	154.9a	<i>0.002 (DxS)</i>
	Season	<i>36.6b</i>	<i>91.6a</i>		<i>88.9b</i>	<i>168.4a</i>	
C	No visible damage	76.0c	162.5a	<i><0.0001 (D)</i>	121.1b	191.6a	<i><0.0001 (D)</i>
	Minor-moderate	55.2d	158.6a	<i>0.003 (S)</i>	120.9b	188.4a	<i>0.002 (S)</i>
	Severe	27.9e	121.1b	<i>0.002 (DxS)</i>	69.3c	136.9b	<i>0.003 (DxS)</i>
	Season	<i>53.1b</i>	<i>147.4a</i>		<i>103.7b</i>	<i>172.3a</i>	
D	No visible damage	41.3c	120.2a	<i>0.05 (D)</i>	96.0c	219.7a	<i>ns (D)</i>
	Minor-moderate	34.6c	92.3b	<i><0.0001 (S)</i>	93.4c	206.6a	<i><0.0001 (S)</i>
	Severe	33.6c	88.3b	<i>ns (DxS)</i>	68.1d	198.0b	<i>0.042 (DxS)</i>
	Season	<i>36.5b</i>	<i>100.3a</i>		<i>85.8b</i>	<i>208.1a</i>	
E	No visible damage	56.5c	109.9a	<i>ns (D)</i>	121.9c	224.1a	<i>ns (D)</i>
	Minor-moderate	50.9c	113.2a	<i><0.0001 (S)</i>	114.4c	208.5a	<i><0.0001 (S)</i>
	Severe	50.7c	77.5a	<i>0.008 (DxS)</i>	108.8c	176.1b	<i>0.013 (DxS)</i>
	Season	<i>52.7b</i>	<i>100.2a</i>		<i>115.0b</i>	<i>202.9a</i>	
F	No visible damage	90.5a	93.5a	<i>0.003 (D)</i>	108.4b	150.4a	<i><0.0001 (D)</i>
	Minor-moderate	75.3a	85.8a	<i>0.003 (S)</i>	91.9b	134.0a	<i>ns (S)</i>
	Severe	32.9b	82.8a	<i>0.003 (DxS)</i>	91.5b	110.5b	<i><0.0001 (DxS)</i>
	Season	<i>66.2b</i>	<i>87.4a</i>		<i>97.3b</i>	<i>131.6a</i>	
G	No visible damage	82.7a	na	<i>0.002 (D)</i>	118.5a	na	<i>ns (D)</i>
	Minor-moderate	63.6a	na	<i>vineyard</i>	104.4a	na	<i>vineyard</i>
	Severe	39.7b	na	<i>removed</i>	94.3b	na	<i>removed</i>
	Season			<i>before harvest</i>			<i>before harvest</i>
H	No visible damage	74.7	144.7	<i>ns (D)</i>	131.3	186.4	<i>ns (D)</i>
	Minor-moderate	69.4	143.8	<i><0.0001 (S)</i>	128.2	164.9	<i><0.0001 (S)</i>
	Severe	58.8	141.0	<i>ns (DxS)</i>	108.4	146.3	<i>ns (DxS)</i>
	Season	<i>67.6b</i>	<i>143.2a</i>		<i>125.9b</i>	<i>165.9a</i>	
I	No visible damage	111.9a	na	<i>0.013 (D)</i>	162.1a	na	<i>0.044 (D)</i>
	Minor-moderate	96.4a	na	<i>one season</i>	148.7a	na	<i>one season</i>
	Severe	41.6b	na	<i>vineyard</i>	88.4b	na	<i>vineyard</i>
	Season			<i>removed</i>			<i>removed</i>
J	No visible damage	28.1a	na	<i>0.05 (D)</i>	99.1a	na	<i>0.038 (D)</i>
	Minor-moderate	20.8a	na	<i>one season</i>	90.2a	na	<i>one season</i>
	Severe	12.1b	na	<i>vineyard</i>	73.8b	na	<i>vineyard</i>
	Season			<i>removed</i>			<i>removed</i>

*na = not applicable, ns = not significant, *D* = fire damage assessment, *S* = season, *DxS* = fire level damage x season. Fire damage assessment and season effects and their interactions were analysed using a two-way ANOVA and the means separated with Tukey's test. Where vines were removed a one-way ANOVA was performed. Means followed by different letters are different at *p* < 0.05.