

Supplementary information

Health costs of wildfire smoke to rise under climate change

Supplementary Table 1 Values used for smoke health cost estimation. Borchers-Arriagada et al. (2021) estimated per hectare smoke health costs from wildfire on the basis of National Parks and Wildlife Service (NPWS) Branches. These values were applied to the corresponding case study landscape.

Case study landscape	NPWS Branch	Wildfire smoke health costs (\$AUD/ha)
Blue Mountains	Greater Sydney, Blue Mountains	241
Gloucester	Hunter Central Coast	311
Casino, Kempsey, Nandewar	Northern	13
Jervis Bay, Southeast Corner, Canberra, Kosciuszko	Southern	45
Broken Hill, Cobar, Mildura, Southwestern Slopes	West	20

Supplementary Table 2 Climate change has the potential to offset the decreases in wildfire smoke health costs from fuel treatment. The first column shows the maximum decrease in wildfire smoke health costs due to fuel treatment, compared to a zero-treatment scenario. This generally occurred at very high treatment rates e.g. 15% of treatable vegetation within both edge and landscape blocks. The second column shows the maximum increase in wildfire smoke health costs due to climate change, compared to the reference period (1990-2009). These results were associated with the climate model ensemble members with the greatest projected increases in fire weather conditions. The third column shows the proportion of treatment-related decreases that are offset by climate change-related increases.

	Change in wildfire smoke health costs, based on an average sized wildfire in each region		
	Maximum reduction due to fuel treatment (%)	Maximum increase due to climate change (%)	Relative offset* (%)
Blue Mountains	-52.6	15.3	29
Broken Hill	-37.5	38.3	102
Canberra	-59.5	9.5	16
Casino	-9.9	4.5	45
Cobar	-6.2	6.1	99
Gloucester	-18.3	8.8	48
Jervis Bay	-17.8	10.1	57
Kempsey	-20.2	4.6	23
Kosciuszko	-14.2	5.2	36
Mildura	-12.0	13.0	108
Nandewar	-37.6	12.1	32
Southeast Corner	-58.2	21.6	37
Southwestern Slopes	-14.8	8.4	57

* Relative offset is defined as the increase due to climate change divided by the decrease due to fuel treatment, and is reported as a relative, not absolute, percentage i.e. a decrease in costs of 10% due to fuel treatment and an increase of 5% due to climate change would be classified as an offset of 50%, not 5%.

Supplementary Table 3 The climate model ensemble was derived from four global climate models used to force three different configurations of the Weather Research and Forecasting (WRF) regional climate model (Evans et al. 2014)

Global climate model (GCM)	Regional climate model (RCM)	Ensemble member
CCCMA3.1	WRF1	1
CCCMA3.1	WRF2	2
CCCMA3.1	WRF3	3
CSIRO-MK3.0	WRF1	4
CSIRO-MK3.0	WRF2	5
CSIRO-MK3.0	WRF3	6
ECHAM5	WRF1	7
ECHAM5	WRF2	8
ECHAM5	WRF3	9
MIROC3.2	WRF1	10
MIROC3.2	WRF2	11
MIROC3.2	WRF3	12

References

1. Borchers-Arriagada N, Bowman DMJS, Price O, Palmer AJ, Samson S, Clarke H, Sepulveda G, Johnston FH (2021) Smoke health costs change the calculus for wildfires fuel management. *Lancet Planetary Health*, 5, e608-19. [https://doi.org/10.1016/S2542-5196\(21\)00198-4](https://doi.org/10.1016/S2542-5196(21)00198-4)
2. Evans, J. P., Ji, F., Lee, C., Smith, P., Argüeso, D., & Fita, L. (2014). Design of a regional climate modelling projection ensemble experiment - NARClIM. *Geoscientific Model Development*, 7(2), 621–629. <https://doi.org/10.5194/gmd-7-621-2014>