Human fire maintains a balance of nature

Vic Jurskis Forests NSW

Alleged impacts of burning

- depletes nutrients
- simplifies vegetation structure
- depletes biodiversity
- doesn’t reduce fire risk

before man came to Australia: fire, flora and fauna fluctuated with climate

infrequent lightning fires
mesic vegetation
browsing megafauna

arrival of man 50,000 years b.p.
relatively stable climate

increased fire
grasses and hard leaved trees dominate
megafauna extinct

Aboriginal fire

favoured

- herbs, grasses
- old trees
- discontinuous fuels

controlled

- shrubs
- saplings, arbivores
- fire risk

Fire sensitive biota restricted to physical refugia

Howitt's observations

- these annual bush fires tended to keep the forests open, and to prevent the open country from being overgrown, for they not only consumed much of the standing and fallen timber, but in a great measure destroyed the seedlings which had sprung up since former conflagrations".
- white man appeared in Gippsland and dispossessed the Aboriginal occupiers to whom we owe more than is generally surmised for having unintentionally prepared it by their annual burnings for our occupation

Howitt's observations

- after some years of occupation whole tracts of country became overgrown by…arborescent shrubs
- and to the same cause we may assign the increase of the leaf eating insects which…threaten the very existence of the red gum
- the memorable black Thursday when tremendous fires raged

PLATE XI. Severe defoliation by *D. violescens* in 1954-55 at Bago S.F.

PLATE XII. Death of Eucalypts following repeated defoliations by *D. violescens* and *P. wilkinsoni* at Konangaroo S.F. (near Jenolan)

FIRE AND THE AUSTRALIAN BIOTA

AUSTRALIAN ACADEMY OF SCIENCE

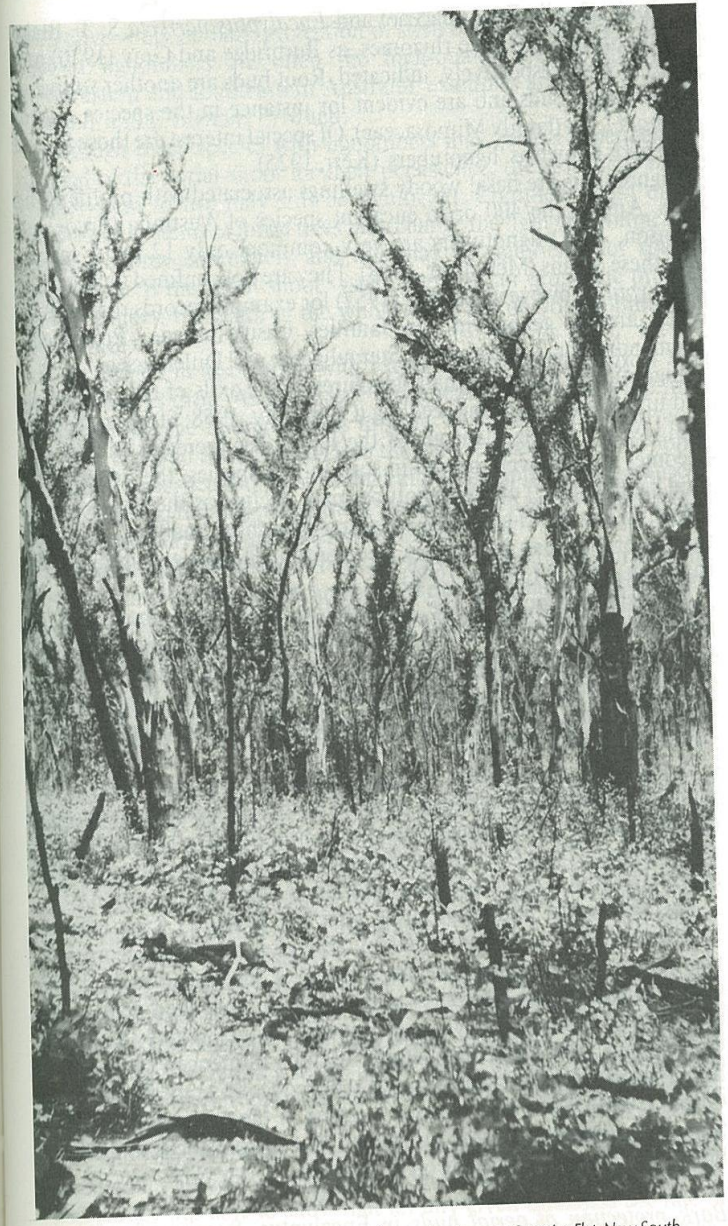


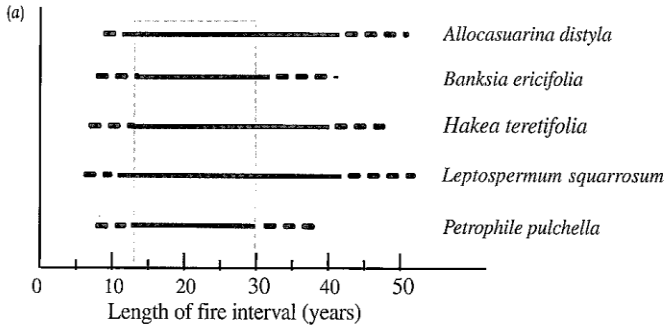
PLATE 1 *Epicormic shoots of* Eucalyptus dalrympleana *after fire near Captains Flat, New South Wales.*

Edited by Ross A. Bradstock, Jann E. Williams, A. Malcolm Gill

Flammable Australia

The Fire Regimes and Biodiversity of a Continent

CAMBRIDGE



false assumptions

- reactions to high intensity fire
- plants reproduce or die
- most plants die
- sensitive plants in fire prone habitats
- ‘undisturbed’ areas are natural
- prescribed fires are homogenous

ELSEVIER

Biological Conservation 76 (1996) 167–175

0006-3207/96 $15.00+.00

0006-3207(95)00098-4

CONSERVATION CONFLICTS OVER BURNING BUSH IN SOUTH-EASTERN AUSTRALIA

David A. Morrison, Rodney T. Buckney, Belinda J. Bewick

Department of Environmental Biology and Horticulture, University of Technology Sydney, PO Box 123, Broadway, NSW 2007, Australia

&

Geoffrey J. Cary

Ecosystem Dynamics, Research School of Biological Sciences, Australian National University, ACT 0200, Australia

false assumptions

- closed scrub/scrub heath/woodland/open woodland
- floristically homogenous
- 2 megafires, several wildfires over 25 years
- fire interval < 7 yrs changes ‘floristics’
- favours 2 short lived semi woody shrubs
- disfavours 5 long lived woody shrubs
- these 5 are most abundant in dataset (top 10%)
- dominant/characteristic species over 15,000 ha

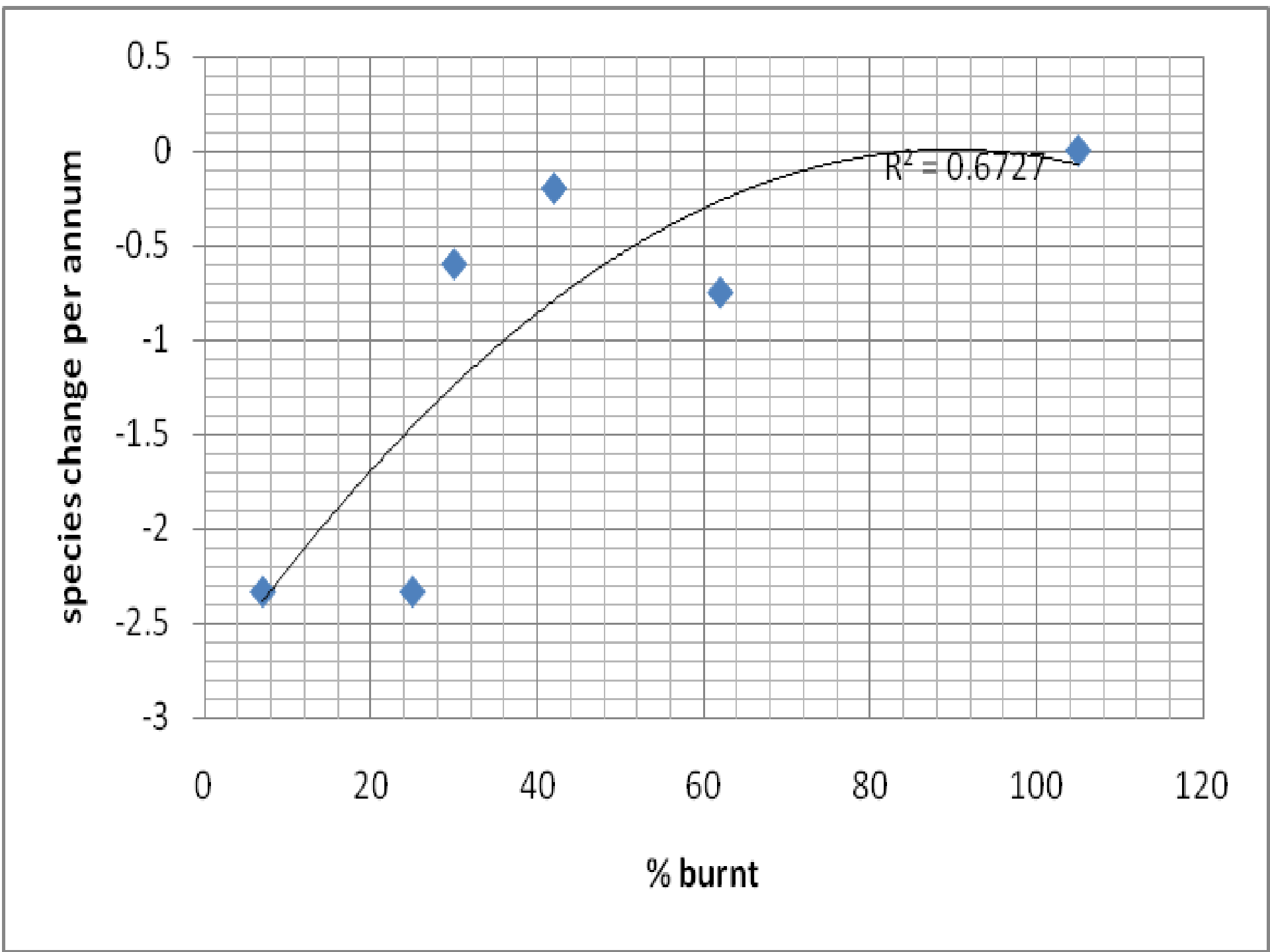
false conclusions

- low intensity fires < 7 yr intervals will alter shrublands/woodlands

- clear conflict between hazard reduction burning and conservation of biodiversity

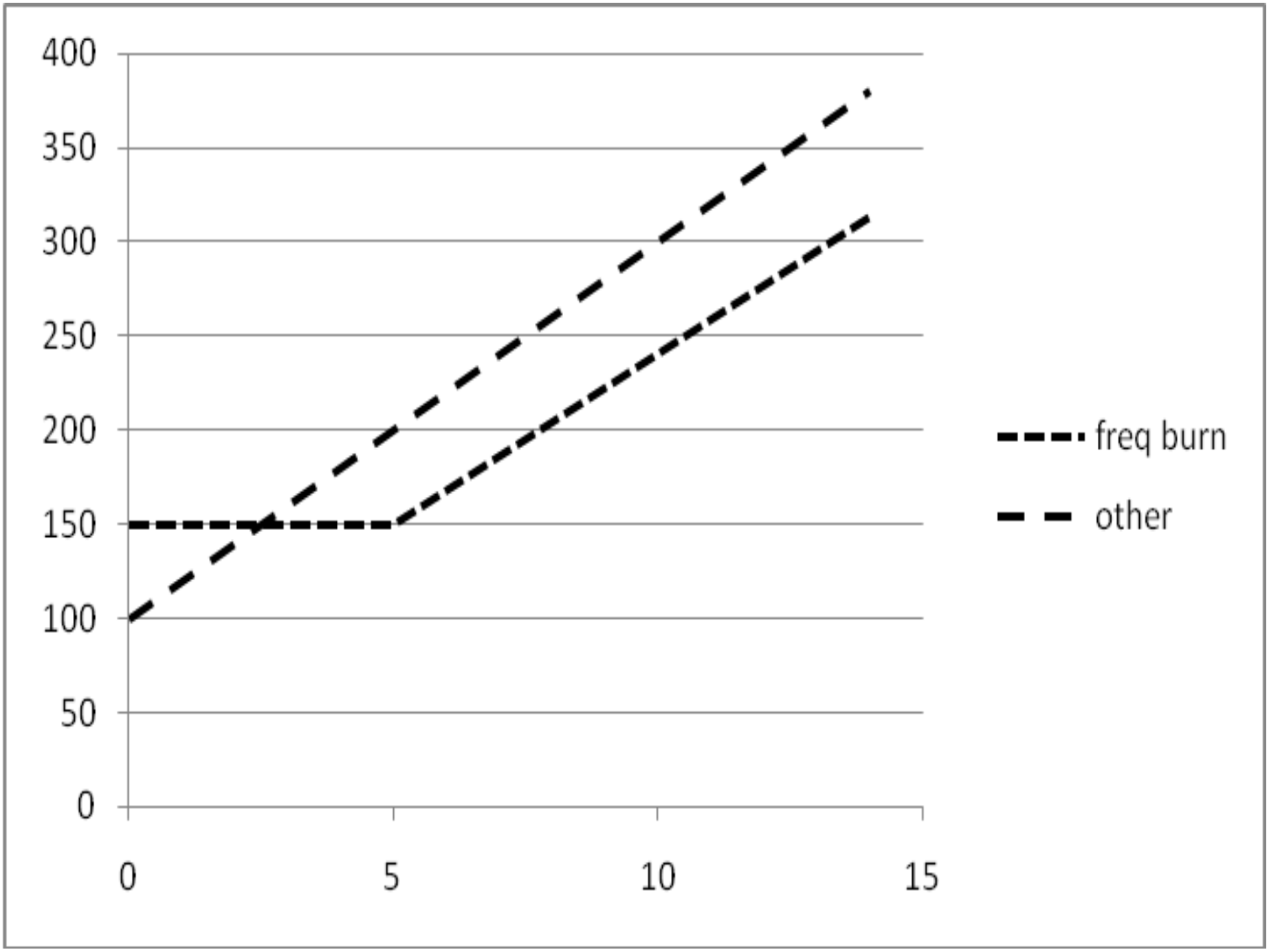

Aldinga Scrub Conservation Park

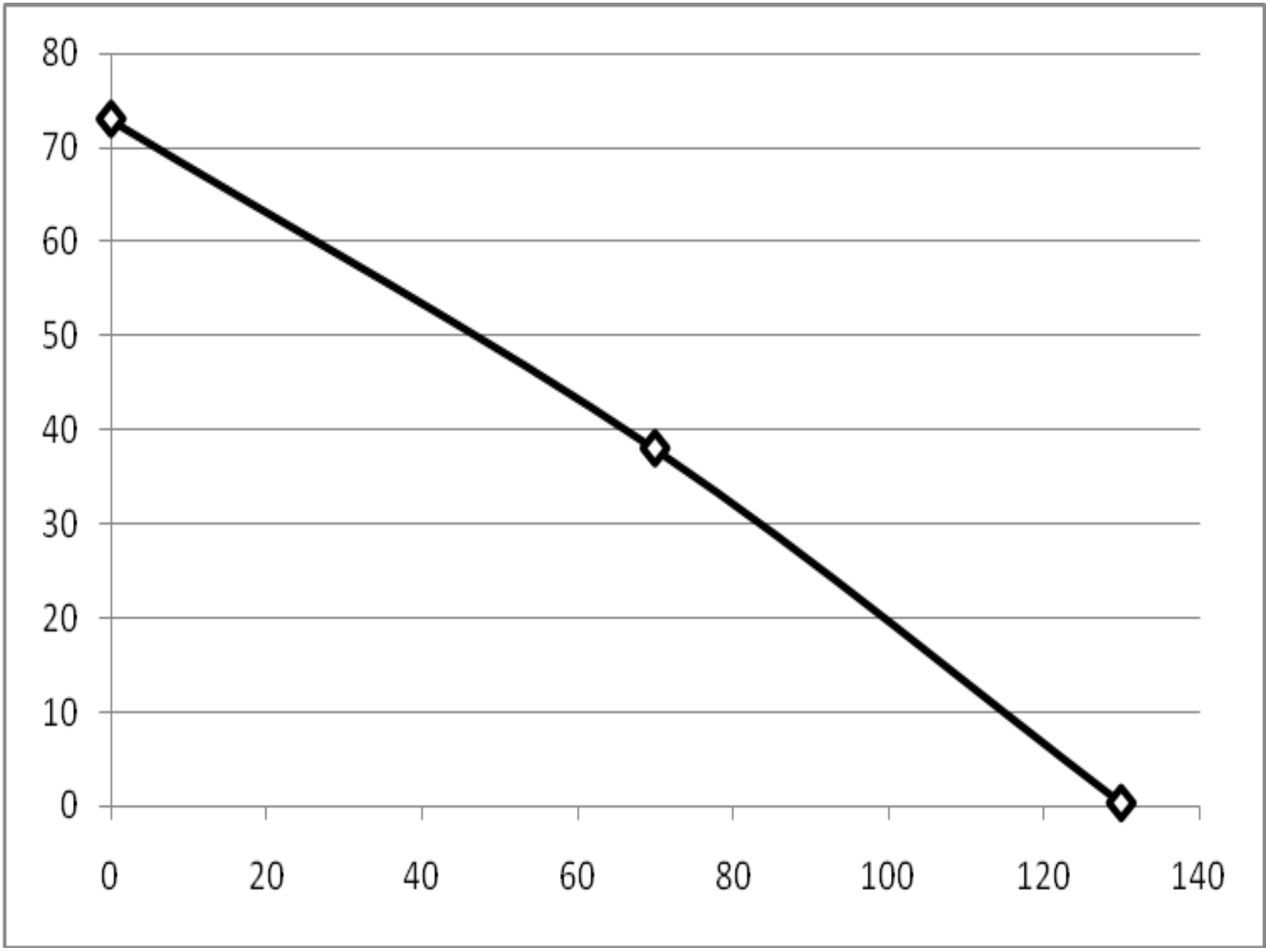
they ran their heads very hard against wrong ideas, and persisted in trying to fit the circumstances to the ideas, instead of trying to extract ideas from the circumstances

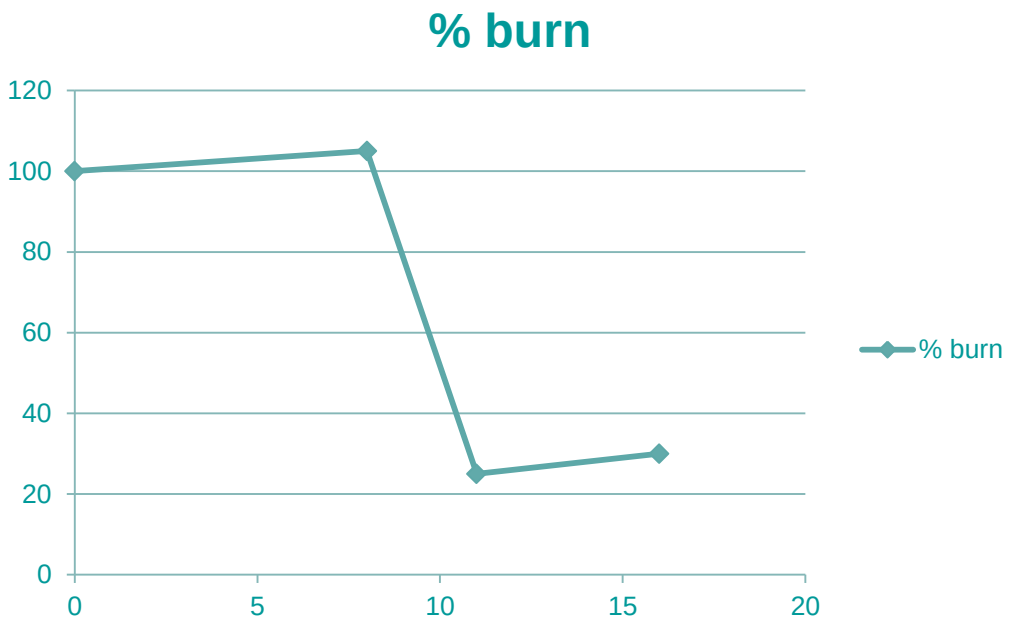

0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
species change per annum
0
20
40
60
80
100
120
% burnt
R² = 0.6727

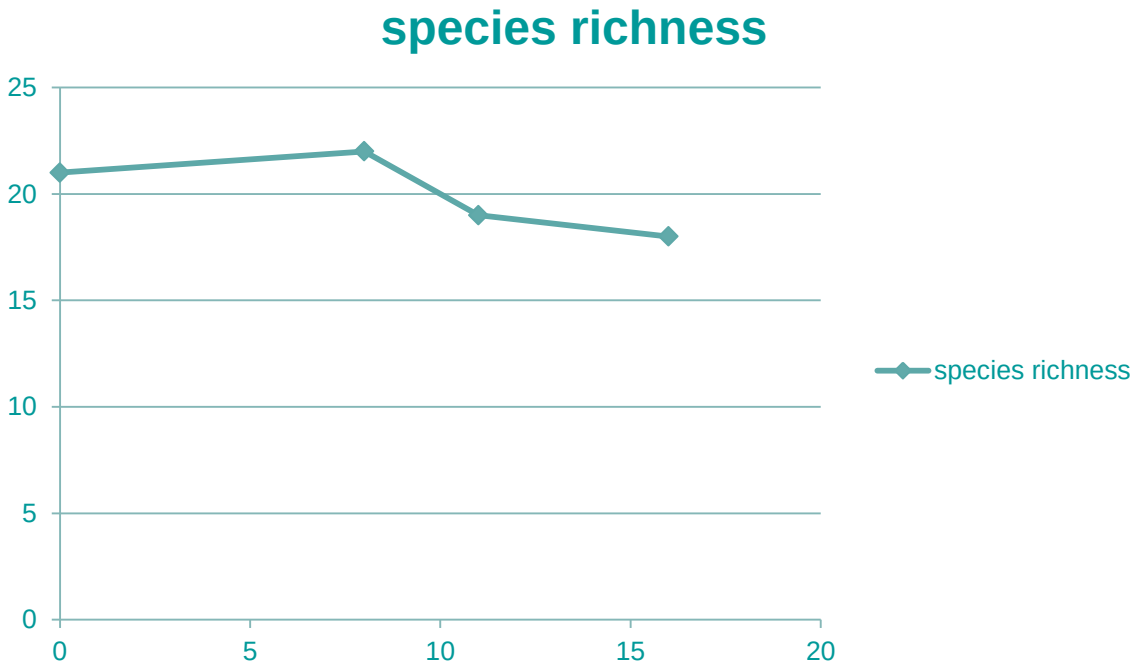
symptoms of chronic decline

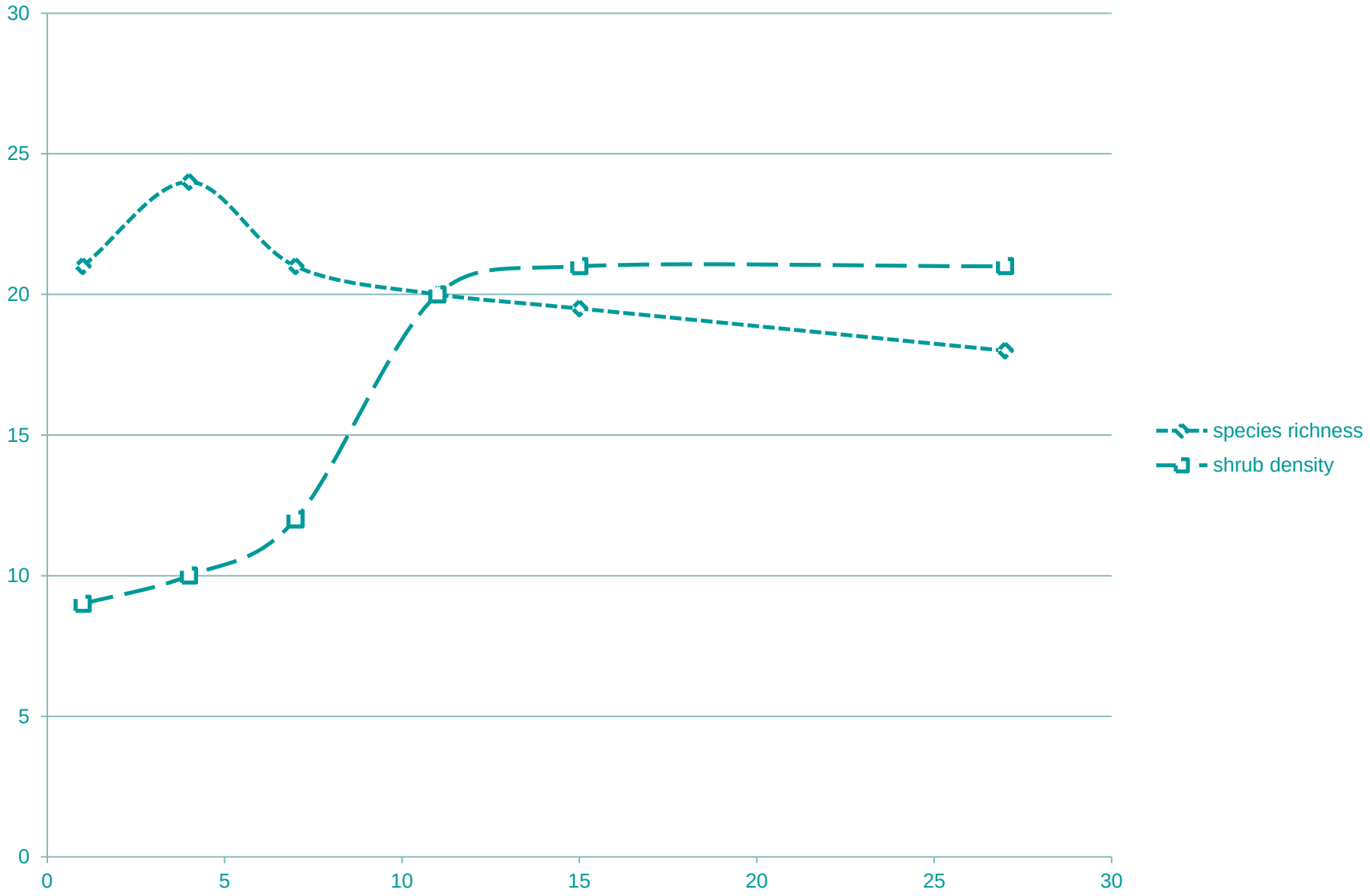
- arbivores
- parasites
- predators of arbivores or parasites

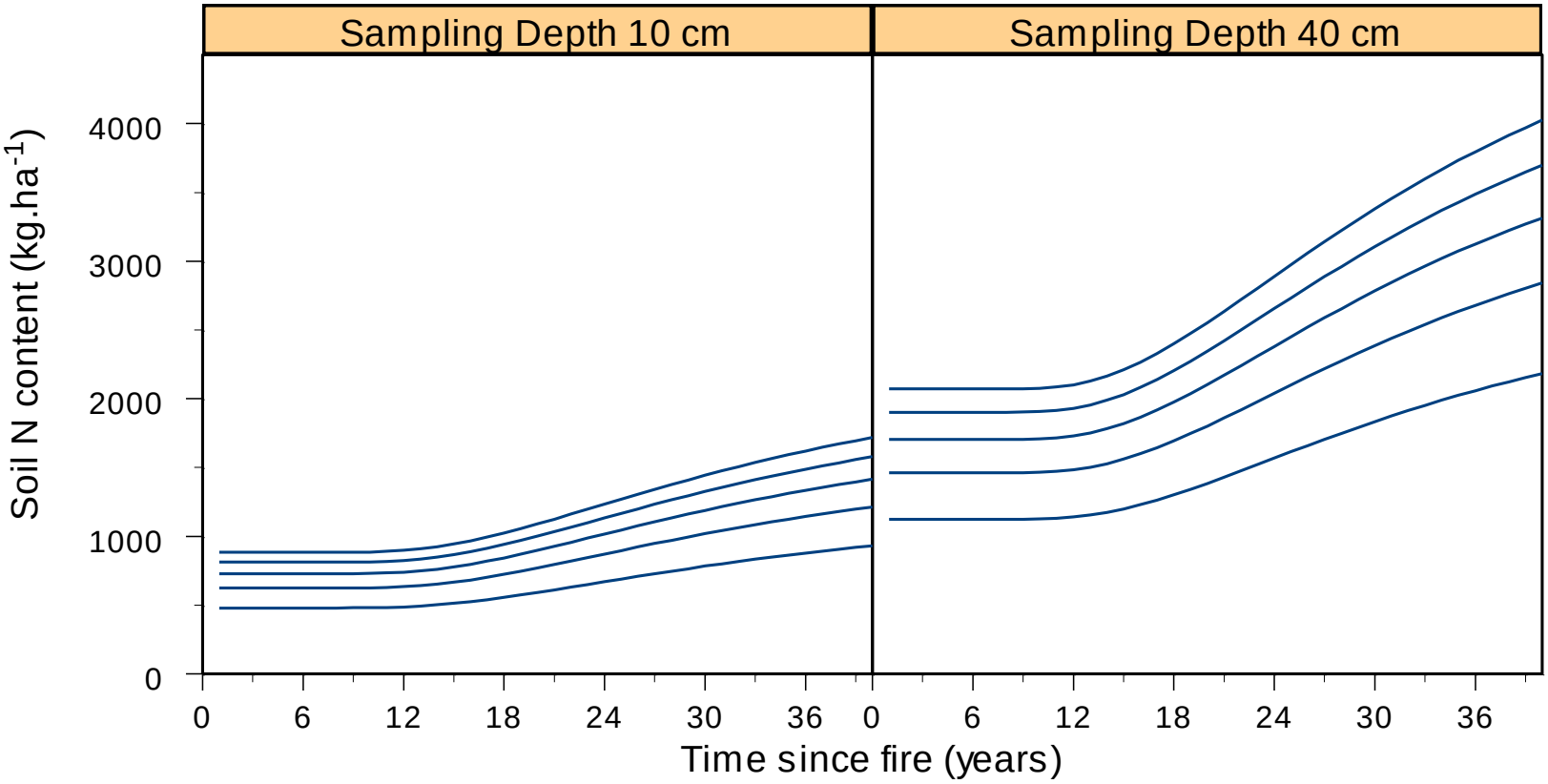

400
350
300
250
200
150
100
50
0
0
5
10
15
freq burn
other


80
70
60
50
40
30
20
10
0
0
20
40
60
80
100
120
140


% burn
120
100
80
60
40
20
0
0
5
10
15
20
% burn


species richness
25
20
15
10
5
0
0
5
10
15
20
species richness


30
25
20
15
10
5
0
0
5
10
15
20
25
30
species richness
shrub density


Sampling Depth 10 cm
Sampling Depth 40 cm
Soil N content (kg.ha-1)
4000
3000
2000
1000
0
0
6
12
18
24
30
36
Time since fire (years)

INVITED FEATURE

Ecological Applications
Vol. 20, No. 1

Ecological Applications, 20(1), 2010, pp. 30–59

Global assessment of nitrogen deposition effects on terrestrial plant diversity: a synthesis

R. Bobbink,[1,17] K. Hicks,[2] J. Galloway,[3] T. Spranger,[4] R. Alkemade,[5] M. Ashmore,[6] M. Bustamante,[7] S. Cinderby,[2] E. Davidson,[8] F. Dentener,[9] B. Emmett,[10] J.-W. Erisman,[11] M. Fenn,[12] F. Gilliam,[13] A. Nordin,[14] L. Pardo,[15] and W. De Vries[16]

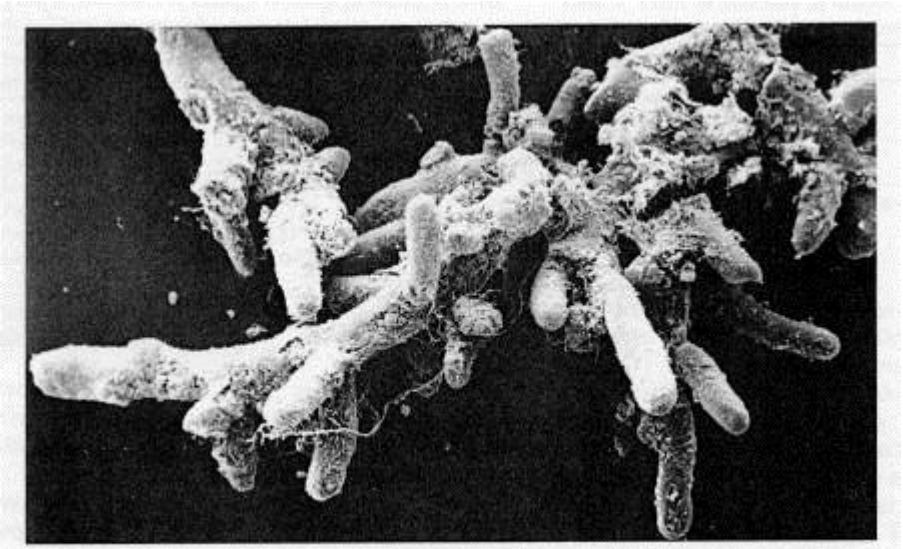
trees' root environment changes

- increased N, exchangeable Al, Mn
- lower C:N and pH
- consequent nutrient imbalances
- more litter and understorey
- less radiation and oxygen
- cooler and damper

mycorrhizae

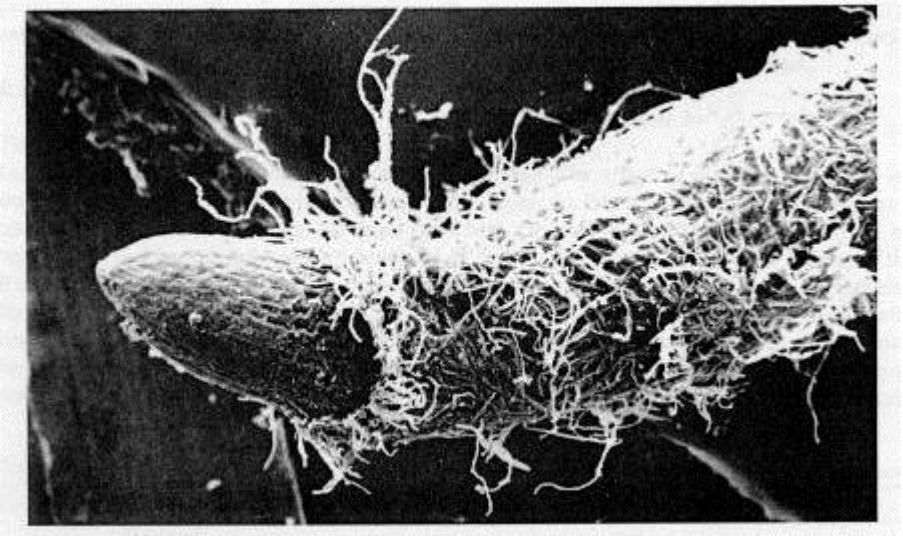
fire excluded

- localised
- closely woven
- deformed roots
- occluded root tips



burnt

- ubiquitous
- loosely woven
- well formed roots
- clear root tips



Forest Ecology and Management 259 (2009) 132–142

Contents lists available at ScienceDirect

Forest Ecology and Management

journal homepage: www.elsevier.com/locate/foreco

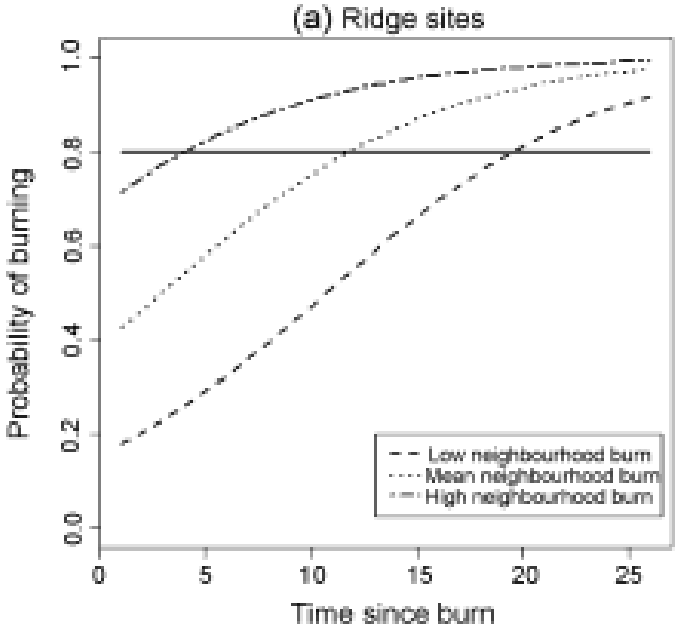
Long-term impacts of prescribed burning on regional extent and incidence of wildfires—Evidence from 50 years of active fire management in SW Australian forests

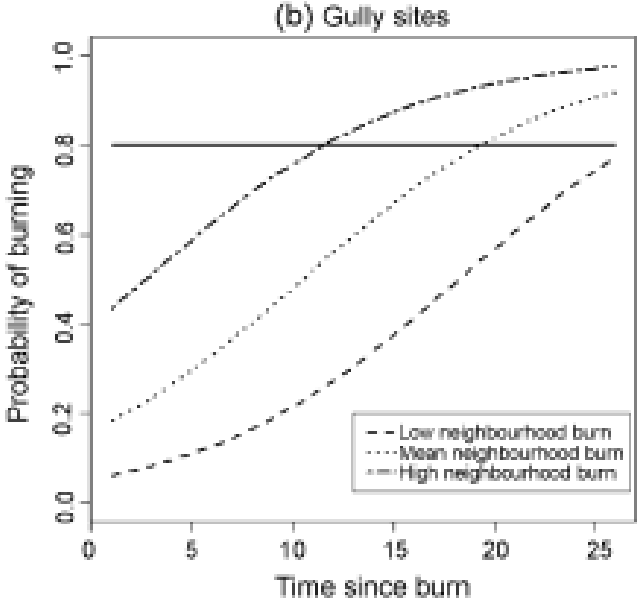
Matthias M. Boer [a,b,*], Rohan J. Sadler [b], Roy S. Wittkuhn [a,c], Lachlan McCaw [a,c], Pauline F. Grierson [a,b]

[a] *Bushfire Cooperative Research Centre, East Melbourne 3002, VIC, Australia*
[b] *Ecosystems Research Group, School of Plant Biology M090, The University of Western Australia, 35 Stirling Highway (M090), Crawley 6009, WA, Australia*
[c] *Science Division, Department of Environment and Conservation, Manjimup, Western Australia 6258, Australia*

prescribed fire intervals

- biodiversity 3-4 years
- nutrient cycling 5 years
- fire safety 6 years


(a) Ridge sites
Probability of burning
0.0
0.2
0.4
0.6
0.8
1.0
0
5
10
15
20
25
Time since burn
Low neighbourhood burn
Mean neighbourhood burn
High neighbourhood burn


(b) Gully sites
Probability of burning
0.0
0.2
0.4
0.6
0.8
1.0
0
5
10
15
20
25
Time since burn
Low neighbourhood burn
Mean neighbourhood burn
High neighbourhood burn