Aboriginal fire regimes in south-west Western Australia: evidence from historical documents

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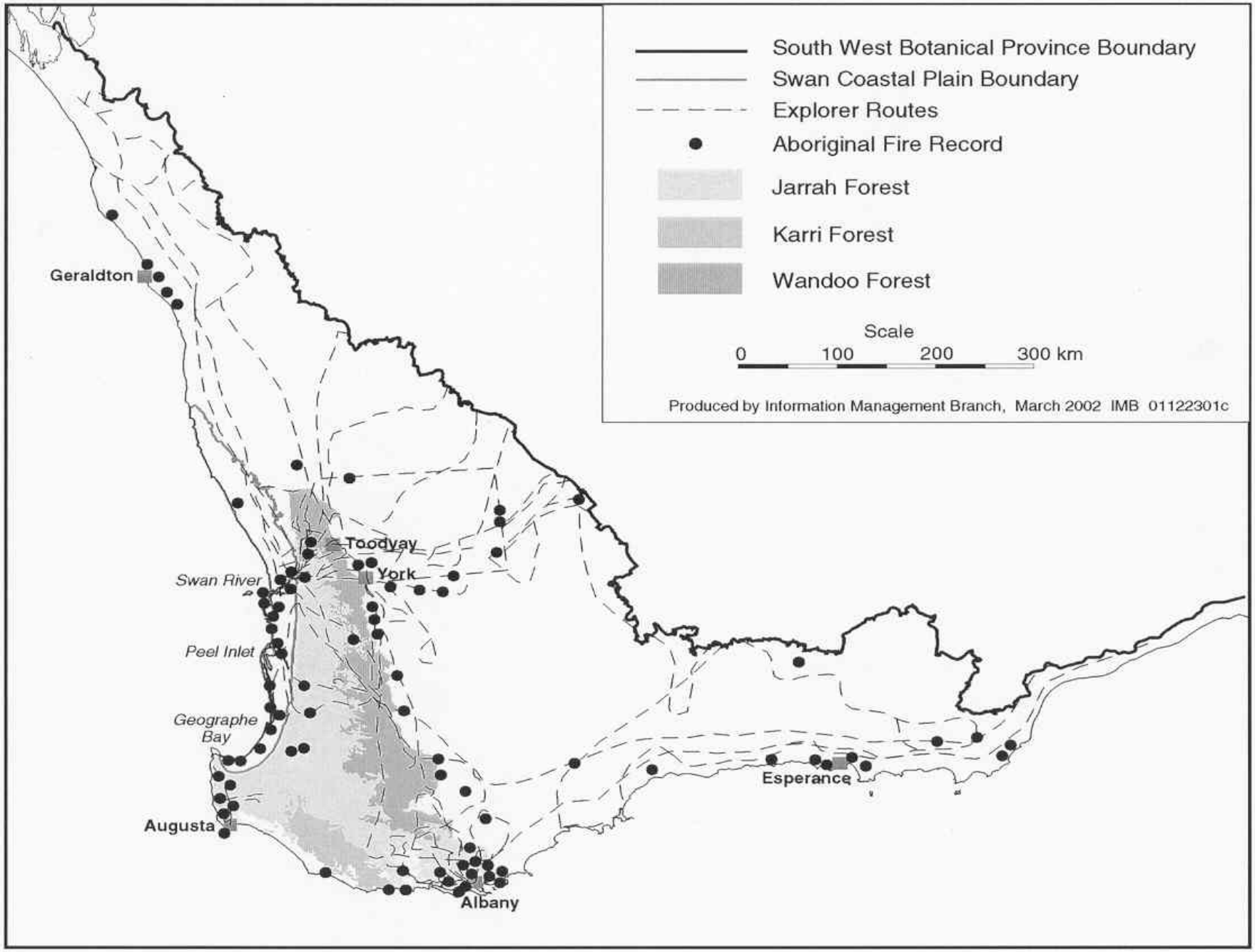
DEPARTMENT OF Conservation AND LAND MANAGEMENT

Conserving the nature of WA

Fire sticks in use by Noongars, 1832, on Mt Clarence, Albany

Source documents = written eyewitness records of visitors or colonists, 1696-1888

- logbooks
- reports
- diaries
- journals
- letters


South West Botanical Province Boundary
Swan Coastal Plain Boundary
Explorer Routes
Aboriginal Fire Record
Jarrah Forest
Karri Forest
Wandoo Forest
Scale
0
100
200
300 km
Produced by Information Management Branch, March 2002 IMB 01122301c
Geraldton
Toodyay
York
Swan River
Peel Inlet
Geographe Bay
Augusta
Albany
Esperance

THE SWAN RIVER NEWS,
AND
Western Australian Chronicle.

No. 43. LONDON, JULY 1ST, 1847. PRICE 5s. PER ANNUM— OR 6s. POST FREE.

OUR WESTERN AUSTRALIAN HOME;

BEING SKETCHES OF SCENERY AND SOCIETY IN THE COLONY,

BY GEORGE J. WEBB, Esq., D.A.C.G.

(*Continued from page* 145.)

THE BUSH FIRE.

I was sitting in the verandah of these barracks on the evening of Sunday, the 21st of February, 1841. The day had been intensely warm;

There were many native fires burning, and though there was no moon the view on all sides was plainly visible. On the shores of the Swan we counted four fires, and on the off side of Mount Eliza there seemed one immense one, as the outline of the hill was thrown prominently forward, and the water threw a bright and strong reflection on its unruffled surface.

Previous research

- King 1963
- Hallam 1975
- Pyne 1991
- Bowman 1998

Why the need for my study?

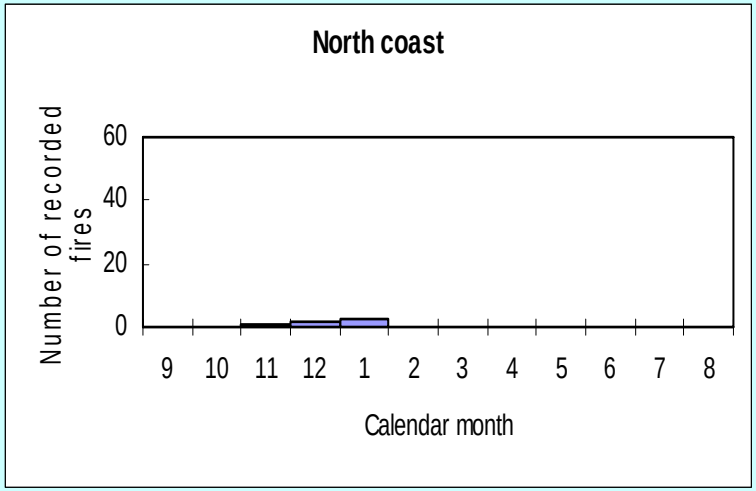
- More records now available
- Broader concept of the South-west
- Paradigm shift in ecology in 1980s
- Necessary for a synthesis of all relevant information (oral, historical, biological, fire behaviour)

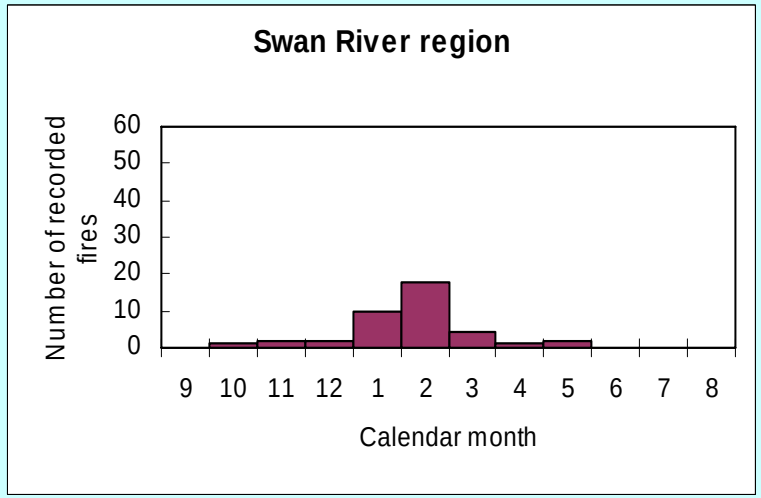
AIM: To integrate all available historical information about Noongar fire regimes

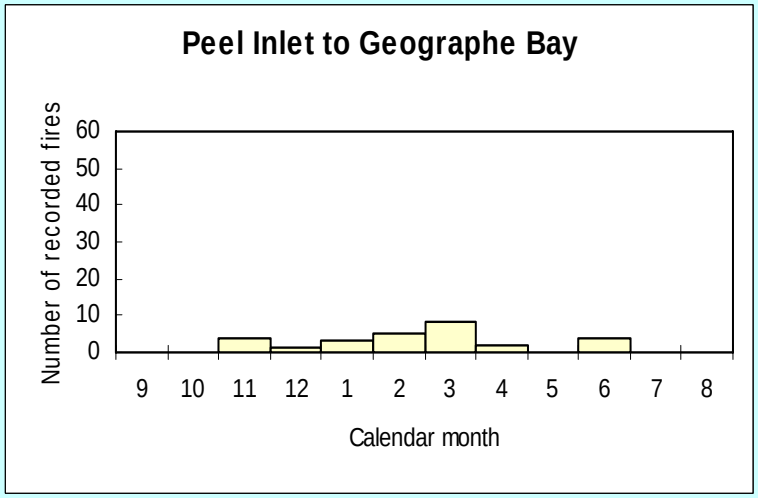
- season
- frequency
- scale
- intensity of burning

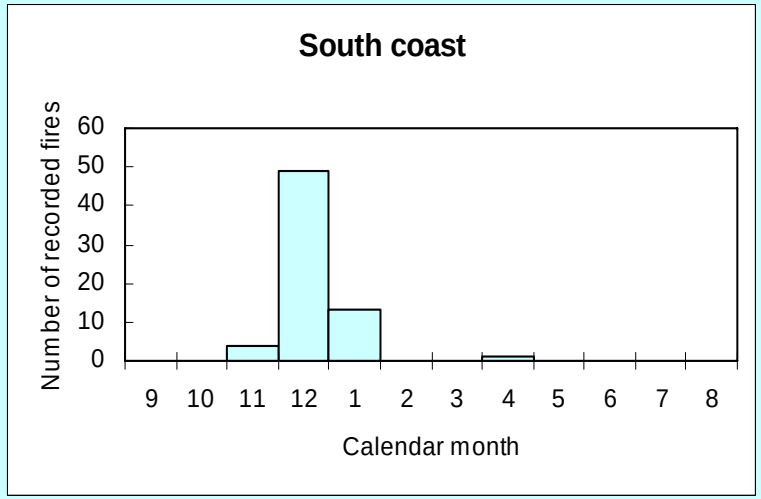
APPROACH: Empirical

Season of burning - 1

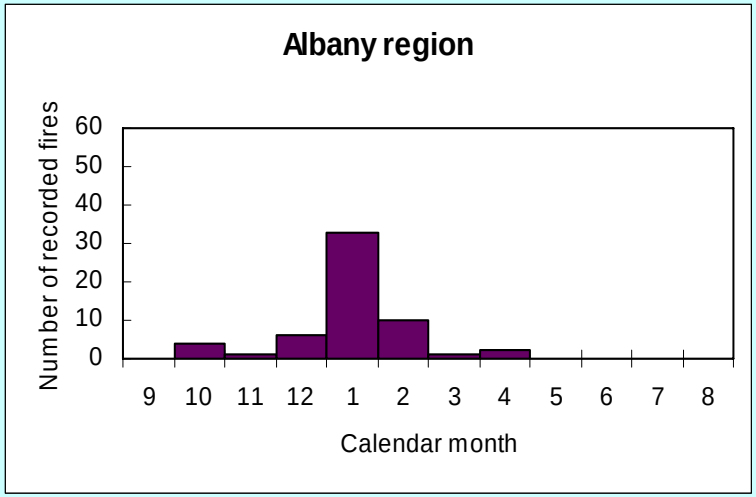


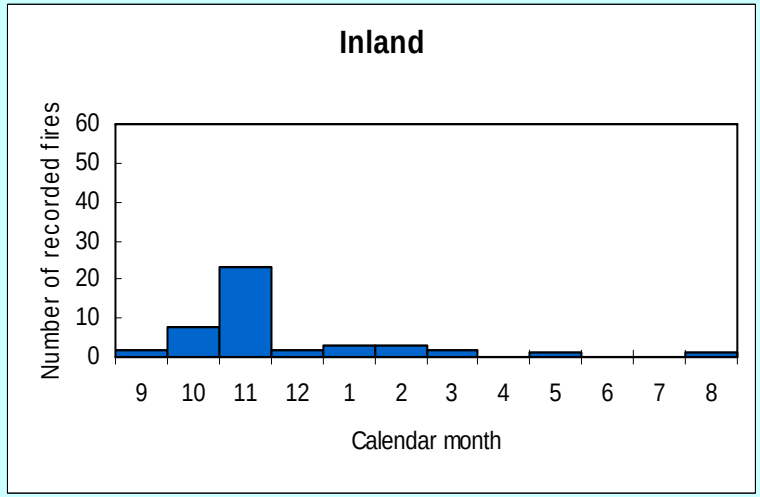


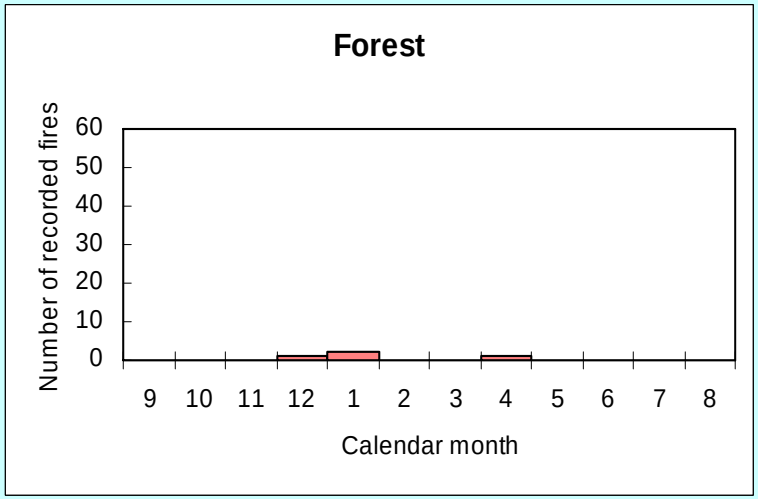


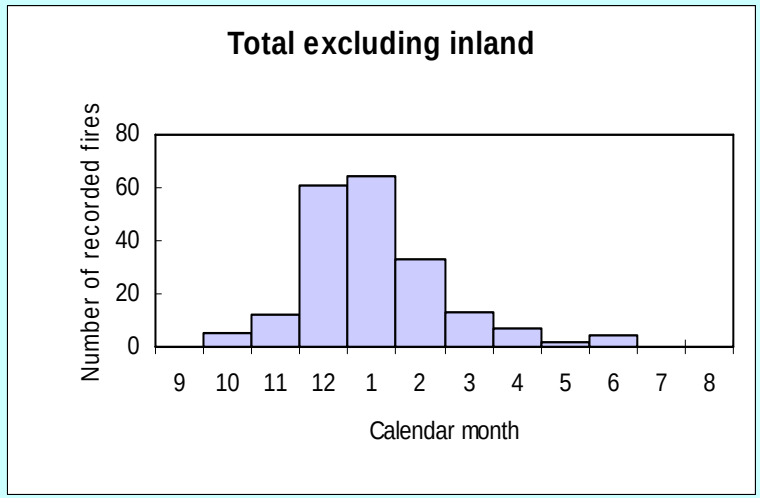


Season of burning - 2









Negative records are in broad agreement

- Firebrands carried at all times of year
- Overlap between negative records & actual records of fires linked to unseasonal occurrence of rain
- Additional evidence from general statements by settlers

Frequency of burning

Six records found

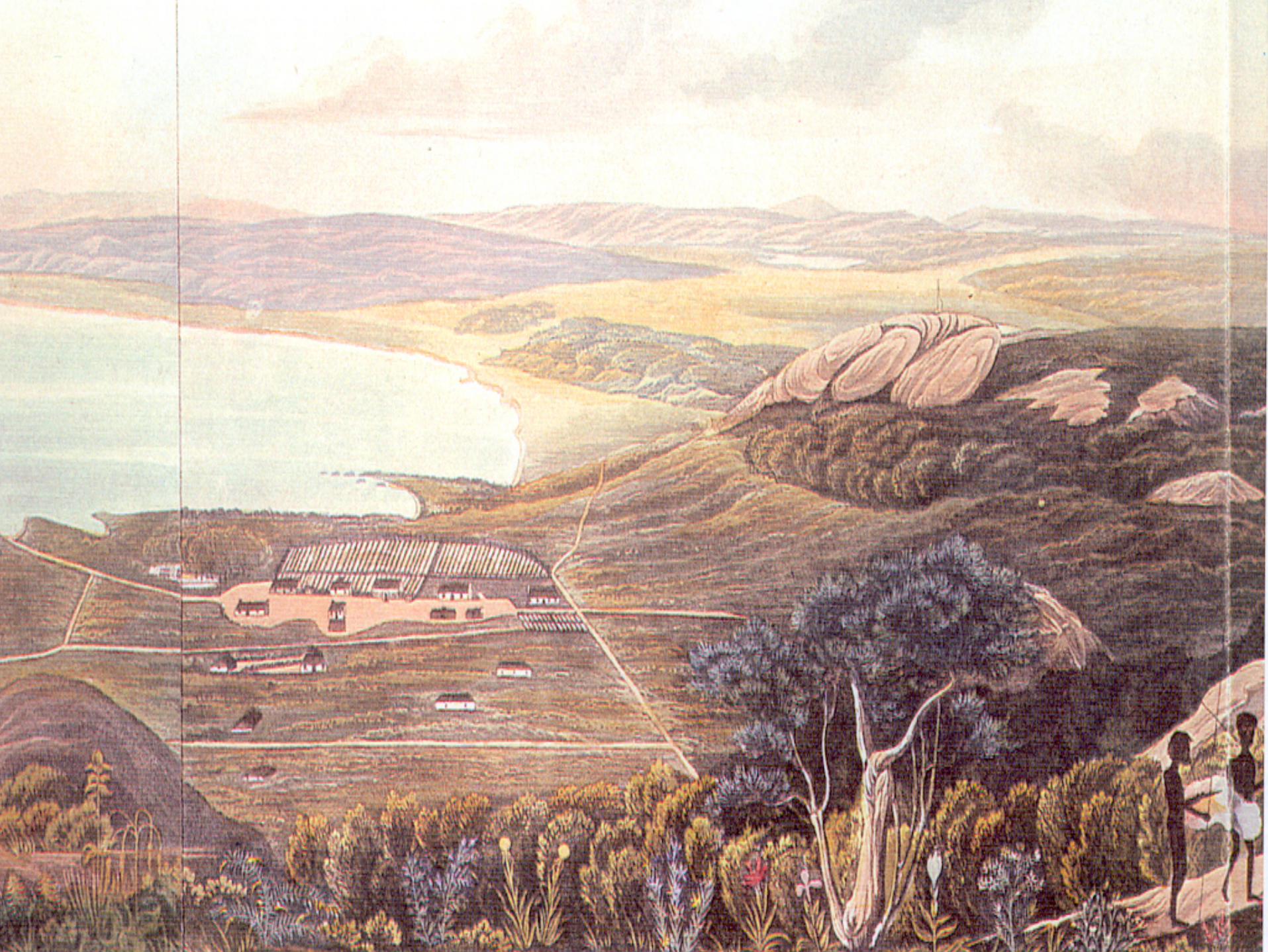
- Bunbury 1830s: 2 or 3 years
- Moore 1840: 2 years
- Drummond 1844: 3 or 4 years
- Drummond 1844: not less than 2 years
- Gilbert 1840s: 3 years
- Singleton 1846: 2 years

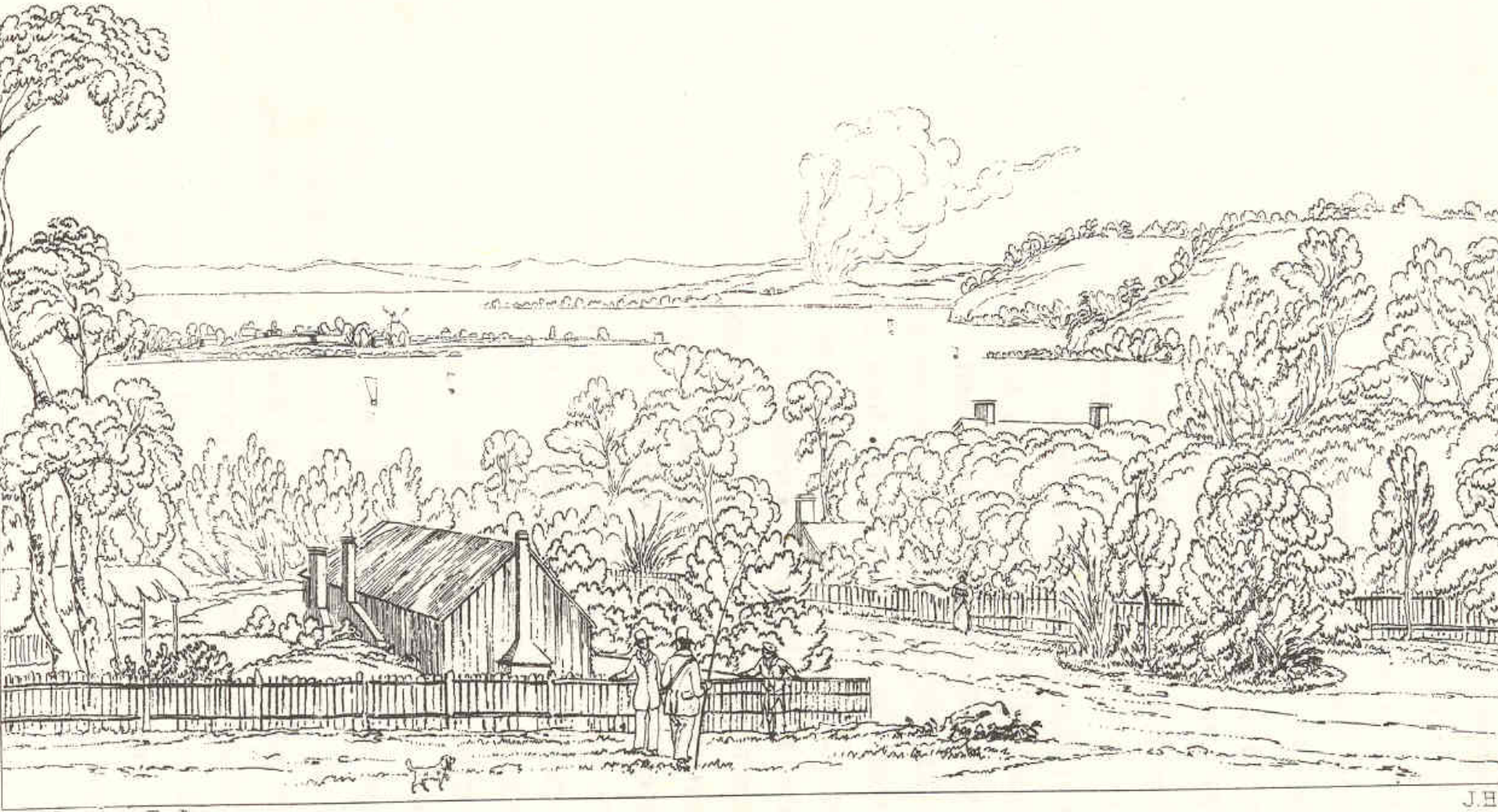
Scale of burning: number & size of fires (1)

- North coast: 5 statements (1697-1846)
- Swan River region: 11 (1696-1852)
- Peel Inlet to Geographe Bay: 5 (1801-1843)
- South coast: 12 (1792-1880s)
- Albany region: 20 (1801-34)
- Forest: 2 (1834-7)
- Inland: 8 (1829-65)

Scale of burning: number & size of fires (2)

- Multiple ignitions on the one day
- Large fires (black smoke)
- Atmospheric pollution
- Obstruction of view by smoke
- Fires at all times of day, including night
- Fires spread rapidly
- Larger fires started by men; smaller fires by women





C.D. Wittenoom Esq.r

J.H

SKETCH OF PERTH AND MELVILLE WATERS WITH MOUNT ELIZA FROM THE MAIN STREET OF PERTH WESTERN AUSTRALIA.

Printed by J. Henshall, 1, Cloudesley Terrace.

Scale of burning: extent of landscape heterogeneity (patchiness) - 1

- North coast: 1 statement (1840)
- Swan River region: 14 (1830-53)
- Peel Inlet/Geographe Bay: 13 (1831-51)
- South coast: 10 (1772-1880s)
- Albany region: 17 (1791-1834)
- Forest: 9 (1830-43)
- Inland: 29 (1830-64)

Scale of burning: extent of landscape heterogeneity (patchiness) - 2

Coastal plains, Jarrah forest & grassy woodland:

- extensive burning but not whole landscape (patches of tens to hundreds of ha)
- riparian areas & mallee scrub not recently burnt
- burning in consecutive portions

Scale of burning: extent of landscape heterogeneity (patchiness) - 3

Inland, where not dominated by grassy woodland:

- Large areas typically unburnt for many years
- Frequent mention of impenetrable thickets by Roe, Gregory, Austin, Lefroy, Clarkson, Hunt, Forrest & Giles

Intensity of fires (1)

- 16 statements (1791-1853)

- European visitors & settlers impressed by scorched crowns, blackened branches & boles of trees

Intensity of fires (2)

- However, scorch & black bark are related to dryness of bark (season of burning), not intensity
- It is logically impossible for frequent fires to be intense
- Frequent fires would be low intensity

  (< 500 kw m^{-1})

Other relevant detail about Noongar burning

- Fires could be lit under strong winds
- Noongar fires burnt till extinguished by coldness & dew of the night or by intervening barren spots
- 2 records of Aborigines beating out fires with green branches - ?indicative of low intensity grass fires

Praise for Noongar fire management

- H. Bunbury: We could never burn the bush with the same judgement and good effect as the natives
- L. Stokes: Burning by natives acquires complete docility
- Several colonists appreciated the value of preventive burning to protect life & property

Data limitations & uncertainties

- Some Europeans made no mention of Aboriginal burning
- How many more records remain to be discovered?
- ?Confusion with signal fires. SW WA: 30 year lag between discovery & settlement, followed by 30 year period of relatively slow occupation

Adoption & adaptation

South coast link 1860s to 1960s

Old timers born 1901-30 adopted and adapted Aboriginal burning methods:

- season: autumn after first rains
- frequency: mostly 3-4 yrs (2/3-8/10)
- size: mostly 10-50 acres
- patchiness: high

Some misconceptions (1)

1. Forest without underwood => repeated burning
2. Occurrence of fallen tree trunks => long absence of fire
3. Dense undergrowth in karri forest => infrequent fire
4. Lightning strikes rare & cause few fires

Some misconceptions (2)

5. Few Noongars in Jarrah forest => less frequent burning
6. Grass always => frequent burning. Inland, grass associated with moist sites around granite rocks, as well as York gum/jam woodland
7. Hollow-butted trees => frequent fires

Congruence with fire behaviour research

- Jarrah forest (Vesta): continuous fires in 3 yr old fuel (5.4 t ha^{-1}), flame height 1 m, crown scorch to 8 m
- Banksia woodland: 5 t ha^{-1} after 4 years
- Karri forest: 5 t ha^{-1} after 2 years
- Wandoo woodland: inter-fire period 6-12 yr
- Kwongan: fire return interval 8-15 yr

What we can learn from Noongar burning -1

- Their burning practices cannot be emulated (because of the prohibited burning season, infrastructure)
- We can, however, manipulate the frequency of burning so as to limit the extent of fires and maximize the spatial variety of fire succession vegetation stages

What we can learn from Noongar burning -2

- Noongars could not have appreciated the many species sensitive to frequent fire (most are cryptic)
- As a precautionary measure, parts of the landscape need to be protected from frequent fire so as to maintain/ increase the local distribution and abundance of these species

The most protectable areas are:

- islands
- permanent water & deeper soil horizons
- riparian zones
- steep, south-facing slopes
- rock expanses
- low rainfall areas (fuel loads discontinuous & slow to accumulate)
- salt-laden vegetation along coast
- small areas surrounded by larger areas that are frequently burnt

Conclusions

- Higher rainfall areas: summer fires; many ignitions on suitable days; fires could be large, in patches up to several hundreds of ha; return interval 2-4 years
- Very high rainfall areas: moist habitats had less chance of burning frequently
- Low rainfall areas: late spring fires; fires infrequent & localized. Much of the landscape unburnt for many years