Long-term science and short-term policy?

(The cathartic effect of the fire regime concept)

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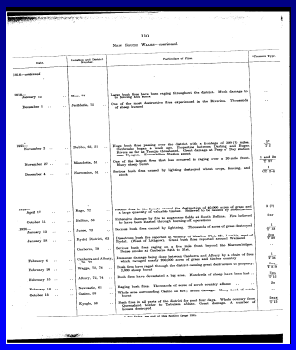
Summary

- Trends in the evolution of bushfire "policy"
- The fire regime concept and its consequences
- Risk management – what is it and why is the time ripe?
- Postlude

The evolution of policy



Foley 1947

Laissez-faire

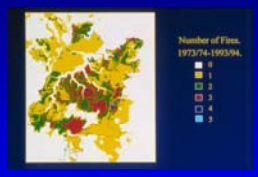
Fire control

Risk management
(what does it entail?)

Fire control – what does it involve?

- Aspires to eliminate or minimise unplanned fire via prevention & suppression.
- "Wildfires" viewed as undesirable events due to their destructive effect on tangible assets.
- "Effects" are chiefly a function of fire intensity ("event" focus).

The fire regime concept



Frequency (length of intervals between fires)

Intensity

Season

Type (e.g. subterranean vs. surface)

- Gill 1975
- UNESCO MAB Fire Conference 1977
- An ecological research concept
- Fire has a temporal dimension (!)

Regeneration capacity of organisms

TIME for replenishment of 'regeneration capacity' is a key issue

"Cycles of fire….cycles of life" (Gill 1999)

Consequences of the fire regime concept?

The fire regime concept and the "fire control" paradigm are uncomfortable bedfellows because of the temporal factor (intensity not the sole focus)

Inherently, a long term research and management emphasis is required to deal with the nature of fire regimes and their effects – can't just focus solely on "events"

- Biodiversity (species dynamics) effects partially explored.
- Other ecological effects less so.
- Other management values?

A fire regime perspective on carbon emissions from fires

- Euc. forest fires in south eastern Australia (> 3 mill. ha) 2002/3 & 2006/7
- Estimates of GHG emissions: 10 to > 100 million tonnes

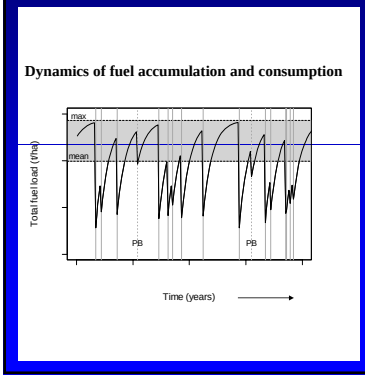
Are landscape fires exacerbating the greenhouse gas problem?

Is this all we need to know?

Subsequent post fire uptake by re-growing vegetation is important (i.e. an understanding of the fire cycle)

A fire regime perspective on carbon emissions from fires

Dynamics of fuel accumulation and consumption



A long term understanding of emissions requires an understanding of how fuel consumption is governed by:

- re-accumulation of fuel between fires;
- variations in length of inter-fire interval;
- variations in fire intensity
- effects of interactions between planned & unplanned ignitions
- other influences (e.g. fire weather)

A fire regime perspective on carbon emissions from fires

- Estimated "annualised" carbon loss from fires in se Oz sclerophyll forests (explicit integration of effects of fire intensity, frequency and dynamics of all biomass pools)

  0.5 – 2 t C ha^{-1} p.a. (Bradstock et al. in prep.)

- NEE estimates – interval between fires – wet euc. forest & savanna

  2 – 4 t C ha^{-1} p.a. (e.g. Cook et al. 2005, Leuning et al. 2005)

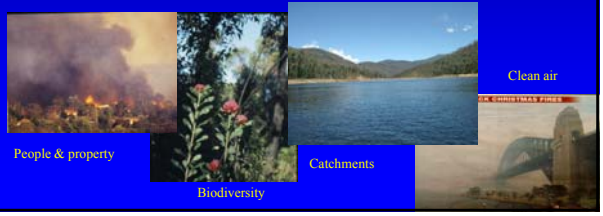
- Rate of C emission from temperate euc. forest fires ≤ uptake between fires?
- Potential for significant increase in emissions if fire activity increases (both planned and unplanned fires)

- **The fire regime concept leads to a detailed and nuanced understanding of the problem**

The fire regime concept and risk management: mutually attractive bedfellows?

"Risk is the chance, within a time frame, of an adverse event with specific consequences." (Burgman, 2005)

Consequential risk requires quantification of probabilities of adverse outcomes to things that we value. i.e. the probability of adverse fire regimes



People & property

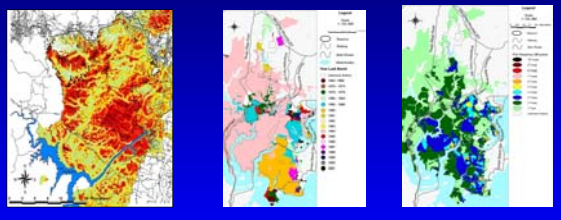
Biodiversity

Catchments

Clean air

What do we need to know to measure risks to things we value?

Severity (intensity) | Time since fire | Fire frequency



Visible → Invisible

Risks to things of value (adverse fire regimes) can only be MEASURED when we have **the trifecta**.

Long-term measurement of fire regimes is therefore the basis for research on risk & consequent management.

Advantages of a risk based approach to fire management

A way to deal with perceived conflicts in managing for multiple values.

Risk as a "common currency"

Risk minimization across a suite of values (trade-offs?)

An imperative to measure response (risk reduced) in relation management 'treatments"

A formal basis for comparative cost-benefit of diverse management activities.

Optimum risk mitigation – the best investment portfolio

Summary

- Aspects of ecological systems (e.g. biodiversity) are known to respond to fire regimes.
- Responses of other ecological aspects and non ecological values can be explored this way.
- Long-term research on fire regimes and their effects begets long-term management.
- The fire regime and risk management concepts are agreeable bedfellows.

van Wilgen 2009a

Van Wilgen 2009b

Postlude

Examination of Δ fire activity @ multi-decadal scale in South Africa

Contrasting savanna & shrubland biomes (tropical/temperate)

Primary correlate of area burned is rainfall (+/-)

Little effect of differing management eras & "fashions" in either case (e.g. van Wilgen 2009ab).

Food for thought