
Photo: J Cuttings, 1985

The 1958 Wandilo Forest Fire Tragedy: *Revisited*

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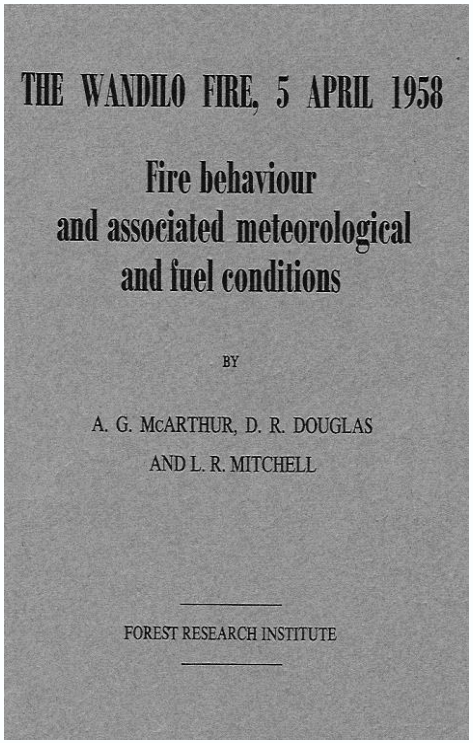
The 1958 Wandilo Forest Fire Tragedy Revisited



Purpose of the presentation:

- Review the description of this event
- Re-examine the incident in light of new knowledge
- Increase fire fighter awareness though lesson learned (rather than “relearned”)

McArthur AG, Douglas DR, Mitchell LR (1966) *The Wandilo Fire, 5 April 1958 Fire behaviour and associated meteorological and fuel conditions*. Forestry and Timber Bureau, Commonwealth of Australia, Canberra.

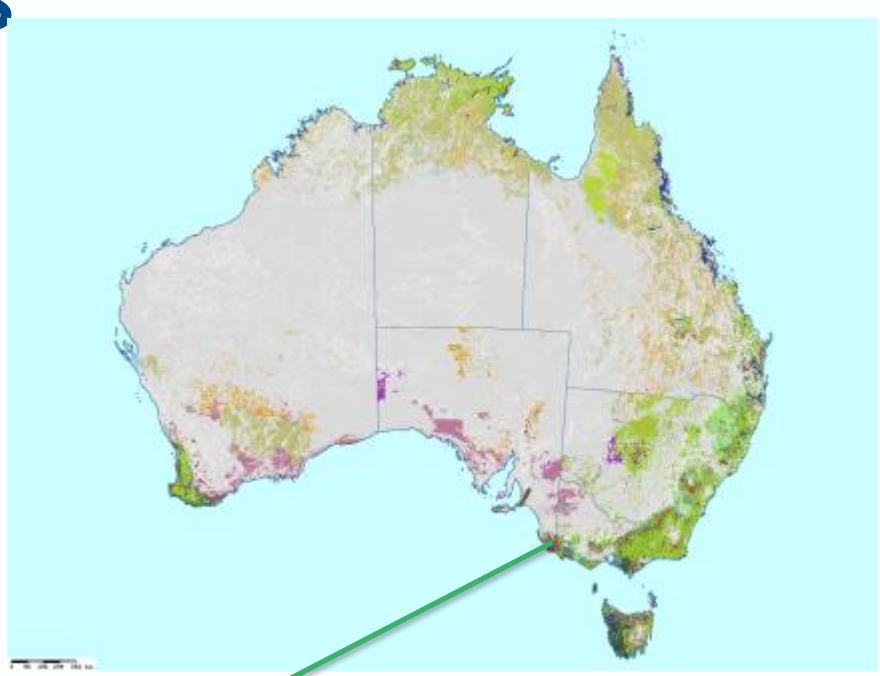
The 1958 Wandilo Forest Fire Tragedy Revisited

From: http://www.firebreak.com.au/wandilo.jpg

Obtained from the Woods and Forests Department Library in Adelaide back in 1990.

- Pre 1958 Australia had a low record of fire fighter fatalities
- Wandilo fire was one of the worst fire fighting tragedies
- 11 fire fighters were trapped by unexpected “blow up” 8 died and 3 survived

Wandilo Fire, 5 April 1958



Fuel types

Swamp vegetation

- Dense tea tree shrub 2 – 3 m high
- Dry, following a very dry summer and below average rainfall previous winter

Native vegetation

- Eucalypt with a shrubby understory
- Frequent hazard reduction burnt areas- 10 – 20 t/ha
- Long unburnt areas- > 20 t/ha

Fuel types

Pine plantation

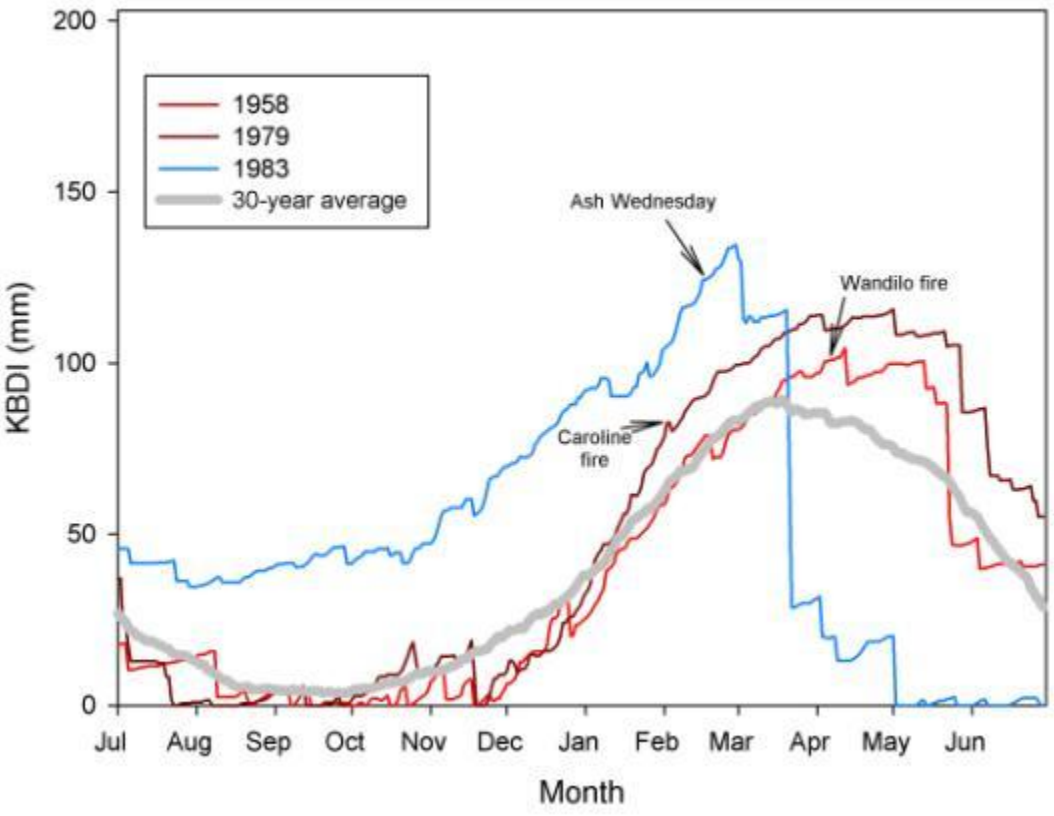
Pinus pinaster

- 10 m high, unthinned and unpruned
- dead branches and needles extended to ground level,
- fuel load 20 – 35 t/ha

Pinus radiata

- unpruned stands
- range of heights- 5 to 30 m
- portion of the area thinned with <1 m depth of logging slash with fuel loads 30 - 55t/ha
- Surface litter fuel 20 – 30 t/ha

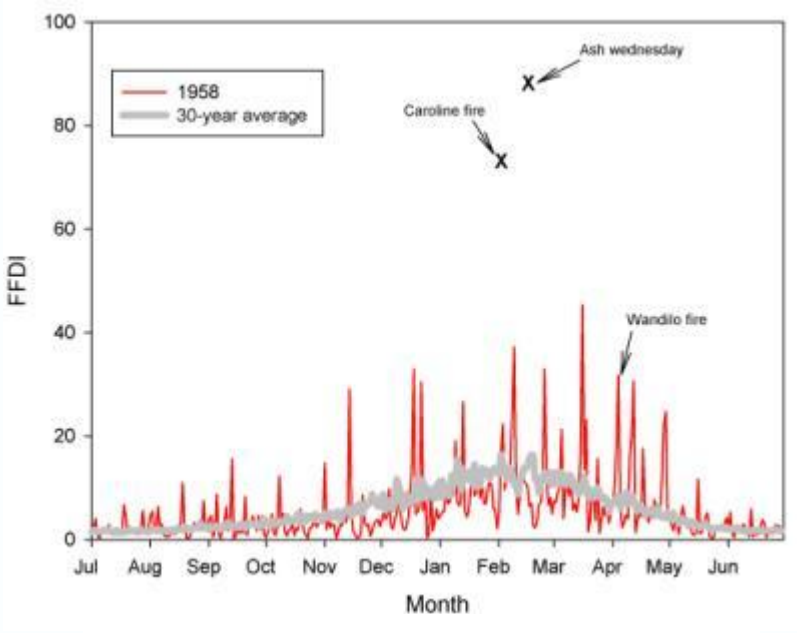
Evolution of seasonal conditions

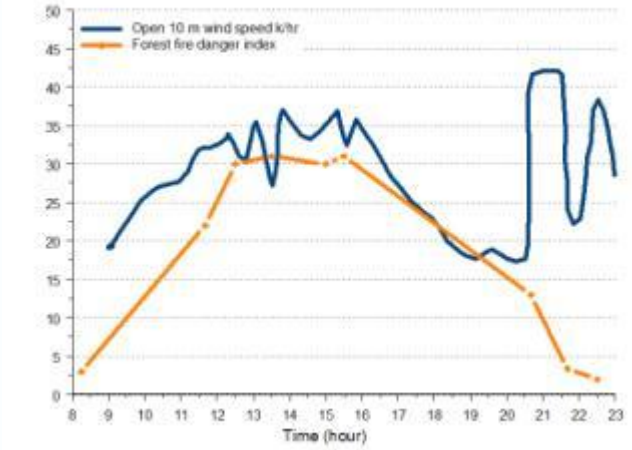


Keetch and Byram Drought Index (KBDI)

- Summer and autumn rainfall were significantly below normal
- Drought indices lower compared to other major fire events in the region
- KBDI level was not significantly different from long-term average
- Continue to increase after mid March

Meteorological conditions



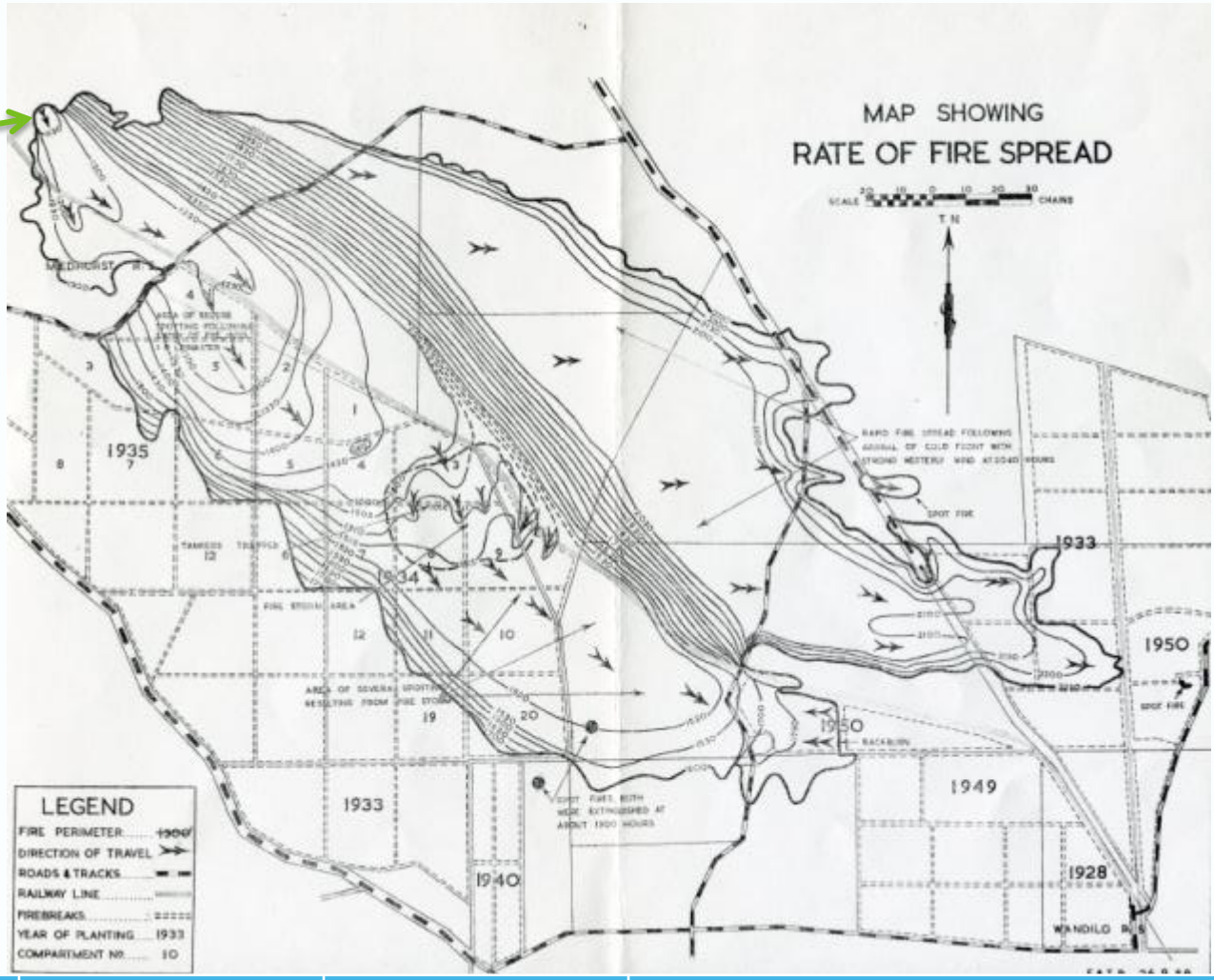


Forest Fire Danger Index

- Previous day warm and dry (Temp 30 ^{o}C, RH 22%)
- Overnight RH was low, thus little moisture gain in heavier fuel components
- Rapid rise of temperature and drop in RH, increasing FFDI, with rapid changes in wind speed, temperature and relative humidity
- High wind speeds (37 km/h) between 12:30 and 15:30,
- Wind change at 20:30 (41 km/h), 5 hrs after entrapment
- Severe conditions for April- more common during summer months (Dec-Feb)

Fire progression

8:25 – 11:30

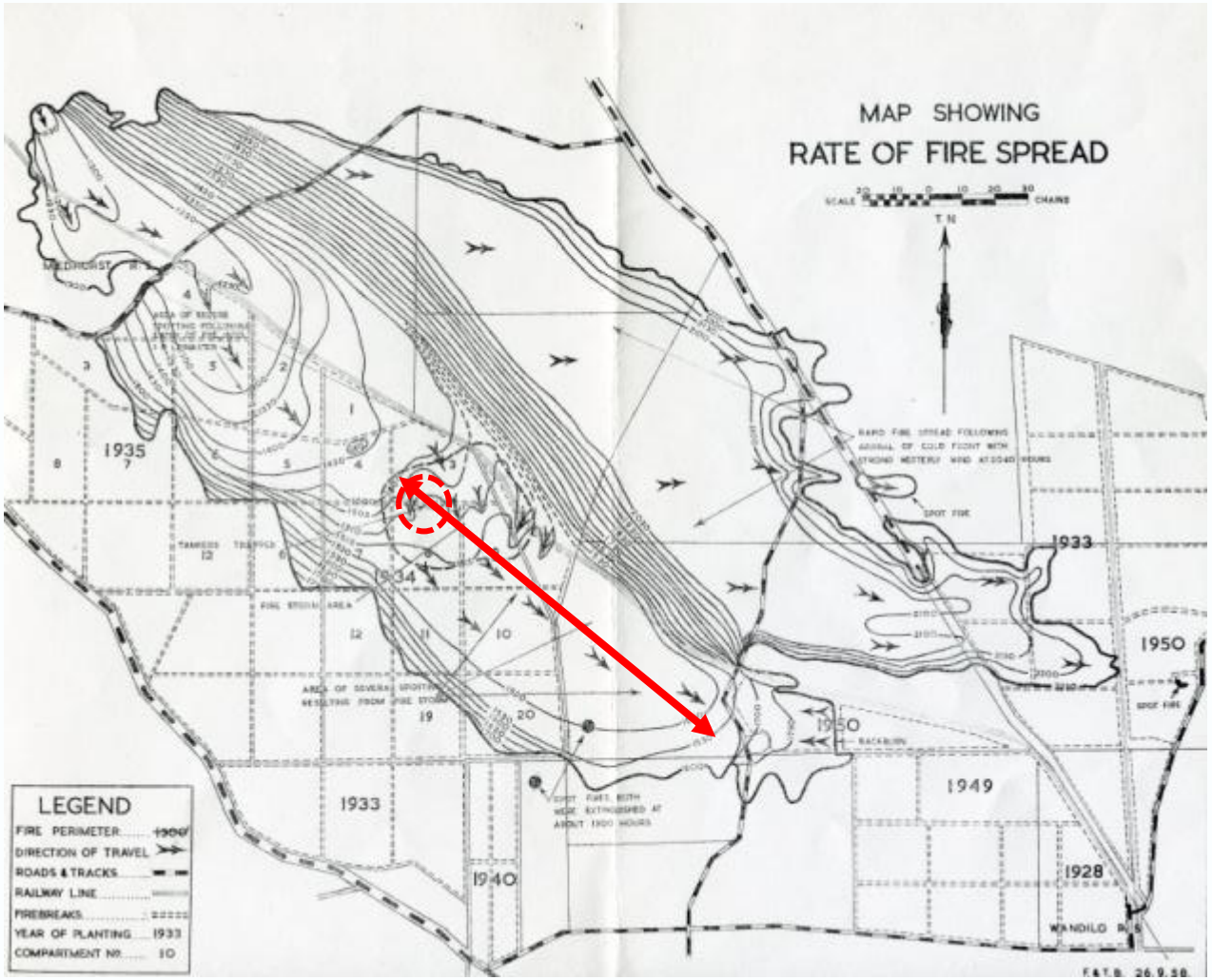


Time	FFDI	ROS (m/min)	Fuel type	Comments
08:25 – 11:40	22	1.7	Swamp	Slow burning, high fuel moisture content

Fire progression

Time	FFDI	ROS (m/min)	Fuel type	Comments
08:25 – 11:40	22	1.7	Swamp	Slow burning, high fuel moisture content
11:40 – 12:30	30	25	Native forest	Intense surface fire, 3-4.5 m flame height
12:30 – 13:30	31	14	P. *pinaster* & *radiata*	Severe fire behaviour- spotting and crowning
13:30 – 15:00	30	8	*P. radiata*	Surface fire with isolated crowning
15:00 – 15:30	31	77	*P. radiata*	Fire storm, extreme spotting up to 2 km

Fire progression



Time	FFDI	ROS (m/min)	Fuel type	Comments
15:00 – 15:30	31	77	*P. radiata*	Fire storm, extreme spotting up to 2 km

Factors contributing to the fire storm

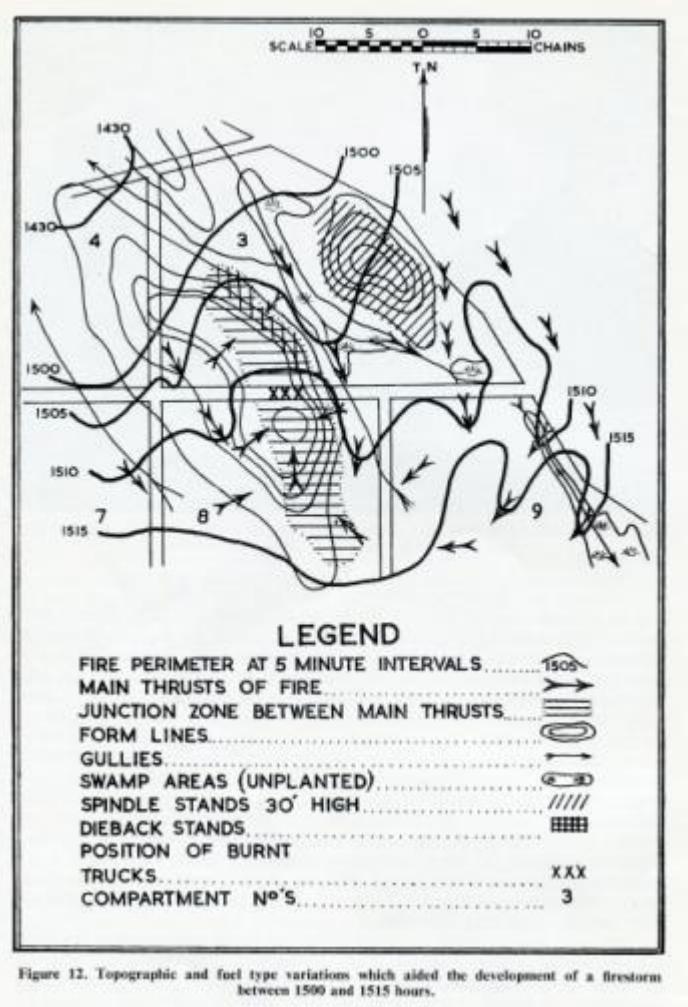
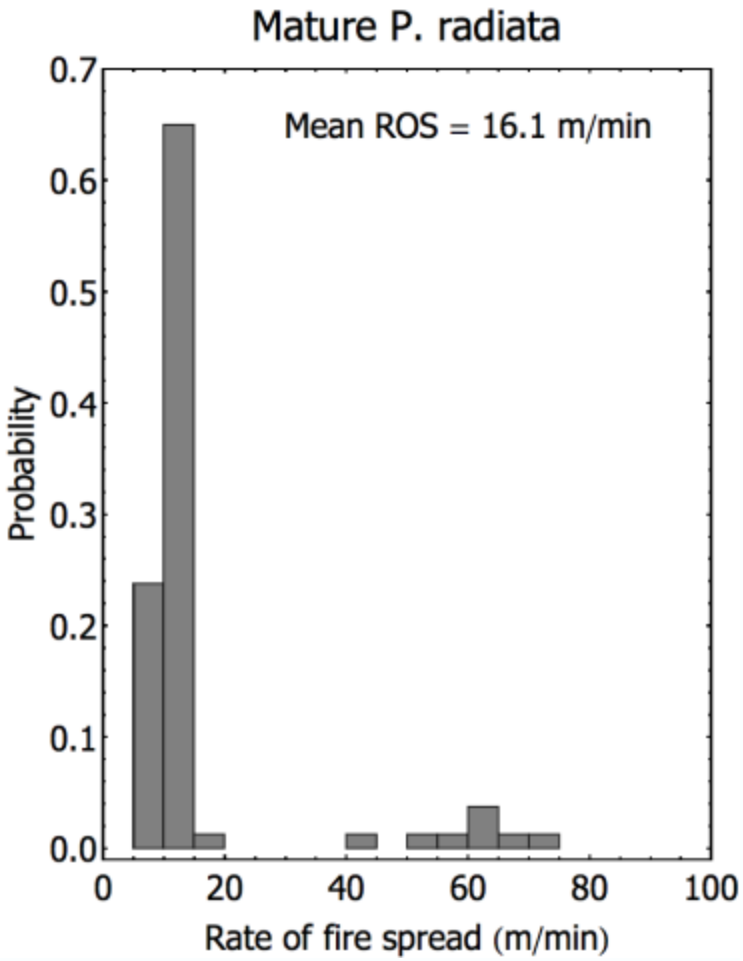


Figure 12. Topographic and fuel type variations which aided the development of a firestorm between 1500 and 1515 hours.

- Wind-funnel effects accelerated fire spread through the swamp
- Induced severe crown fire in dieback pines (heavy fuel loads), and spotting
- Two head fires on either side of the sand dune
- Strong convectional in-draught, caused by crown and the two accelerating head fires
- Strong convective updraft and strong winds aloft initiated immediate and heavy spotting up to 2 km

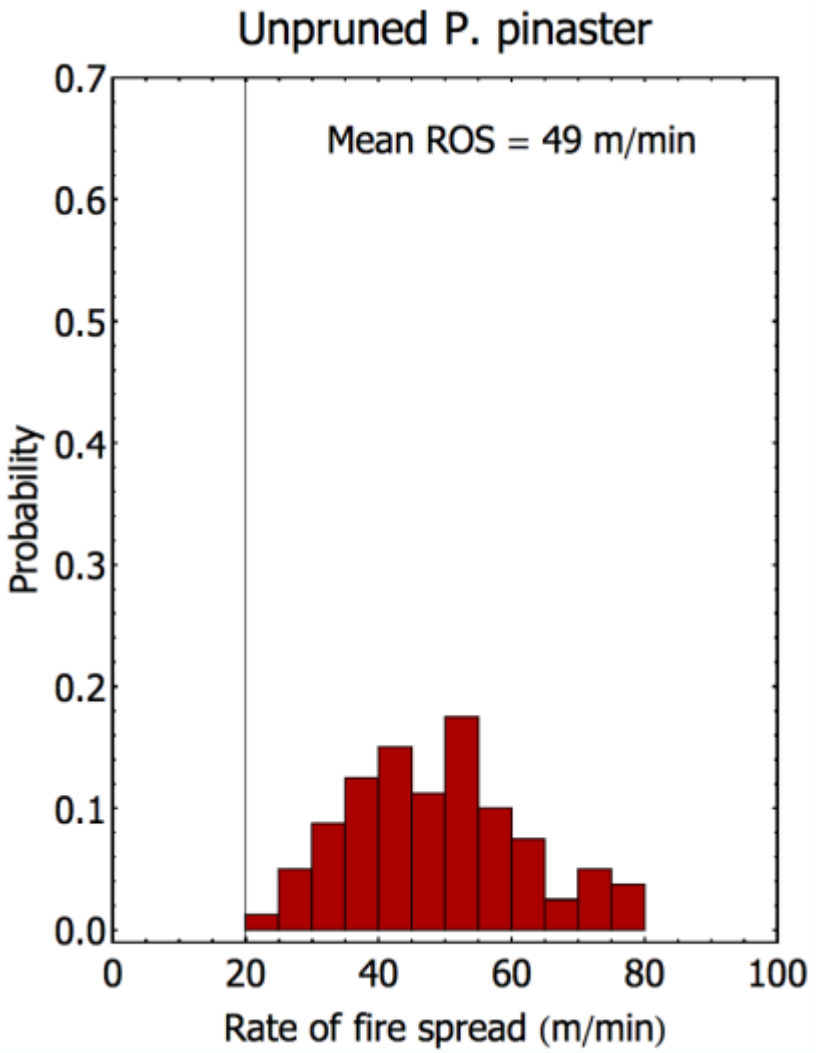
McArthur, et al., (1966)

Factors contributing to sudden changed fire behaviour- *change in fuel type / structure*



Factors contributing to sudden changed fire behaviour- *change in fuel type / structure*

15 to 50 m/min



Factors contributing to blow-up

- Transition from slow-spreading, low-intensity to fast moving, high-intensity (i.e., surface fire to crown fire)
  - Wind and slope aligned
  - Wind channeling
  - Mass spotting
  - Change in fuel type / structure

- The longer the fire burns and the larger it gets the greater likelihood of high-intensity fire often occurs rapidly (Butler et al., 1998, 1994 South Canyon fire analysis)

Lesson learned: *transition in fire behaviour*

"As the borderline between a surface fire and a crown fire can be such a delicate balance, a slight change in one of the key variables at this time of day may trigger a quiet, normal surface fire into an erratic high intensity crown fire" *(McArthur et al., 1966)*

Thank you

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