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Database capture of individual significant-scale Australian forestry plantation fire losses

Project number: PRE507-1920 March 2020

Border Fire, 30 December 2019, just after the fire jumped the Walwa River and entered pine plantations
(photo from A. Partridge, HVP Plantations)

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Forest & Wood Products Australia

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Prepared for

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IMPORTANT NOTICE

This work is supported by funding provided to FWPA by the Department of Agriculture and Water Resources (DAWR).

ISBN: 978-1-920883-98-0

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Final report submitted to FWPA in March 2020

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Background

The 2019/20 fire season has been horrific from an Australian forestry plantation loss perspective. Unofficial figures across the entire continent suggest total losses of more than 100,000 ha of plantations. In one region (Kangaroo Island), almost the entire plantation resource was destroyed. Much of the national area loss was softwood plantations (mainly Radiata pine). The softwood losses are particularly significant, because prior to the fire season, there was already a serious forecast domestic softwood log supply/demand deficit.

While the 2019/20 fire season losses are the worst recorded in Australia's history, there has been more than a decade (since the 2009 Black Saturday fires in Victoria) of relatively few plantation fire losses. However, recent losses provide a wake-up call in terms of a need to better understand risks, fuel loads, firefighting capability, future supply shortfalls, availability of plantation insurance in the future, and impacts on plantation valuations. There is a reasonable likelihood that in 2020, values of Australian plantations will reduce, because Discount Rates used in formal valuations will rise as a result of increased perceived risks. This has an impact on future investment into plantation development.

From a knowledge conservation perspective, FWPA is seeking historical information of larger-scale Australian plantation fire losses, in order to assist with its risk management strategic planning, and has engaged Geddes Management Pty Ltd to provide such data. In the future, FWPA plans to engage ABARES to use such information for general industry statistical reporting.

Project scope

Taking into account only the larger-scale losses (ie about 100 ha or more per fire), provide a database of plantation area fire losses by year (and if possible, by date), by region and by species. Where information is readily available, identify the maximum Forest Fire Danger for individual fires and the total area of each fire event.

Methodology to update the plantation fire loss database

Geddes Management already had a large database of individual Australian plantation fire losses, including many of the greater-than-100 ha plantation loss events. However, the data was recorded as plantation loss area, state and year in which the loss occurred. It did not include the fire date, the fire name, the fire locality, the fire cause, the maximum Forest Fire Danger (during the course of the fire) or the total fire area. In order to improve data already collected and to identify plantation fire losses not previously included on the database, the following steps were taken:

- Annual Reports (where they were available electronically) of Woods & Forests/ForestrySA and State Forests NSW were reviewed. A general limitation of these reports was that in most cases, only the total plantation area for each year was identified. It was generally only when there were very large-scale losses, that details were provided on individual fires.
- Each individual plantation fire loss report that Geddes Management has undertaken since 1996 was reviewed. These reports are from insurance loss assessments, and include softwood and hardwood plantation fire losses in each state and territory. While there are almost 200 separate fire loss reports, only a portion of those were for plantations where more than 100 ha was burnt. Those reports contained other information, such as Forest Fire Danger, fire cause, fire locality and fire name, and sometimes had data on the overall fire area.
- A number of representatives from plantation organisations were contacted, including the Forest Products Commission WA, ForestrySA, Green Triangle Forest Products, HVP Plantations, Australian Bluegum Plantations, PF Olsen Australia, Timberlands Pacific (in both Tasmania and the Green Triangle), Sustainable Timber Tasmania, Forestry Corporation NSW, and HQPlantations.
- Retired foresters that had knowledge of fire losses were contacted. These included Ken Nethercott (Green Triangle fires), John Sedgley (NSW fires) and Tony Cannon (Tasmanian fires).

A literature review was conducted to identify any past plantation losses and to collect (where possible) more information about each fire loss. Documents viewed included:

- AFAC (2019). A review of the management of the Tasmanian of Dec 2019 - Mar 2019. Prepared for the Tasmanian government by AFAC (Jul 2019).
- Bartlett, A. 2003. Fire Management in Pine Plantations (unpublished).
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- Burrows, N. (2019). Lessons and Insights from Significant Bushfires in Australia and Overseas. Informing the 2018 Queensland Bushfires Review (May 2019).
- Cannon, A (2019). Submission (on behalf of the Institute of Foresters of Australia) into the AFAC Inquiry into the 2018/19 Tasmanian Bushfires (May 2019).
- Cruz, M.G & Plucinski, M.P. (2007). Billo Road Fire - report on fire behaviour phenomena and suppression activities.
- CSIRO 1989. Plantation Fire Losses in Australia 1971 to 1989. Division of Forestry, Bushfire Research Unit. Unpublished Report.
- CSIRO 1999. Bushfires in Australia. Prepared for the 2009 Senate Inquiry into Bushfires in Australia. CSIRO Submission 09/355, July 2009.
- Dawson, M. 1982. High Intensity Fires in Plantations of *Pinus radiata*. Paper presented to Australian Forestry Standing Committee Research Working Group 6.
- Ellis, S., Kanowski, P., and Whelan, R. J. 2004. National Inquiry on Bushfire Mitigation and Management 2004.
- Ferguson, E. 2016. Report of the Fire Special Inquiry into the January 2016 Waroona Fire, WA.
- Forest Fire Management Group (2007). Softwood plantation fire synopsis. Compiled by Forest Fire Management Group (endorsed by AFAC).
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- GHD 2010. GHD Department of Agriculture, Fisheries and Forestry, Report for FICCRF Plantation Amplified Bushfire Risk Study, Regional Plantation Forestry Fire Risk Assessment, Context Study Brief for Green Triangle, November 2010.
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- Keeves, A. and Douglas, D.R. 1983. Forest fires in South Australia on 16 February 1983 and consequent future forest management aims. *Aust. For.* 46(3), 148-162.
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- McArthur, A.G. 1965. The behaviour characteristics of the Longford Fire: 17 Nov 1962. Published by the Forestry and Timber Bureau as Leaflet No. 91 (1965).
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- Partridge, A. 2020. "HVP Northern Region Fire Impacts" a presentation to the South West Slopes Forestry HUB, 28 Feb 2020.
- Pratt, J. 1990. The Millbrook Fire, March 8 1990, Woods and Forests Department, South Australia. Internal Report.
- Rawson, R.P., Billing, P.R., Duncan, S.F. 1983. The 1982-83 forest fires in Victoria. *Aust. For*., 46, 163-172.
- Royal Commission 2006. The Canberra Firestorm: Inquest and inquiry. Maria Doogan, Coroner (2006).
- Royal Commission 2010. 2009 Victorian Bushfires Royal Commission. Government Printer for the State of Victoria.
- Select Committee on Agriculture and Related Industries (2010). The incidence and severity of bushfires across Australia (August 2010).
- Smith, R. 1992. The Myalup Wildfire, April 1991. Fire Protection Branch, Department of Conservation and Land Management, Western Australia.
- TFFPN (2019). Submission into the AFAC Inquiry into the 2018/19 Tasmanian Bushfires (May 2019).
- Venz, P. W. 2005. Fire occurrences at Beerburrum (Jul 2005).

In order to fill other gaps in the knowledge base, ABC news stories and regional newspaper articles were searched on the internet.

Three forestry consultants provided information; Phil Clements (NSW losses), Lew Parsons (Green Triangle losses) and Peter Zed (Queensland losses).

The outcome of these investigations was a spreadsheet with five worksheets:

- Read me first: This provided a short summary of what information was included. For example, in the period from 1929 to 1958, because of the smaller size of the national estate, losses in excess of 60 ha have been included, while from 1959 to current, only individual plantation losses exceeding 100 ha have been included. It provided a map of the National Plantation Inventory regions and a code identification for each region in the main body of the spreadsheet (ie in the “all fires” worksheet). It also listed the Forest Fire Danger ratings for each category (Low, Moderate, High, Very High, Extreme and Catastrophic) as used in the “All fires” worksheet.
- All fires: This provided a list of each larger-scale plantation fire loss identified with columns for; year, fire start date, state, NPI region, fire location, fire name, species burnt, fire cause, maximum Forest Fire Danger (during the course of the fire), plantation area loss, total fire area and reference (as to where the data was sourced).

- Losses per decade: Data from “All fires” has been extracted to provide areas burnt by decade. It shows all decades for which data has been identified, and then fire losses for 2005-2020 in order to have a consistent time period.
- References: All references used are listed in alphabetical order.
- Losses exceeding 1,000 ha: Those individual fire losses where more than 1,000 ha of plantation was burnt have been extracted from the “All fires” worksheet.

Limitations

The database is not complete. It is recognised some >100 ha fire losses have been missed. And any future plantation fire losses will need to be added. However, we believe it includes all larger scale plantation losses in Western Australia (since 2005), South Australia (since 1929), Victoria (since 1962), Tasmania (since 2000), NSW (since 1968), ACT (since 1939), Queensland (since 1977) and the Northern Territory (since 2005). It is quite likely there are some other plantation losses in privately owned estates that have not been identified.

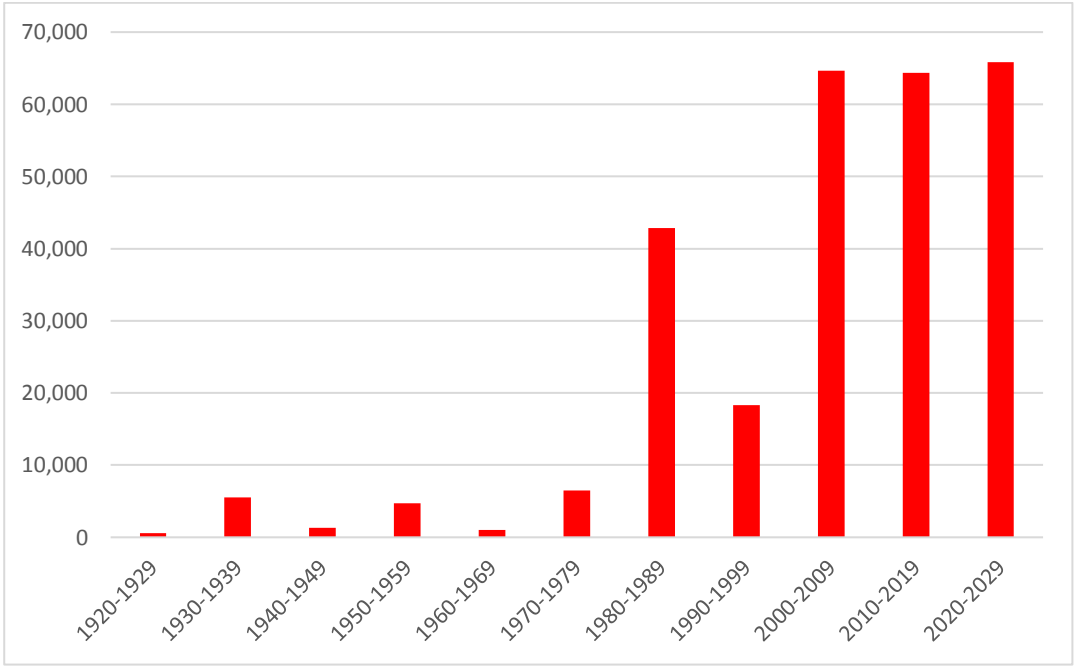
Wherever possible, each fire in the database has a reference as to where the data was sourced. However, there are some fires where area loss data were gathered by Geddes Management prior to 2005, for which there is no reference.

While the year of loss has been identified for every fire in the list, actual fire-start dates have not been identified for some of the losses prior to 2003.

Initial analysis

This analysis used 100 ha as the lower limit for a larger-scale loss. While all plantation losses have monetary loss implications and cause grower hardship in dealing with the blackened trees in terms of salvage and replanting, when the area loss exceeds 100 ha, there are market implications in terms of loss of future log (or chip) regional supply. The total number of larger-scale fires identified (including losses in excess of 60 ha in the period from 1929 to 1958) was 215. Area losses per decade (from 1922 to February 2020) are shown in Figure 1. The large-scale losses in Tasmania in January 2019, and the 2019/20 summer losses on Kangaroo Island (SA) and in Victoria and NSW, have clearly distorted the decade of 2010-2019, as shown in Figure 1.

Figure 1: Area losses per decade for individual fires when more than 100 ha was burnt



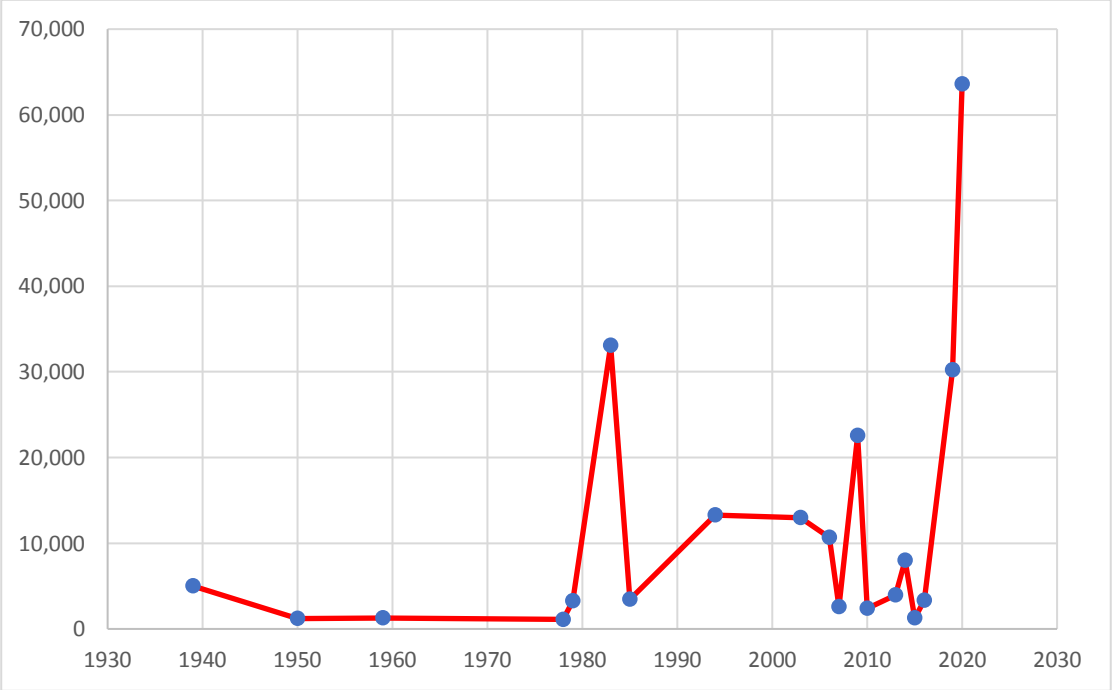
The number of fires identified by state are shown in Table 1. Data is shown for all fires recorded, and then for the period 2005-2020, in order to make time-period-like comparisons between states and territories.

Table 1: Number of >100 ha individual fire losses by Australian state

State or Territory	No. >100 fires	Period	No. >100 fires	Period
ACT	6	1939-2020	0	2005-2020
NSW	25	1968-2020	11	2005-2020
NT	1	2005-2020	1	2005-2020
QLD	22	1977-2020	8	2005-2020
SA	45	1029-2020	12	2005-2020
TAS	22	2000-2020	16	2005-2020
VIC	63	1962-2020	37	2005-2020
WA	31	2005-2020	22	2005-2020

When fires are so large that 1,000 ha or more is damaged, they have regional wood supply implications. Of the total 215 fires, there were 52 individual events where losses of 1,000 ha or more were experienced. Figure 2 summarises those landscape scale losses in terms of burnt plantation area per year.

Figure 2: Australian plantation area losses (ha) from individual fires exceeding 1,000 ha in size



Then in terms of understanding the years in which the landscape scale losses (ie of 1,000 ha and greater sized individual plantation losses) occurred, Figure 3 shows all events identified, while Figure 4 zooms in to explore only those landscape scale losses since 1978.

Figure 3: Numbers of fires where 1,000 ha or more of plantation was burnt

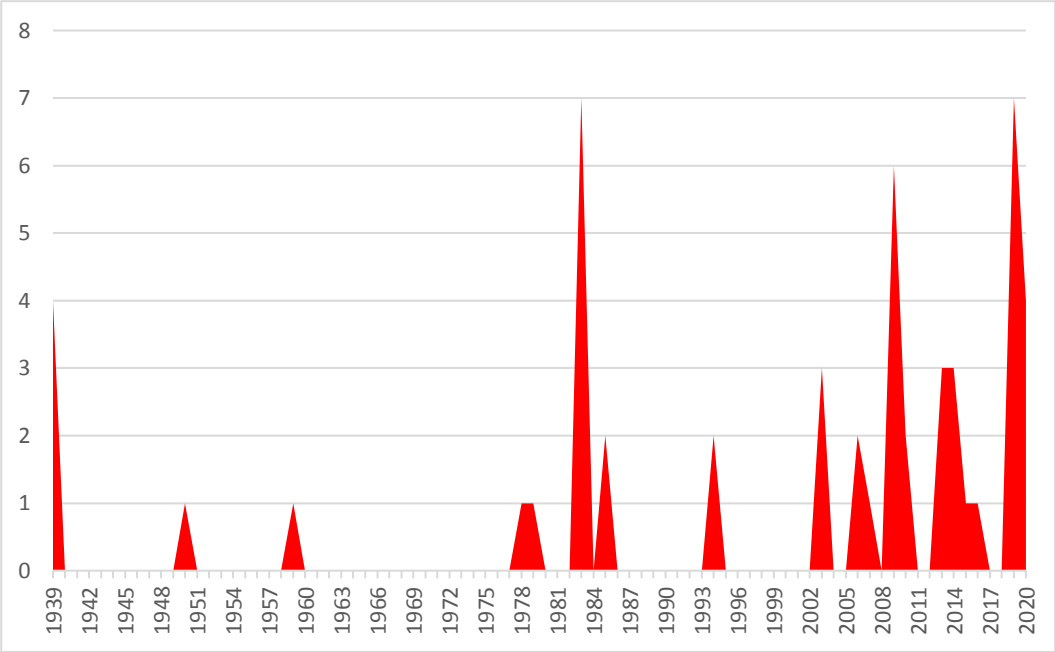


Figure 4: >1000 ha fire loss events since 1978