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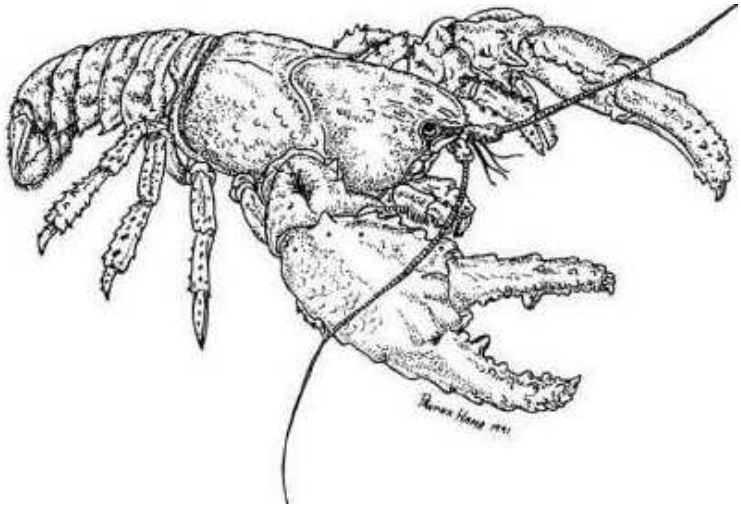
WEBSITE OF THE CENTRAL NORTH FIELD NATURALISTS



Bushfires in Tasmania - are the January-February 2016 highland fires a sign of things to come?

by **Nick Fitzgerald**

After the 2016 Tasmanian bushfires - photo by R & M McQueen

The past summer was an unusual one: it was the hottest summer on record in Tasmania and in the western half of the state rainfall was slightly below average following a record dry spring, driven in part by a strong El Niño event.[1] Major lightning storms in January ignited scores of bushfires; some continued to burn for weeks. Also remarkable was the relatively few days of high fire danger. High fire danger days, like dry lightning, are predicted to become much more frequent in the coming decades.[2]

There has been an increase in the number of lightning-ignited fires in Tasmania since 1980.[3] Tens of thousands of hectares per year were burned by such fires in three of the past ten fire seasons.[4] It seems that changed weather patterns are making 'dry lightning' – where lightning is not accompanied or followed by heavy rain – the latter being much more common in Tasmania.

Of the approximately 70 lightning fires which ignited in January 2016, around 20 continued to burn well into February in the west of the state, with insufficient rainfall to extinguish them. A bushfire which began in the Fisher River valley on the 13th January raced up the Devils Gullet, burning rainforest in the bottom of the gorge and sparse eucalypt forest on near-vertical rock faces, before reaching the flatter alpine country of the Central Plateau. This 'Lake Mackenzie Fire' burned around 26,000 hectares (around 2.5 times the size of Maria Island or Robbins Island). Another fire in the Mersey Valley, near Lake Bill, threatened the Walls of Jerusalem National Park, but fortunately the weather conditions did not propel this fire into the highland ecosystems.

While fire is a key part of the ecology of the Tasmanian Wilderness World Heritage Area (TWWHA) it can be very destructive in some ecosystems. When fire-sensitive vegetation is replaced by more fire-tolerant and flammable vegetation the shift is usually permanent.[5] After a month with less than 50 mm of rainfall, even rainforest can burn.[6] Under such dry conditions, the normally stable boundaries between rainforest and other vegetation, such as scrub and moorland, will not stop the advance of a bushfire.

Tasmania is a global hotspot of conifer diversity.[7] Eight out of our ten conifer species are ancient Gondwanan species, confined to cool moist habitats. They are typically very slow-growing, long-lived and have poor seed dispersal.[8] They lack the various adaptations to fire found throughout the majority of Australia's flora. In addition to the conifers, Tasmania has an unsurpassed flora of ancient relictual (palaeo-endemic) plant species which require moist, fire-free habitats.[9] The scientific and conservation significance of these species, and the communities they comprise, are important world heritage values of Tasmania's wilderness.[10] Having remained largely unchanged since they first evolved on a humid Earth, these plants tend to be highly fire sensitive.

Some of the larger pencil pine (*Athrotaxis cupressoides*) trees killed by the recent fires would be close to 1000 years old. Long-term research sites at Mt Read and Mt Field investigating recovery after fires in alpine vegetation have shown virtually no recruitment of conifers or deciduous beech (*Nothofagus gunnii*), even where a local seed source remains. Cushion plants appear to be more resilient but are slow to recover.[11] Apart from the local extinction of poorly-dispersed species with poor regeneration success (multi-decadal lack of pencil pine recruitment on the Central Plateau, for example, may be caused by marsupial browsing),[12] the other major potential impact of highland fires is loss of organic soils by combustion and/or erosion. The age of these organic peat soils could date back to the beginning of the Holocene. Natural processes to reverse these almost instantaneous changes would require thousands of years.

Tasmania's Central Plateau is the stronghold of pencil pines and has been seen frequent, localized, low severity fires since before the British occupied the country.[13] Fires lit by graziers have burnt much of the Plateau (particularly in 1960-61 which was the driest spring-summer in the 80 years prior to 2015-16), resulting in the loss of around one-third of the extent and 10% of the population of pencil pine.[14] King Billy pine (*Athrotaxis selaginoides*) forest on the West Coast Range and elsewhere was similarly impacted by anthropogenic fires from the 1880s into the early 1900s.[15]

In the end, around 15,000 hectares - less than 2% - of the TWWHA was burnt

in the 2016 summer and only a small proportion of this burnt area was fire sensitive vegetation. Probably less than 35 hectares of pencil pine was destroyed.[16] The danger is that incremental losses like these will compound over the coming decades or, worse, conditions like the past summer coincide with severe fire weather with catastrophic outcomes. Active interventions, such as replanting or ex situ conservation, may need to be employed. Department of Primary Industry, Parks, Water and Environment (DPIPWE) is currently assessing the damage to the alpine ecosystems near Lake Mackenzie to determine management actions for this site.

The Lake Mackenzie fire burned the headwaters of part of the Mole Creek karst catchment. Where peat soils (organic soils) have burned, the land surface cannot act like a sponge as it once did. Previously, this sponge acted as a buffer to release water gradually. Now, the effects of rainfall events are seen quickly in the caves below the Western Tiers. These 'flashier' hydrological phenomena could mean poor karst conservation outcomes: increasing effects of climate change, longer dry spells and more severe floods stress the karst ecosystems and the very substrates cave animals live upon.[17]

Extensive fires in the Tarkine region burned mostly scrub and moorland with some wet eucalypt forest and rainforest. The 'Maxwell River Fire' in remote southwest Tasmania burned mostly buttongrass moorland and scrub. The Tasmanian Parks & Wildlife Service monitored this fire and the weather conditions in readiness to act if fire-sensitive vegetation became at risk,[18] as happened in 2013 when a lightning fire burned 45,000 hectares near the Giblin River in southwest Tasmania,[19] burning riparian Huon pine forest and reaching the edge of the alpine zone in the Western Arthur Range.

The Parks and Wildlife Service utilises a Bushfire Risk Assessment Model and expert advice to monitor and predict threats to natural values, in line with their management goal: 'No loss of fire-sensitive vegetation or other high conservation values in the TWWHA'.[20] However, there may be limitations to achieving the goal on the ground, due to severe conditions, remote locations and limited fire fighting resources.

It is difficult to ascribe climate change as a direct cause for any single event. It may seem strange to consider lightning fires as anthropogenic, but that is the logical conclusion from the facts of climate change. Large bushfires were very infrequent prior to European invasion and subsequently increased due to intentional and indiscriminate burning of the bush and changed land management. In the modern era, with restrictions on use of fire in the bush, improved understanding of bushfire science, better fire suppression capability and fire surveillance technology (including satellite images), we might expect to see less destruction caused by bushfires. However, these advances may not be enough to compensate for the increases wildfire frequency and severity we are beginning to see in this changing climate.[21]

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