

# RECENT BUSHFIRE SMOKE INTERVALS IN TASMANIA, WITH AN EMPHASIS ON THE 2019 JANUARY- FEBRUARY IMPACTS.

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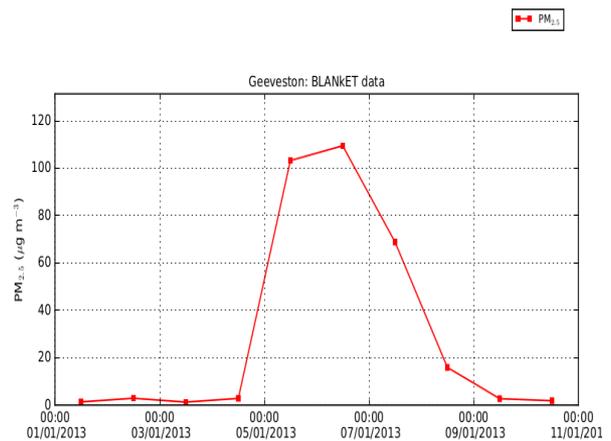
## 1. Summary

Broad-based air monitoring began in Tasmania in 2009. The network has measured bushfire (wildfire) smoke in most summer seasons. Of particular note have been significant smoke impacts in January-February in 2013, 2016, and recently in 2019. In 2013 a number of bushfires burnt across the state, including a large (24,000 ha) fire which substantially damaged the town of Dunnally in Tasmania's south-east. Less well publicised was a larger fire (50,000 ha) in the south west wilderness area, originating near Giplin River. Smoke from this significantly degraded air quality in the Huon Valley, south of Hobart. Each of the three Huon air quality stations recorded one or more days with day-averaged PM<sub>2.5</sub> over 100 µg/m<sup>3</sup>. In 2016 many areas across the north of Tasmania, including Launceston, were significantly affected by smoke from a number of large fires in January and February, burning mostly in the north and north-west. These fires were ignited by a single 'dry' thunderstorm on the 13<sup>th</sup> of January. The total burnt area was over 100,000 ha. Many air quality stations recorded one or more days with day-averaged PM<sub>2.5</sub> over 100 µg/m<sup>3</sup>. Wynyard air station recorded one day near 500 µg/m<sup>3</sup>. In mid January 2019 another dry lightning storm ignited wildfires across central and southern Tasmania. Subsequently, the four largest of these (Great Pine Tier, Gell River, Moores Valley, and Riveaux Road) burnt around 190,000 ha. Geeveston and Cygnet stations in the Huon Valley recorded the highest smoke levels, as peak values and sustained impacts: At Geeveston there were 16 days with day-averaged PM<sub>2.5</sub> over 25 µg/m<sup>3</sup>. Twelve of these days were over 100 µg/m<sup>3</sup>, while the maximum day-averaged value was 508 µg/m<sup>3</sup>.

## 2. 2013 bushfires

In January 2013 a large number of bushfires occurred across Tasmania. The major bushfires in this interval were in the far southwest (Giplin River), at Lake Repulse (upper Derwent Valley), in the Forcett and the Tasman Peninsula areas, to the south of Bicheno on the mid east coast, at The Steppes in the Central Highlands, and at Montumana on the north-west coast. The total area burnt was near 95,000 ha. The most destructive fire significantly damaged the town of Dunally in the state's south-east. The single largest fire was the Giplin river fire at approximately 50,000 ha, which

also resulted in the highest smoke levels measured by the Tasmanian monitoring network, which occurred in the Huon Valley, south of Hobart. The day-averaged PM<sub>2.5</sub> time-series for Geeveston (Huon Valley) for the 1<sup>st</sup> to 10<sup>th</sup> of January 2013 is shown in Figure 1.



*Illustration 1: Day-averaged PM<sub>2.5</sub> time-series for Geeveston (Huon Valley) for the 1<sup>st</sup> to 10<sup>th</sup> of January 2013.*

## 3. 2016 Bushfires

The months preceding the summer of 2015-2016 were unusually dry in Tasmania. In January 2016 a series of dry lightning storms ignited multiple fires across the state, including in the Tasmanian Wilderness World Heritage Area (TWWHA). By March 2016, a approximately 130,000 ha of the TWWHA had been affected by fire. Smoke impacts from these fires were particularly severe across the north-west and north of Tasmania, including significant although lower impacts in Launceston and the Tamar Valley. The peak of the day-averaged PM<sub>2.5</sub> levels of just under 500 µg/m<sup>3</sup> occurred at Wynyard on the 19<sup>th</sup> of January 2016. The time-series of day-averaged PM<sub>2.5</sub> from Wynyard air station is given in Figure 2.

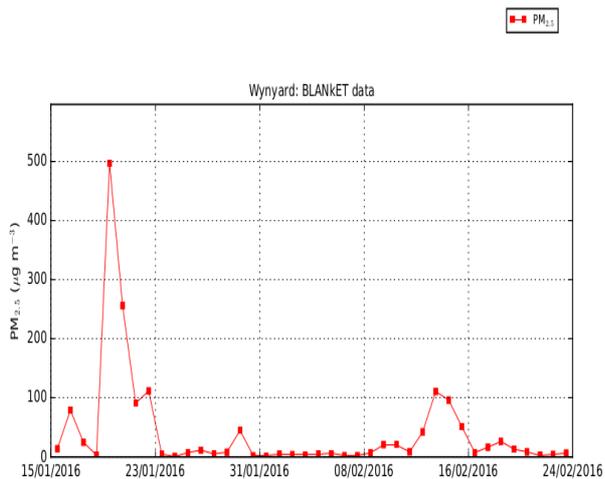


Illustration 2: Time-series of day-averaged  $PM_{2.5}$  from Wynyard air station, north-west Tasmania, 15th to 23rd to January 2016.

#### 4. 2019 Bushfires

A severe bushfire season was also experienced in Tasmania in summer 2018-2019. The total burnt area exceeded 200,000 ha. On the 13<sup>th</sup> of January 2019 a dry-lightning storm moved eastwards across the southern half of the state, leaving a trail of ignition points. These grew to become several very large fires. Other large fires developed on the central plateau and on the west coast. The fires west of the Huon Valley had the most impact on measured air quality, with Geeveston station again recording the highest  $PM_{2.5}$  levels.

Figure 3 shows the day-averaged  $PM_{2.5}$  time-series for Geeveston for 2010 to early 2019. Winter woodheater smoke intervals are labelled as are some extreme planned-burn smoke events, and the 2013, 2016, and 2019 bushfire smoke intervals. The 2019 smoke impact was unprecedented.

A comparison of Geeveston 2019 January  $PM_{2.5}$  levels and (date-shifted)  $PM_{2.5}$  data from the Hazelwood coal mine fire, recorded by EPA Victoria at Morwell South, is given in Figure 4. The Morwell South data commence a few days after the Hazelwood fire began, hence the peak may have been missed. However, the 2019 bushfire smoke levels at Geeveston were comparable to those from the coal mine fire.

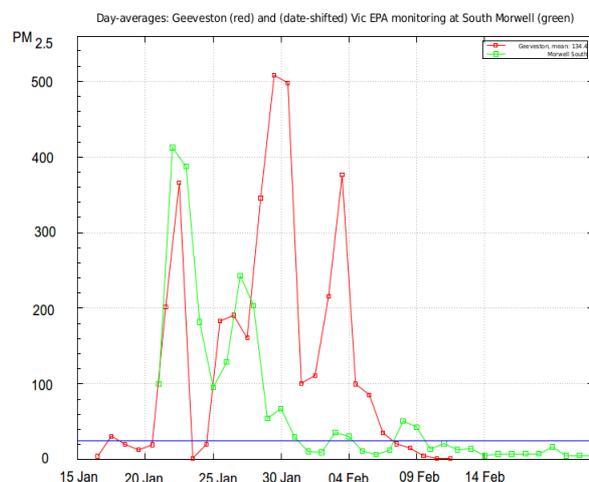


Illustration 4: Comparison of day-averaged  $PM_{2.5}$  from Geeveston, January 2019, and the (date-shifted)  $PM_{2.5}$  measured at Morewell South during the Hazelwood coal mine fire by EPA Victoria.

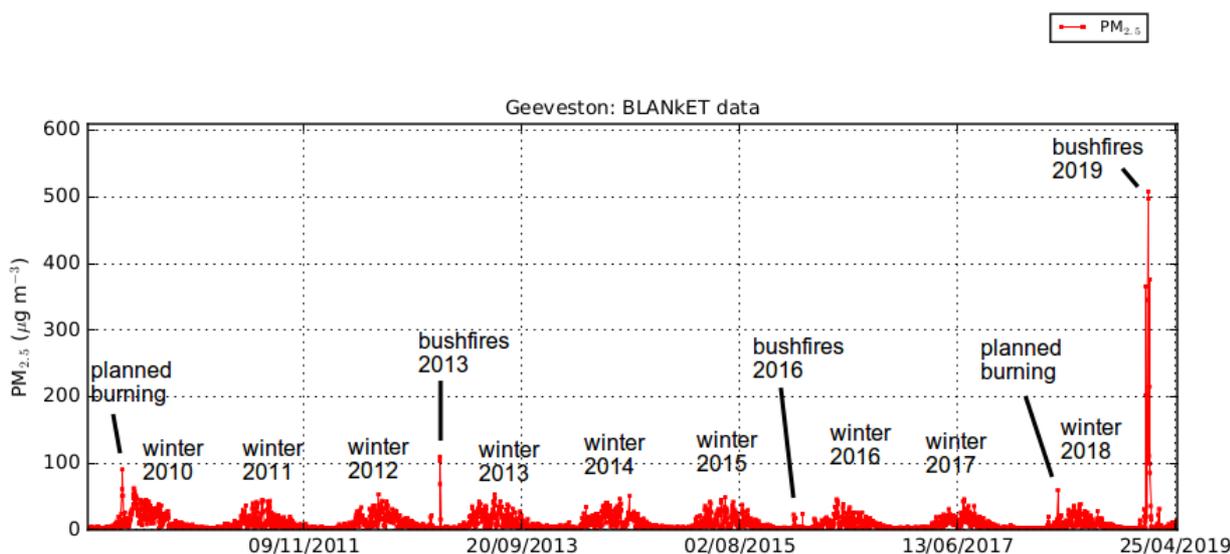


Illustration 3: Time-series of day-averaged  $PM_{2.5}$  for Geeveston station, 2010 to early 2019.