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The Hon. Bob Baldwin MP
Parliamentary Secretary for the Minister to Environment
PO Box 6022
House of Representatives
Parliament House
CANBERRA ACT 2600

Dear Mr Baldwin

Re: My three recommendations for your new panel, appointed to review official national temperature records

Congratulations on your recent appointment as Parliamentary Secretary for the Minister to Environment, with particular responsibilities for the Bureau of Meteorology.

I note that you have moved quickly to appoint a panel to review the Bureau of Meteorology's official national temperature records, including to improve public confidence in the wake of concerns about the Bureau's treatment of historic data.

I use historic temperature data from many locations across Australia in my ongoing research concerned with long-range rainfall forecasting, so I am very familiar with individual records for many locations. These individual data series tend to show cycles of warming and cooling. For example: some warming along the east coast from about 1860 to 1900, cooling from about 1910 to 1950, followed by warming from about 1960 to 2000. Yet the official overall trend, as reported by the Bureau, is one of continuous warming. Of course, the average of many individual stations, which is the national trend, should be broadly consistent with trends at individual stations, but it is not. This is because of what could be loosely termed "creative accounting practices" used by the Bureau in both the homogenisation of data to remodel individual series, and also the choice of

stations and time periods when the individual series are combined to calculate a national average for each year.

I make the following three recommendations to the new panel that, if implemented by the Bureau, would make the overall official national temperature trend for Australia more consistent with history, and reasonable accounting practices.

1. Use the same locations when calculating average mean temperatures for different years.

The national average temperature is calculated from a set of just 104 weather stations, but these same 104 locations are not used every year. In particular, hotter places are added later in the time series, which currently begins in 1910. For example, Wilcannia is a very hot town in western NSW. There is a long continuous maximum temperature record for Wilcannia that extends back to 1881, but the Bureau only adds Wilcannia into the mix from 1957.

Obviously, if the national average temperature is calculated from a mix of hotter locations in the 1990s, than say in the 1920s, then it will appear that Australia was hotter in the 1990s, even if the temperatures at individual weather recording stations were the same during these two periods. In fact, continuing with Wilcannia as just one example, temperatures were a bit hotter at Wilcannia in the 1920s (mean maximum monthly temperature January 1920 to December 1929 was 26.9 degree Celsius) than during the 1990s (mean maximum monthly temperature January 1990 to December 1999 was 26.5 degree Celsius).

2. Start the official record from 1880, not 1910, thus including the hot years of the Federation drought in the official record.

At the moment the Bureau begins the official record in 1910. It is variously claimed this is because the first year Stevenson screens were installed is 1910, or that this is the year from which all Stevenson screens were installed. In fact, Stevenson screens were installed at some locations used to calculate the national average temperature from as early as 1880, and at other locations as late as 1971.

The Bureau has also persisted with misinformation about the lack of temperature recordings from Western Australia before 1910. It has continued to ignore correspondence from me seeking clarification that in

fact: temperatures were recorded in Stevenson screens at Geraldton, Rottnest, Bunbury, York and Albany from 1880 and at a further ten regional centres in Western Australia from 1895.

In starting the record in 1910 the Bureau in effect excludes the very hot years of the Federation drought (1895 to 1903) from the official record. We know from many newspaper reports, as well as unofficial temperature recordings, that January 1896 was exceptionally hot across Australia, with residents evacuated by train from many parts of western NSW because of the soaring temperatures. At places like Wilcannia, for example, there was a well-documented spike in burials at the local cemetery in January 1896.

3. Don't make adjustments to temperature series unless an irregularity exists in the original series that was caused by a known, documented change in the equipment at that weather recording station, and/or a known change in the siting of the equipment.

I acknowledge that it is sometimes necessary to make adjustments to the actual recorded temperature in order to create one continuous long series. For example, there are only a few dozen places in Australia like Wilcannia where temperatures have been recorded in the same place, and with the same equipment, for a very long period of time. At the nearby location of Bourke, for example, the temperatures were first recorded at a telegraphic office, then at the local post office, and more recently at the airport. Because there was a period of overlap, when temperatures were recorded at both the airport and post office, it is evident that on average the temperature is about 0.3 degree Celsius hotter at the airport. It would be reasonable to thus homogenise the record accordingly, and the Bureau does this. But it is nonsense for the Bureau to subtract 0.35 degrees from the maximum temperature record for Bourke from 1953, and to add 0.42 degrees to the record from 1914 because there was no equipment change or site move at these times. According to the relevant documentation, these changes are made to the record at Bourke because of statistical discontinuities calculated from temperatures measured as far away as Bathurst, which is over 500 kilometres to the southeast and in a different climatic zone.

These types of arbitrary and illogical adjustments are made to the majority of the 104 temperature series from which the national average temperature is variously calculated. I understand this method of homogenisation is considered world's best practice within the mainstream climate science community, and is the same methodology used by NASA to

determine that 2014 was the hottest year on record globally. But to the thinking scientist, statistician, mathematician and/or accountant, unaffected by group think and the appeal of anthropogenic global warming, I would suggest it's indefensible.

In conclusion, while the Bureau professes to use world's best practice in the construction of temperatures series that ostensibly show run-away global warming, the techniques employed could perhaps be better described as designed to exclude the hot years of the Federation drought, negate the cooling evident across much of the continent from 1910 to 1950, and exaggerate recent warming from at least 1970 to 2000. That many senior managers at the Bureau have built their careers on the notion that temperatures will continue to increase, and are recorded in the Climategate emails as believing in the need to continually reinforce to the public that temperatures will continue to increase irrespective of the evidence, means the committee has a mighty job restoring some integrity to the official national temperature record. Indeed, I believe this will only be possible when there is cultural change at the Bureau, and within the climate science community more generally. I nevertheless wish you, and the new panel all the best in this most important endeavour.

Yours sincerely

Dr Jennifer Marohasy
Research Scientist

Copies: Dr Ron Sandland as Head of the Panel, Dr Dennis Jensen MP and Mr George Christenson MP as members of the National Parliament particularly interested in homogenization, Graham Lloyd as Environmental Editor at The Australian, Ben Cubby as Deputy Editor at the Sydney Morning Herald, Luke Grant at radio 2GB, and other media, Jo Nova at JoanneNova.com and other bloggers, those thinking souls subscribed at JenniferMarohasy.com, and also Facebook and Twitter friends.