Climate Indicators Summary
October 2017
PMNM Climate Change Working Group

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Good news - 2017 has shown some slight moderation from the successive record hot years of 2015 and 2016

Bad news – this is still the second-hottest year ever recorded
Land & Ocean Temperature Departure from Average Jun 2017–Aug 2017
(with respect to a 1981–2010 base period)

Data Source: GHCN–M version 3.3.0 & ERSST version 4.0.0

[Map of global temperature departures with color scale from -5 to 5 degrees Celsius]

National Centers for Environmental Information
Wed Sep 13 07:28:56 EDT 2017

Please Note: Gray areas represent missing data
Map Projection: Robinson
Land & Ocean Temperature Departure from Average Aug 2017
(with respect to a 1981–2010 base period)

Data Source: GHCN–M version 3.3.0 & ERSST version 4.0.0

You are here

Degrees Celsius

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Map Projection: Robinson
Digression #1 – The West is burning

September smoke plume from Montana fires reaches to Lake Erie

Larger fires are linked to long-term U.S. trend of drier West and wetter East
Meanwhile, summer sea ice extent at both poles tracks near the lowest values ever seen in the satellite record.

3rd lowest extent ever recorded in the Arctic, 2nd lowest extent in the Antarctic.
Arctic sea ice thickness is also anomalously low, facilitating loss by melt.

Darker blue color indicates thinner ice pack.
The implications for the Monument, if any, are unknown.
Global Sea Surface Temperature Anomaly – 3 August 2017
Sea Surface Temperature Anomaly, Hawaii Sector – 3 August 2017
Currently running 1-2 °C above average throughout the archipelago.
Note the concentration of ocean heat northeast of the Hawaiian Islands

This was predicted by NOAA models
Experimental product indicates a 100% chance of some degree of thermal stress for reefs in the southeast portion of the Monument through the end of the year, as well as for the main Hawaiian Islands.

Some coral bleaching is currently being observed on Oahu.
60% Stress Level Probability – October 2017 - January 2018

90% Stress Level Probability – October 2017 - January 2018
Digression #2 – An exceptionally active Atlantic hurricane season

By contrast, cyclone formation in the Pacific has been below average. El Nino years suppress cyclone formation in the Atlantic, enhance it in the Pacific.
Looking Forward

An ensemble of 25 climate models predicts mild La Nina or ENSO neutral conditions through spring 2018.

There is no current indication of an El Nino recurrence anytime soon.
Conclusions

2017 shows some slight moderation from the global trend of record hot years, both on land and in the ocean, but is still the second-hottest year ever recorded. The years 2015-2017 were the three warmest on record, which may eventually exert cumulative thermal stress on the Monument’s terrestrial ecosystems, potentially affecting seabird nesting.

ENSO-neutral conditions currently prevail, and are predicted to continue. The risk of hurricanes is therefore less than in the past two years.

Reefs in the Monument suffered thermal stress over the summer, and there is a 90% chance of minor thermal stress continuing from now through January 2018. The ocean surrounding the Monument retained more heat than anywhere else in the Pacific – but the extent coral of bleaching, if any, is not yet determined.

Local cyclogenesis is unlikely through the remainder of 2017. Waning of El Nino resulted instead produced a strong Atlantic hurricane season.

Sea level continues to rise at 3-5 mm per year. Inundation is a long-term problem that will not go away.
Questions?