Climate Indicators Summary
October 2018
PMNM Climate Change Working Group

Dan A. Polhemus
U. S. Fish & Wildlife Service
Honolulu, HI
2018 shows a slight abatement from record heating trends

Only the 4th hottest year on record so far
Land & Ocean Temperature Departure from Average Jun 2018–Aug 2018
(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

National Centers for Environmental Information
Thu Sep 13 04:19:57 EDT 2018

Please Note: Gray areas represent missing data
Map Projection: Robinson
Land–Only Precipitation Percentiles Jun 2018–Aug 2018
NOAA’s National Centers for Environmental Information
Data Source: GHCN–M version 2
Digression #1 – The current summer looks a lot like an El Nino year

A spate of cyclogenesis occurred from August onward in the Eastern Pacific

Hurricane Lane, 22 August 2018

Hurricanes Norman and Olivia, 5 September 2018
Hurricane Walaka passed through the Monument a week ago

Tracked close to Johnston Atoll, then through the French Frigate Shoals sector on 3 October 2018

Although the system was weakening, winds may have been near 120 knots (138 mph)

No instrumentation at FFS

No impact assessment currently available
Global Sea Surface Temperature Anomaly – 7 May 2018
Sea Surface Temperature Anomaly, Hawaii Sector – 7 May 2018

NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3) 8 May 2018

[Map showing sea surface temperature anomalies with color scale and grid]

No Data
Ice

Temperature Scale:
-5 -4 -3 -2 -1 0 0.2 1 2 3 4 5 °C
Sea Surface Temperature Anomaly, Hawaii Sector – 19 Oct. 2018

NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3.1) 9 Oct 2018
Degree Heating Weeks – 7 May 2018

NOAA/NESDIS Degree Heating Weeks for last 12 Weeks – 5/7/2018
Experimental product indicates near zero probability of significant thermal stress for Monument reefs from now through January 2019
Digression #2 – A warmer atmosphere holds more water

Hurricane Lane was the second-wettest tropical cyclone in U.S. history.

The wettest ever was Hurricane Harvey in Texas – just last year.

72 Hour Rainfall totals from Hurricane Lane

National Weather Service Honolulu

August 25th, 2018
Issued at 11am HST

Storm total of 52 inches of rain in Mountain View on Big Island

Rainbow Falls at Hilo – before and after
The Carolinas were wet as well

Hurricane Florence dumped enough rain on the Carolinas to fill Chesapeake Bay.

Pacific and Atlantic hurricane seasons are no longer alternating in intensity.
- A warm Atlantic now drives its own cycle.

In November, Wilmington, North Carolina ended up with a storm total of 35.12 inches of rain.

This has enormous impacts in a continental setting.
Digression #3 - it is not wet everywhere: the American West is very dry

On the Colorado River, Lake Mead is only 38% full, and Lake Powell is only 45% full.
The Colorado River basin has now been in some form of drought for 20 years.
Looking Forward

Conclusions

2018 has shown some abatement from the recent trend of record hot years. The ocean surrounding Hawaii is not carrying the same amount of heat as in 2017.

ENSO-neutral conditions currently prevail, but may change to El Niño by fall. 65-70% chance of El Niño development this winter. Recent local cyclogenesis is consistent with El Niño development. This could produce drier than average winter conditions in the Monument.

There is a near zero chance of significant thermal stress to the Monument’s coral reefs from now through early 2019. Ocean heating is instead occurring to the south of us, in the Central Pacific.

Local cyclogenesis occurred in the Eastern Pacific from August onward. Hurricane Walaka passed directly through the Monument near FFS as a Category 3 hurricane with winds potentially in excess of 130 mph.

Sea level continues to rise at 3-5 mm per year. Inundation is a long-term problem that will not go away, and may increase over time depending on rates of ice sheet melt in Greenland and Antarctica.