2016 Outlook on Coral Bleaching: El Niño, the guest overstaying his welcome

Dr. C. Mark Eakin
NOAA Coral Reef Watch
http://coralreefwatch.noaa.gov
2015: Warmest Year Ever – Again

Land & Ocean Temperature Percentiles Jan–Dec 2015
NOAA’s National Centers for Environmental Information
Data Source: GHCN–M version 3.3.0 & ERSST version 4.0.0

http://www.ncdc.noaa.gov/sotc/global/201512
2015: Warmest Year Ever – Again

Year-to-Date Global Temperature
for 2015 and the other six warmest years on record

http://www.ncdc.noaa.gov/sotc/global/201512

NOAA’s National Centers
for Environmental Information

http://www.ncdc.noaa.gov/sotc/global/201512
2015 Hawaiʻi Bleaching

Kahului Point, Maui, Hawaii - 28th August 2015

Kahului Point, Maui, Hawaii - 6th November 2015
Global Bleaching: Last Half of 2014

NOAA Coral Reef Watch Annual Maximum Satellite Coral Bleaching Alert Area 2014

- No Stress
- Watch
- Warning
- Alert Level 1
- Alert Level 2

Hawaii
Guam & Marianas
Marshall Islands
Florida

http://coralreefwatch.noaa.gov
Global Bleaching: 2015

NOAA Coral Reef Watch Annual Maximum Satellite Coral Bleaching Alert Area 2015

- No Stress
- Watch
- Warning
- Alert Level 1
- Alert Level 2

Regions of Interest:
- Hawai‘i
- PNG and Solomons
- Kiribati
- Panamá
- Galápagos
- Samoas
- Fiji

http://coralreefwatch.noaa.gov
2015 Caribbean Bleaching

NOAA CRW 5-km Night-Only Bleaching Alert Area Year-to-date Maximum 27 Nov 2015

2015 Bleaching in:
- Florida
- Cuba
- Bahamas
- Turks & Caicos
- Cayman Islands
- Dominican Republic
- Haiti
- Bonaire

Cory Walter
MOTE
Cayman Islands
Rupert Ormond
Heriot-Watt Univ.
June 2014-December 2015 Thermal Stress

Global Reefs:
• 32% exposed to Alert Level 1 or 2
• ~100% stressed

US Reefs:
• 72% exposed to Alert Level 1 or 2
• 100% stressed

http://coralreefwatch.noaa.gov
Global Bleaching: Early 2016

NOAA CRW 5-km Night-Only Bleaching Alert Area Year-to-date Maximum 15 Feb 2016

Map showing bleaching alert areas in Western India, Seychelles, and Heron Island.
Global Bleaching: Early 2016

Seychelles
Heron Island
(Herion Island, Jan 30, 2016, R. Vevers)
Global Bleaching: Early 2016

NOAA CRW 5-km Night-Only Bleaching Alert Area Year-to-date Maximum 15 Feb 2016

Map showing the bleaching alert areas with various colors indicating different levels of alert. The areas highlighted include Heron Island, Fiji, New Caledonia, and Kiribati.
Global Bleaching: Early 2016

NOAA CRW 5-km Night-Only Bleaching Alert Area Year-to-date Maximum 15 Feb 2016

Votua Village, 
(Feb. 10, 2016, V. Bonito)
FISHHERIES

Fish Kills: Unprecedented temperature threatens marine eco-system

Lice Movono-Rova

February 9, 2016 | 4:14 pm

Thousands of dead fish are washing up on the shores of Coral Coast as a result of the recent high temperature, with a local expert saying reefs could lose a significant amount of coral if seawater temperatures remain high.
Who’s the Biggest El Niño?

Monthly ERSSTv4 Niño3.4 index values

Niño3.4 index values

2015–16

1997–98

Jan Mar May Jul Sep Nov Jan Mar May Jul

https://www.climate.gov/news-features/blogs/enso/
El Niño Forecast

Mid-Jan 2016 Plume of Model ENSO Predictions

Dynamical Model:
- NASA GMAO
- NCEP CFSv2
- JMA
- SCRIPPS
- LDEO
- AUS/POAMA
- ECMWF
- UKMO
- KMA SNU
- IOCAS ICM
- COLA CCSM3
- MetFRANCE
- SINTEX-F
- GFDL CM2.1
- CMC CANSIP
- GFDL FLOR

Statistical Model:
- CPC MRKOV
- CDC LIM
- CPC CA
- CPC CCA
- CSU CLIPR
- UBC NNET
- UCLA-TCD
- UNB/CWC

1997-98 El Niño

1998-99 La Niña

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.html
Bleaching Risk Through May 2016
Likely to Return to Indian, Eastern Pacific

2016 Feb 16 NOAA Coral Reef Watch 60% Probability Coral Bleaching Thermal Stress for Feb–May 2016
Experimental, v3.0, CFSv2–based, 28–member Ensemble Forecast

Potential Stress Level:  
- Watch
- Warning
- Alert Level 1
- Alert Level 2

http://coralreefwatch.noaa.gov
June 2014-June 2016 Thermal Stress

Global Reefs:
• 32% → 62% exposed to Alert Level 1 or 2
• ~100% → 100% stressed

US Reefs:
• 72% → 73% exposed to Alert Level 1 or 2
• 100% stressed
Bleaching Risk: June Through August 2016 Likely to Return to Southeast Asia, Caribbean

2016 Feb 16 NOAA Coral Reef Watch 60% Probability Coral Bleaching Thermal Stress for Jun–Aug 2016
Experimental, v3.0, CFSv2–based, 28–member Ensemble Forecast

Potential Stress Level: Watch Warning Alert Level 1 Alert Level 2

http://coralreefwatch.noaa.gov
Questions?

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