

NOAA Coral Reef Watch
Seasonal Coral Bleaching Thermal Stress Outlook
(Experimental product, 2x2 degree spatial resolution)

Analysis of September 2010 Coral Bleaching Thermal Stress and Seasonal Guidance Through December 2010

[Note: The Bleaching Outlook discussed below is an experimental product and should be used as an indicator of potential general patterns rather than a precise predictor of thermal stress at any location. Actual conditions may vary due to model uncertainty, subsequent changes in climatic conditions, extreme localized variability, or weather patterns.]

SUMMARY:

The NOAA Coral Reef Watch (CRW) [satellite coral bleaching monitoring](#) shows sea surface temperatures (SSTs) continue to remain above average throughout the wider Caribbean region. Large areas of the southeastern Caribbean Sea are experiencing thermal stress capable of causing coral bleaching. The western Gulf of Mexico and the southern portion of the Bahamas have also experienced significant bleaching thermal stress. The CRW Coral Bleaching Thermal Stress Outlook (Figure 1) indicates that the high stress should continue to develop in the southern and southeast Caribbean [until mid-October](#). Bleaching stress in the western Gulf of Mexico and southern Bahamas should dissipate quickly in the next couple of weeks.

2010 Sep 07 NOAA Coral Reef Watch Coral Bleaching Thermal Stress Outlook for Sep-Dec 2010
(Version 2, Experimental)

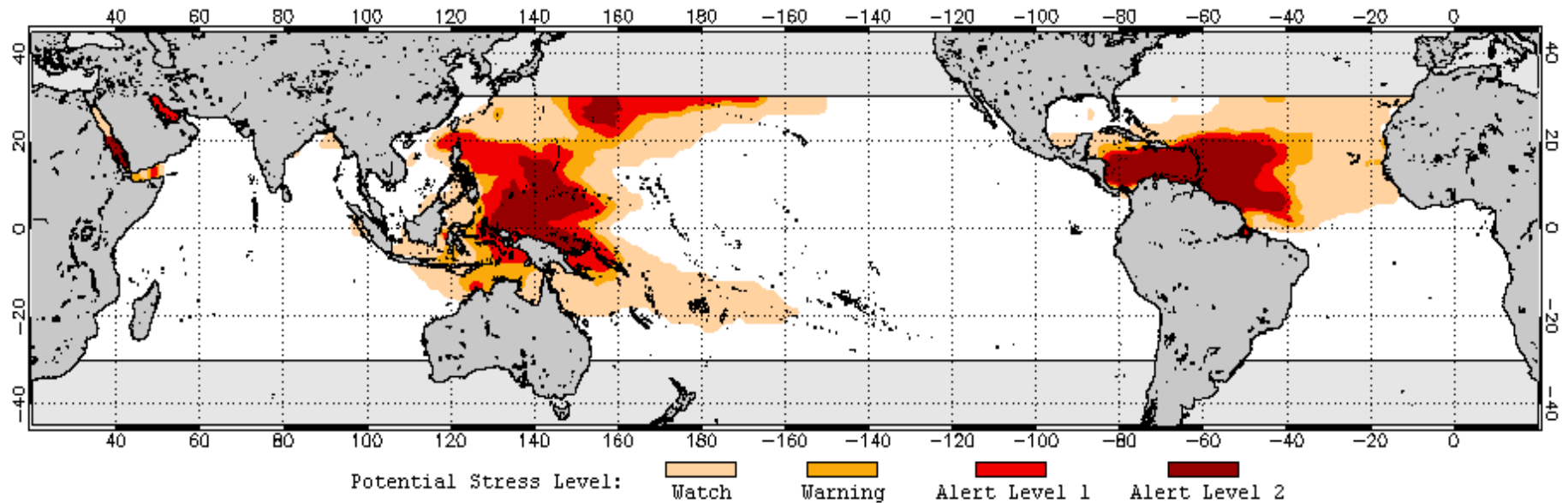


Figure 1. Global Coral Bleaching Thermal Stress Outlook for September-December 2010, issued on September 7, 2010.

According to the CRW Bleaching Alert Area (Figure 2), there is currently bleaching-level thermal stress around a large region in the northwestern Pacific, but except for the eastern coast of Japan, the high-stress areas are outside of areas where corals occur. The high thermal stress previously centered on the Philippines has mostly dissipated. Some areas around the Northwestern Hawaiian Islands, the Philippines, and Palau continue in a Bleaching Watch status. The outlook (Figure 1) shows that the thermal stress in the northwestern Pacific is expected to shift south [starting in October](#) as the northern hemisphere summer ends. There is a potential for bleaching-level stress [through November](#) in a region centered to the south of Guam and extending from Palau to Chuuk. We will continue to watch the potential for thermal stress around Papua-New Guinea later in the year.

Most of the southern hemisphere and the entire Indian Ocean basin are expected to remain free from significant bleaching thermal stress through December 2010 (Figure 1).

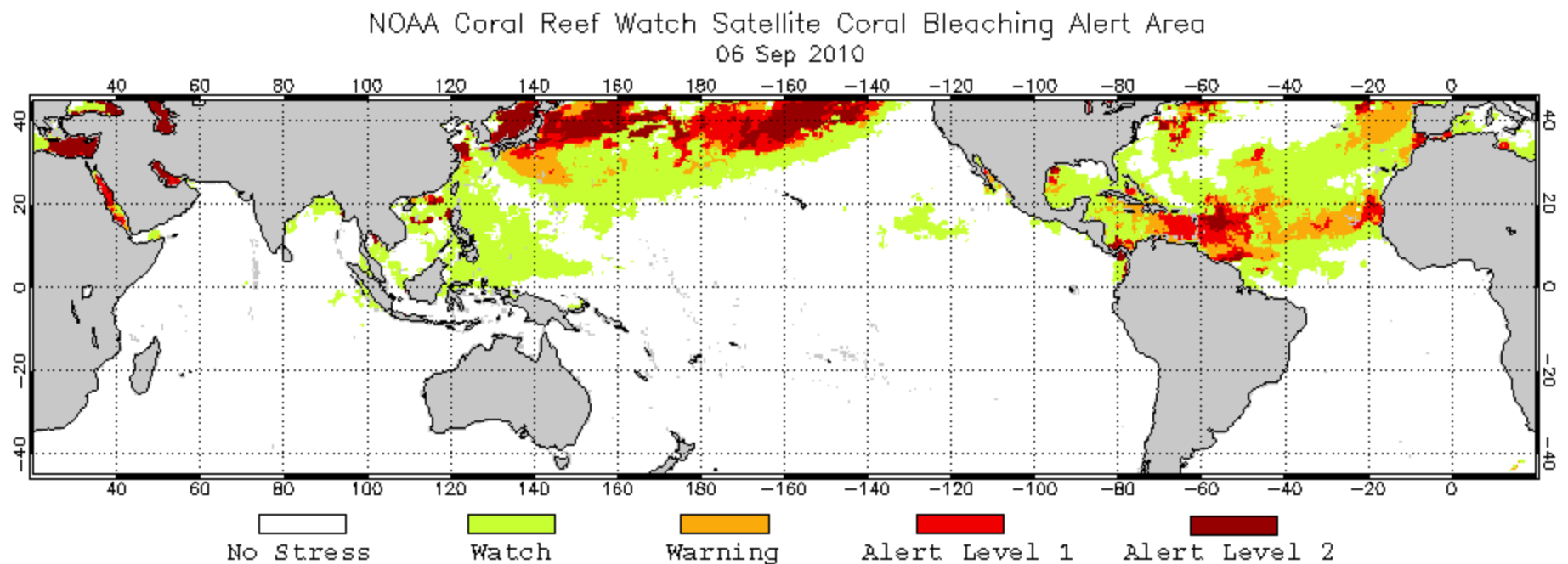


Figure 2. Global Coral Bleaching Thermal Stress Alert Area of September 6, 2010.

Analysis and Outlook for Caribbean, Gulf of Mexico and Bahamas

Current conditions:

The CRW satellite monitoring shows that thermal stress levels capable of causing bleaching have continued to develop in the southeastern Caribbean since July (Figure 3), bearing a similar signature to the thermal stress observed at the same time period in 2005 (Figure 4), the year of a record mass coral bleaching event. The highest thermal stress currently spans the entire Lesser Antilles, from Montserrat to Tobago. Lower levels of stress extend westward across the northern coast of Venezuela, and high stress is also found on the Caribbean coast of Panama and Costa Rica.

NOAA/NESDIS Degree Heating Weeks for last 12 Weeks – 9/6/2010

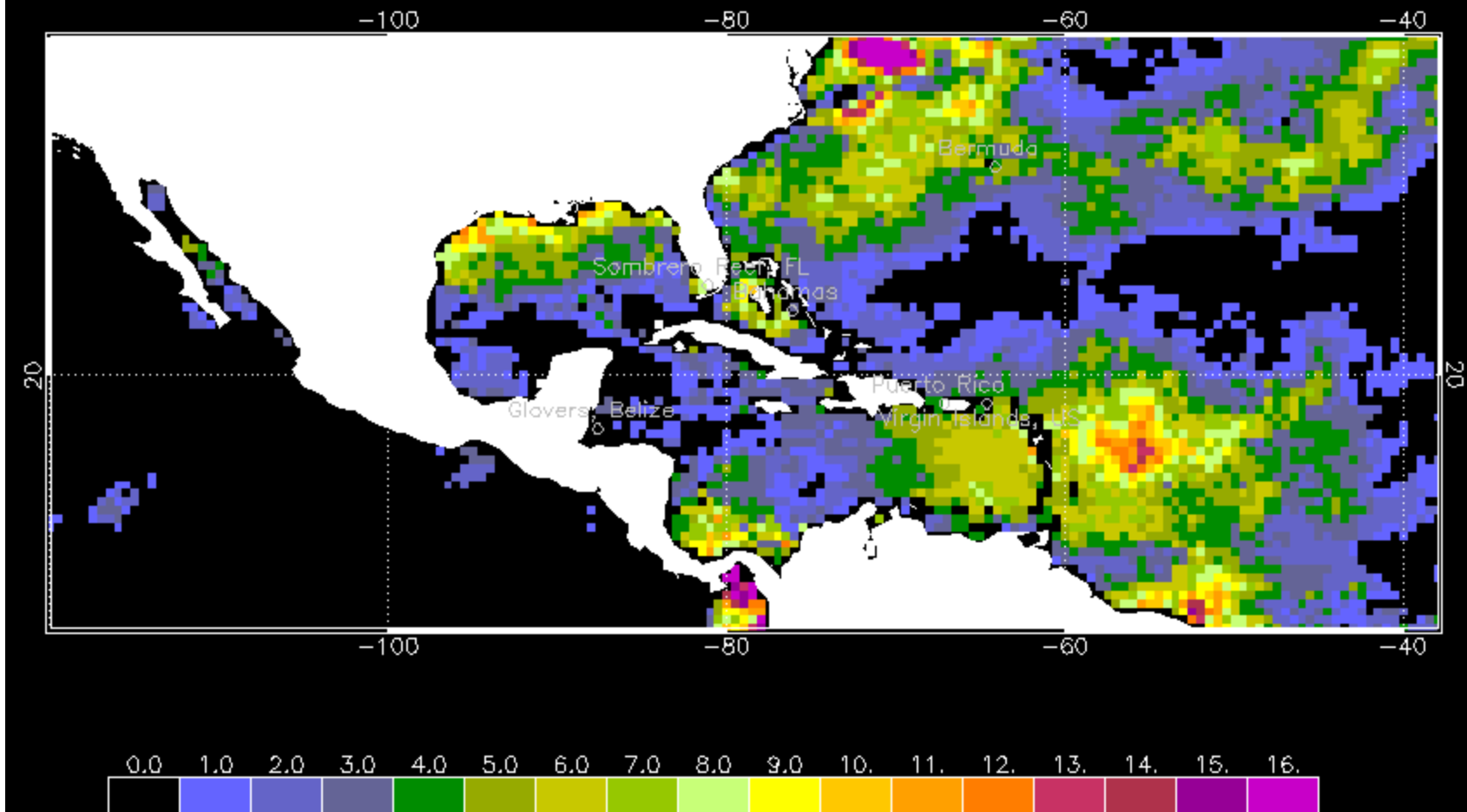


Figure 3. Degree Heating Weeks as of September 6, 2010, in the Caribbean region.

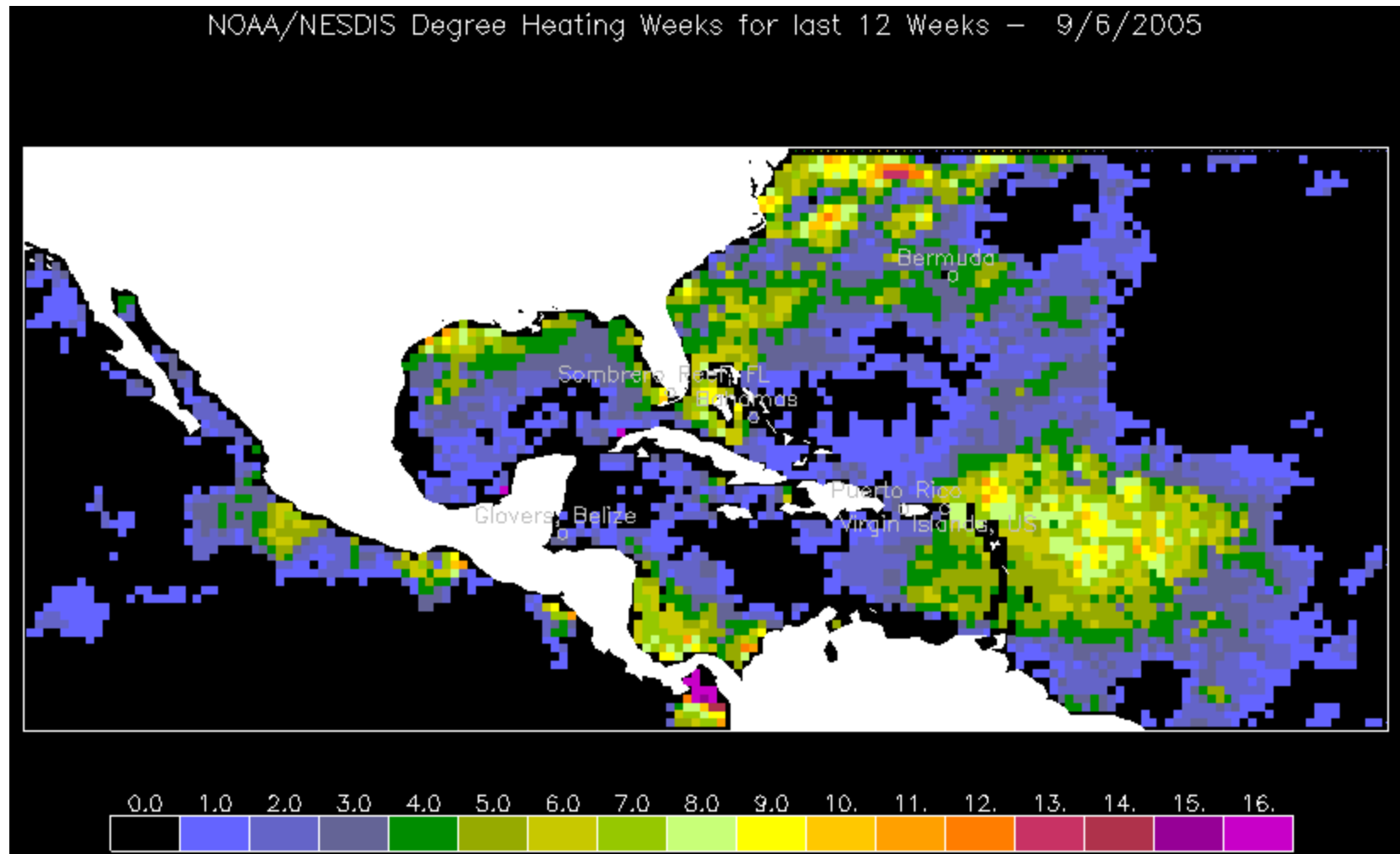


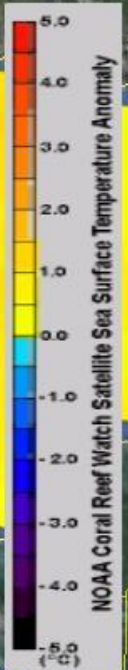
Figure 4. Degree Heating Weeks for the same date in 2005.

The bleaching stresses in the western Gulf of Mexico and southern Bahamas are still lingering. Earlier stress in Florida, northern Bahamas, and the Greater Antilles has eased, partly due to recent tropical weather. Hurricane Earl left a clear track of cooler water north of the region (Figure 5) including reports of cool water at depth in the US Virgin Islands, and other weather disturbances have cooled temperatures from Texas to the Virgin Islands. Mixing and cooling from a hurricane can reduce thermal stress to a reef and prevent severe bleaching ([Manzello et al., 2007*](#)). Bleaching has been reported in Tobago to the south and mild bleaching in the US Virgin Islands to the north.



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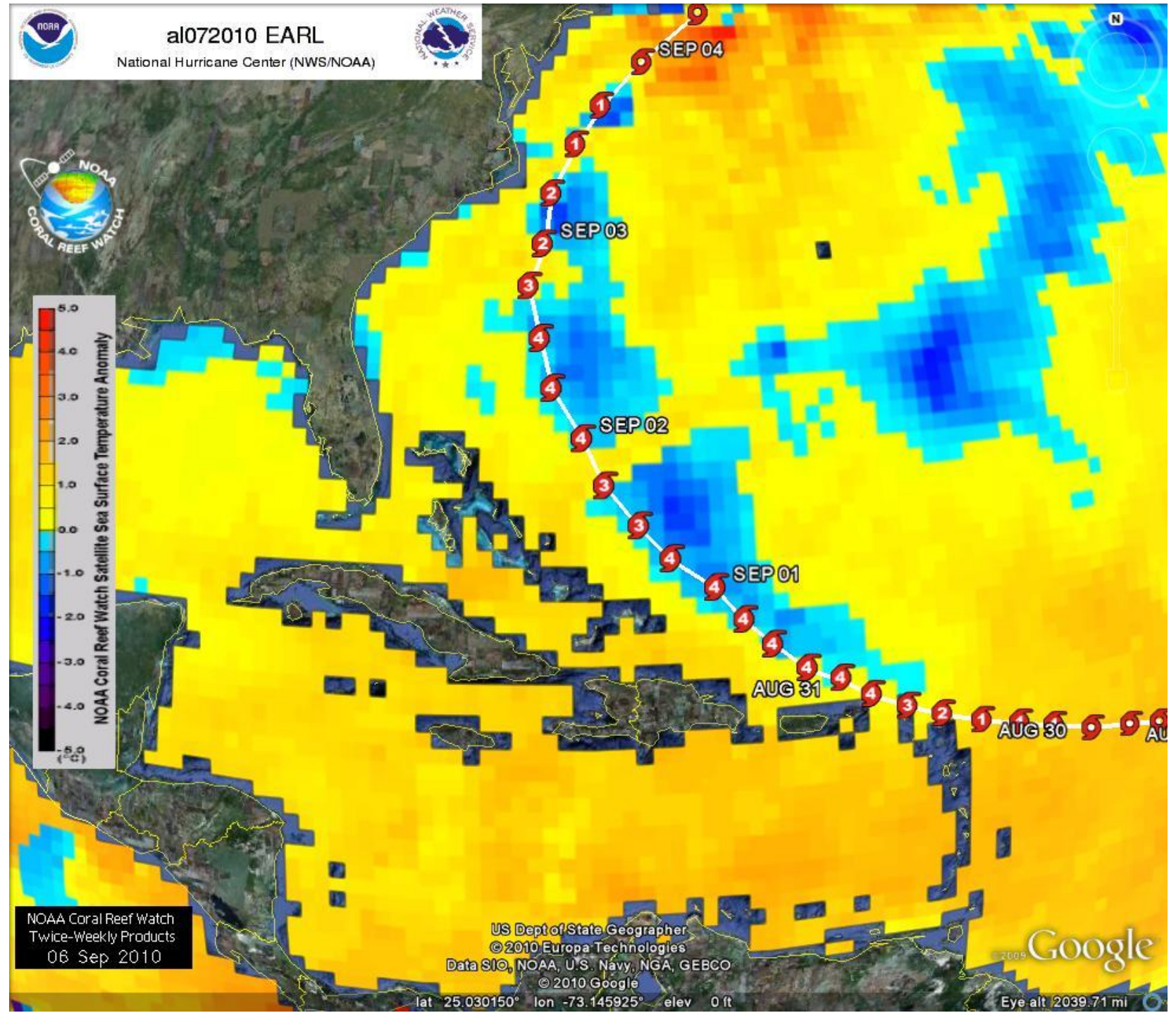
NOAA Coral Reef Watch
Twice-Weekly Products
06 Sep 2010

US Dept of State Geographer
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lat 25.030150° lon -73.145925° elev 0 ft

Eye alt 2039.71 mi





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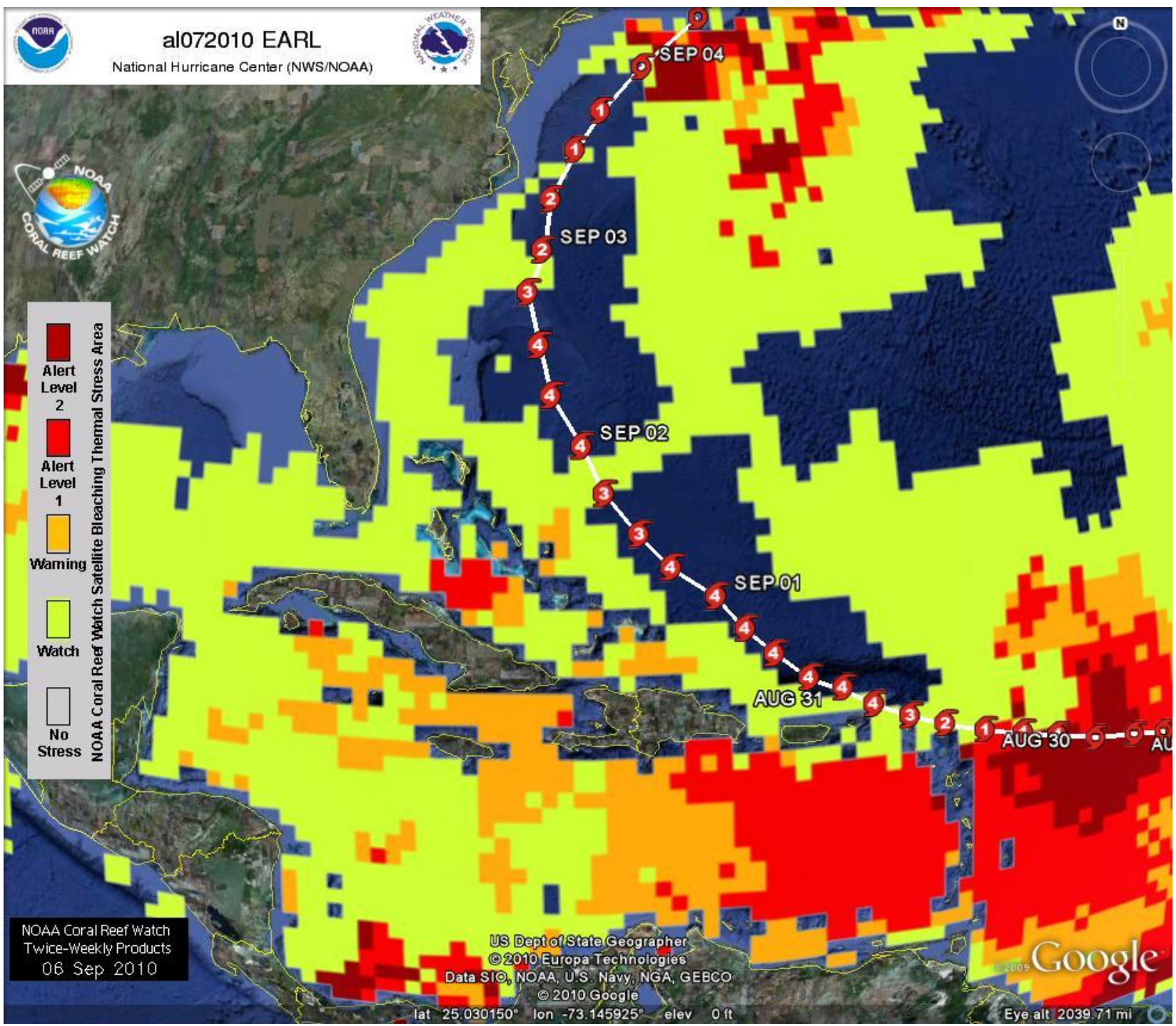


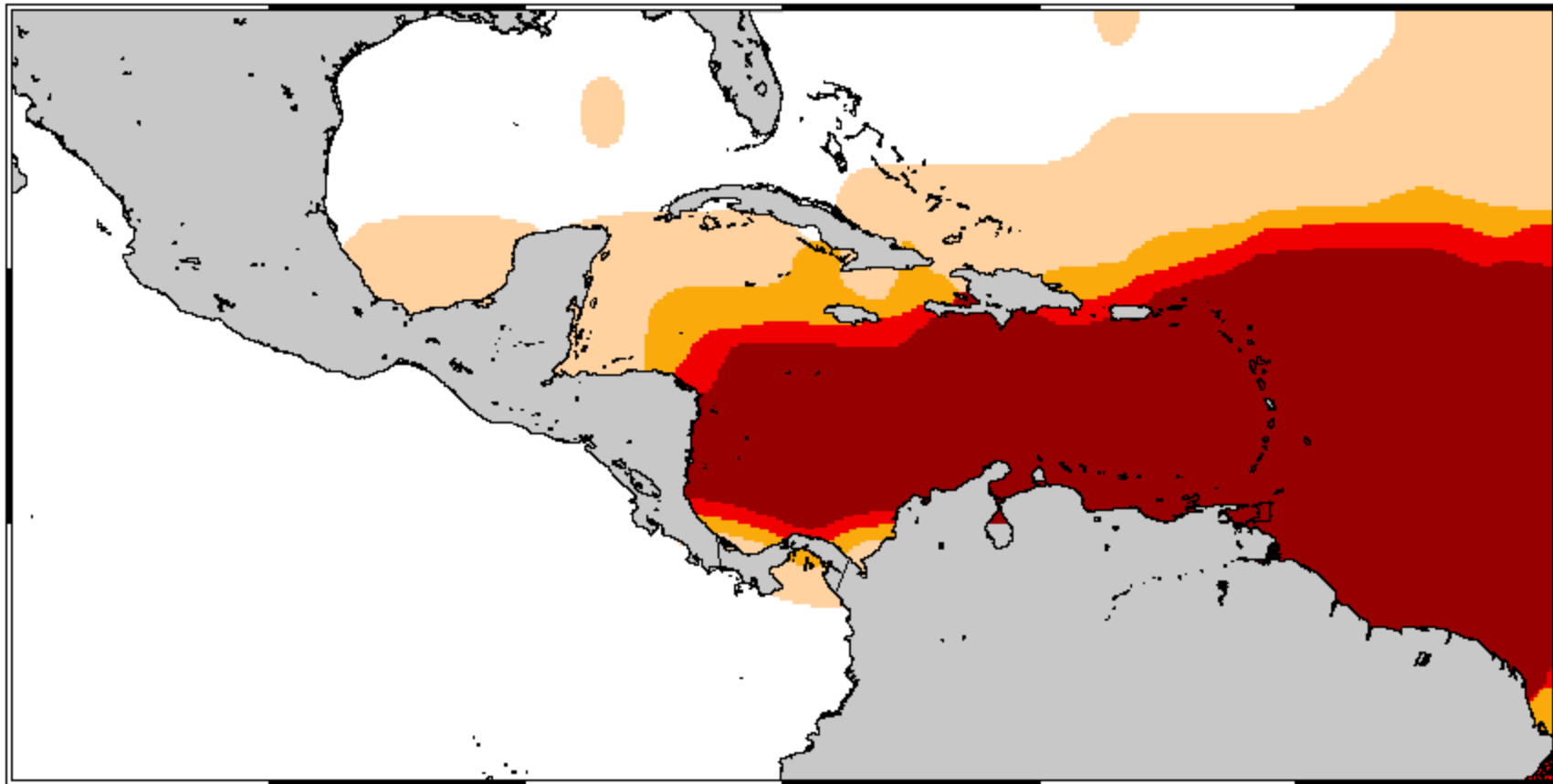
Figure 5. SST Anomaly from September 7, 2010 (top panel) showing cooler water in the wake of Hurricane Earl (Hurricane track from the National Hurricane Center (<http://www.nhc.noaa.gov/>)); Bleaching Alert Area from September 7, 2010 (bottom panel) showing the resulting dissipation of the bleaching thermal stress along the track. (Images from Google Earth.)

Bleaching outlook:

The CRW Coral Bleaching Thermal Stress Outlook continues to indicate a high potential for thermal stress capable of causing significant coral bleaching in the southern Caribbean in 2010 (Figure 6). The region at greatest risk fills the region east from Nicaragua past the island of Hispaniola to Puerto Rico and the Lesser Antilles, and south along the Caribbean coasts of Panama and South America. The intensity of the potential thermal stress is predicted to increase [through October](#). The Caribbean typically experiences elevated temperature during the second year of an El Niño event, with the 2009-2010 El Niño ending in May 2010. The region described here as having the highest potential to experience bleaching-levels of thermal stress is the same region that has been anomalously warm throughout 2010. The model is only slightly over-predicting the strength of the current thermal stress, adding to our confidence that this may be a severe bleaching event.

The lingering bleaching stress in the western Gulf of Mexico and southern Bahamas is expected to dissipate quickly in the next couple of weeks.

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

Figure 6. Caribbean Coral Bleaching Thermal Stress Outlook for September-December 2010, issued on September 7, 2010.

Analysis and Outlook for western Pacific:

Current conditions:

The thermal stress that caused bleaching in Southeast Asia and the Philippines has abated (Figure 7), but temperatures across much of the western tropical Pacific remain above normal at the moment. Some thermal stress has accumulated in the Northwestern Hawaiian Islands, and temperatures remain near the bleaching threshold in that region.

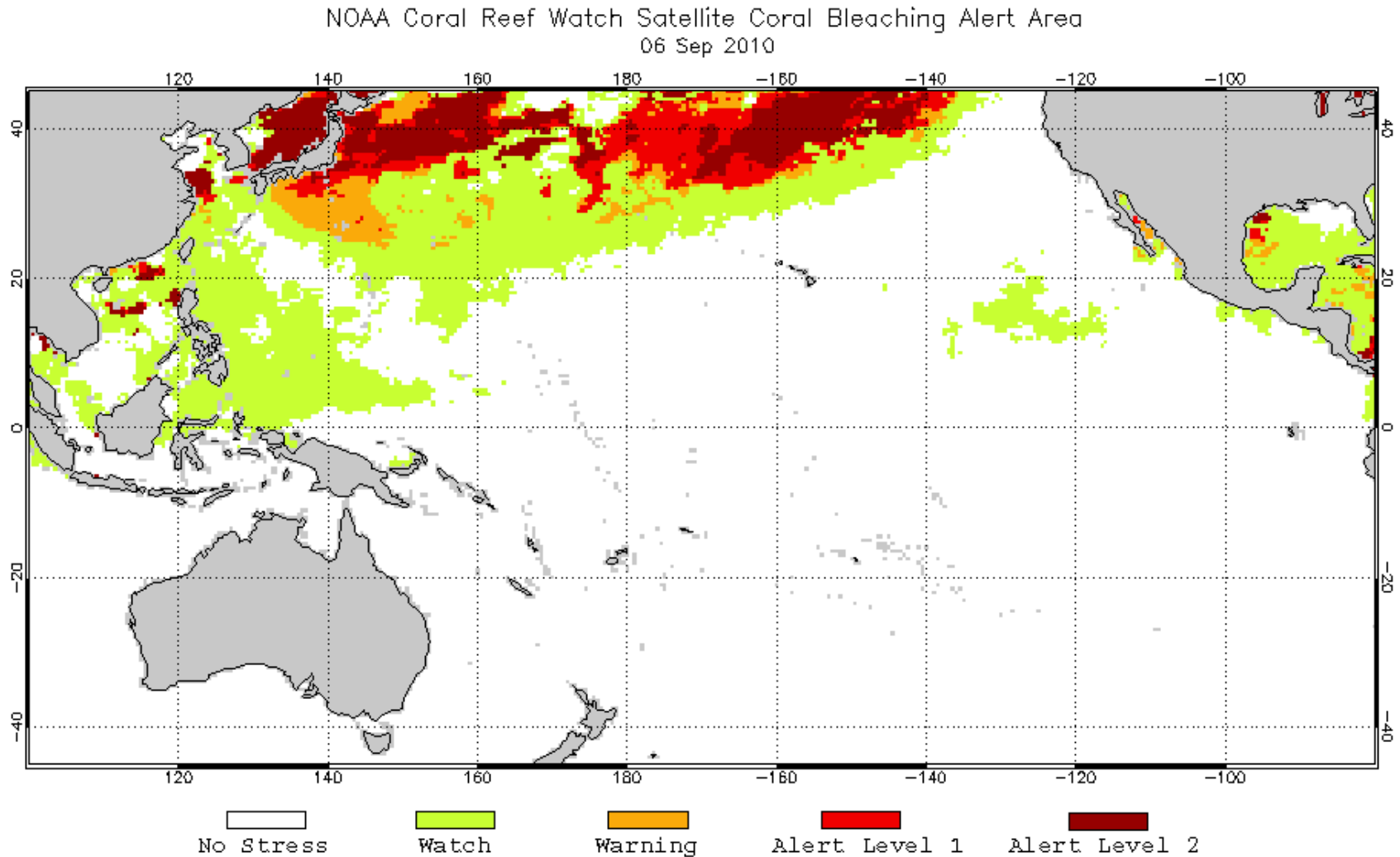


Figure 7. CRW satellite coral bleaching alert areas of September 6, 2010.

Bleaching outlook:

As the summer comes to an end in the northern hemisphere, our outlook (Figure 8) shows that the thermal stress in the northwestern Pacific is expected to shift south [starting in October](#). The outlook indicates that there is a potential for thermal stress capable of causing bleaching [through November](#) in the region south from the Northern Mariana Islands and Guam to the Federated States of Micronesia (FSM), extending from Palau to Chuuk. This may move to include the northern coast of Papua-New Guinea [in December](#). However, unlike conditions in the Caribbean, most of this western Pacific region has not yet warmed to bleaching levels. The model is over-predicting warming at this time, leading to a hope that bleaching will not be severe.

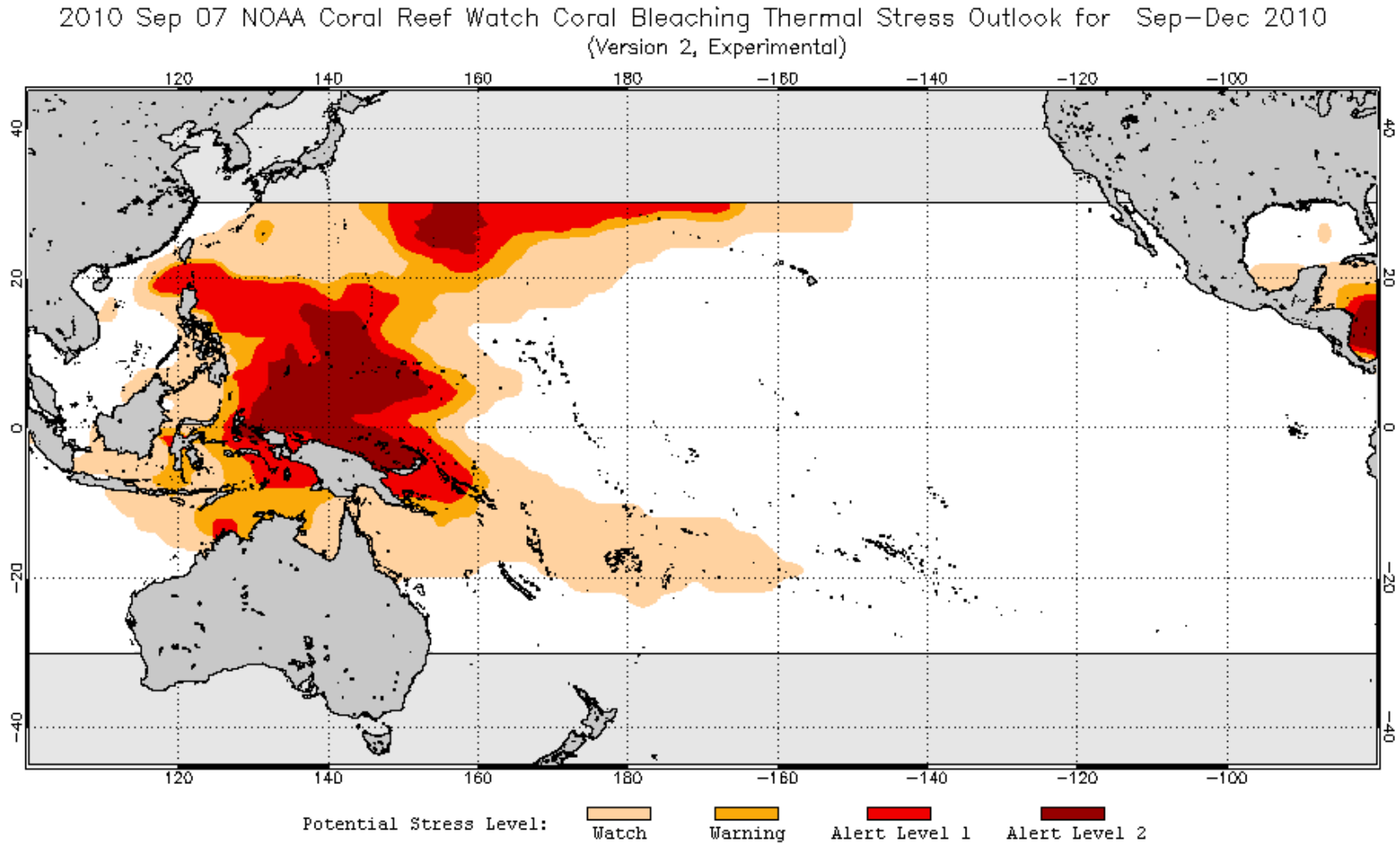


Figure 8. Pacific Ocean Coral Bleaching Thermal Stress Outlook for September-December 2010, issued on September 7, 2010.