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INSIGHT

2022 Hurricane Outlooks and 2021 Hurricane Season Review

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Many in Congress have expressed interest in increasing scientific understanding of tropical cyclones and improving forecasts to help their constituents prepare for the yearly hurricane season and potentially decrease a storm's impact on an individual or community. The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) is responsible for issuing tropical cyclone forecasts, including track, intensity, storm surge, and rainfall.

NOAA defines a *tropical cyclone* as a "rotating, organized system of clouds and thunderstorms that originates over tropical or subtropical waters and has a closed low-level circulation." According to NOAA, tropical cyclones include

- Tropical depressions—maximum sustained winds of ≤ 38 miles per hour (mph).
- Tropical storms—maximum sustained winds of 39-73 mph. NOAA typically names a storm once it reaches this strength.
- Hurricanes—maximum sustained winds of ≥ 74 mph, corresponding to at least a category 1 or 2 on the Saffir-Simpson Hurricane Wind Scale. Hurricanes may also be called *typhoons* or *cyclones*.
- Major hurricanes—maximum sustained winds of ≥111 mph, corresponding to a category 3, 4, or 5.

NOAA releases seasonal hurricane outlooks relevant to the United States, including the north Atlantic, eastern Pacific, and central Pacific Oceans, before each hurricane season begins. Such outlooks include information on potential named storms, hurricanes, and major hurricanes. The Atlantic and central Pacific seasons run from June 1 through November 30; the eastern Pacific season begins May 15. Tropical cyclones, however, may form outside of these time frames. In August, NOAA typically updates the Atlantic outlook but not the Pacific outlooks. Multiple nonfederal entities also publish outlooks. These forecasts rely, in part, on NOAA's collected and shared information.

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2022 Hurricane Season Outlooks

In May 2022, NOAA issued its initial 2022 Atlantic hurricane outlook (**Table 1**), indicating a 65% likelihood of an above-normal season rather than a near- (25%) or below-normal season (10%). The predicted number of named storms, hurricanes, and major hurricanes was similar to the number predicted in August 2021 for the 2021 Atlantic hurricane season. NOAA indicated that the higher level of activity is attributed to climate factors, such as the ongoing periodic cooling of sea surface temperatures in the central and east-central equatorial Pacific (La Niña phenomenon), warmer-than-average sea surface temperatures in the Atlantic Ocean and Caribbean Sea, weaker tropical Atlantic trade winds, and an enhanced West African monsoon system.

Table 1. 2022 Atlantic Hurricane Season: 1991-2020 Annual Averages and 2022 Outlooks

	1991-2020 Annual Averages	NOAA May 2022 Outlook	NOAA August 2022 Outlook
Named Storms	14	14-21	NA
Hurricanes	7	6-10	NA
Major Hurricanes	3	3-6	NA

Sources: NOAA, "Tropical Cyclone Climatology" (hereinafter, NOAA, "TC Climatology"); NOAA, "NOAA 2022 Atlantic Hurricane Season Outlook," May 24, 2022.

Notes: NA = not available. NOAA notes a 70% probability for each of the May 2022 outlook ranges of activity.

NOAA released its 2022 outlooks for the eastern (**Table 2**) and central Pacific hurricane seasons in May 2022. NOAA anticipated that both the eastern and central Pacific areas likely would experience below-normal seasons (60%) rather than near- (30%) or above-normal seasons (10%).

Table 2. 2022 Eastern Pacific Hurricane Season: 1991-2020 Annual Averages and 2022 Outlook

	1991-2020 Annual Averages	NOAA May 2022 Outlook
Named Storms	15	10-17
Hurricanes	8	4-8
Major Hurricanes	4	0-3

Sources: NOAA, "TC Climatology;" NOAA, "NOAA 2022 Eastern Pacific Hurricane Season Outlook," May 24, 2022.

Note: NOAA notes a 70% probability for each of the May 2022 outlook ranges of activity.

NOAA predicts two to four tropical cyclones in the central Pacific in 2022 (the average is four to five tropical cyclones per year).

2021 Hurricane Season

In May 2021, NOAA issued its initial 2021 Atlantic hurricane outlook (**Table 3**), indicating a 60% likelihood of an above-normal season rather than a near- (30%) or below-normal season (10%). In its August 2021 update, NOAA increased the likelihood of an above-normal season to 65%, adjusted the ranges of expected named storms and hurricanes, and retained its original number of major hurricanes (**Table 1**).

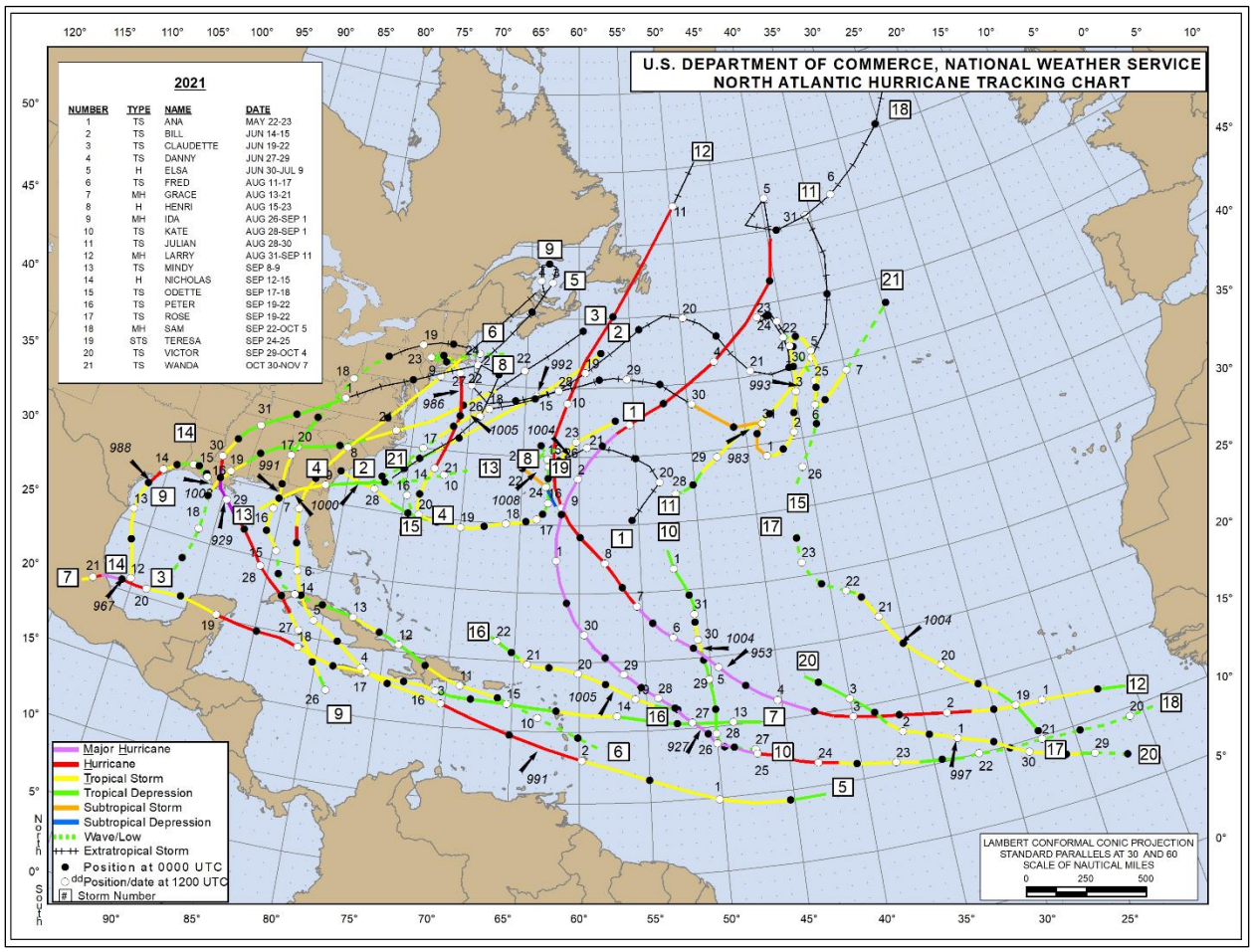
Table 3. 2021 Atlantic Hurricane Season: Outlooks and Actual Amounts

	NOAA May 2021 Outlook	NOAA August 2021 Outlook	2021 Actual
Named Storms	13-20	15-21	21
Hurricanes	6-10	7-10	7
Major Hurricanes	3-5	3-5	4

Sources: NOAA, "NOAA Predicts Another Active Atlantic Hurricane Season," May 20, 2021; NOAA, "Atlantic Hurricane Season Shows No Signs of Slowing," August 4, 2021; and NOAA, "Active 2021 Atlantic Hurricane Season Officially Ends," November 30, 2021.

The 2021 Atlantic hurricane season (**Figure 1**) was the third most active year on record in terms of named storms (21) and the sixth consecutive year with an above-normal Atlantic hurricane season. Since 2016, a tropical cyclone has formed before the June 1 start of the hurricane season (e.g., tropical storm Ana formed in May 2021).

Figure 1. NOAA's 2021 Atlantic Tropical Cyclone Tracks



Source: NOAA, National Hurricane Center.

Note: Major hurricanes (Grace, Ida, Larry, Sam) denoted in purple.

NOAA released its 2021 eastern Pacific (**Table 4**) and central Pacific hurricane outlooks in May 2021, anticipating these regions likely would experience near- (45%) to below-normal (35%) seasons, with above-normal seasons less likely to occur (20%).

Table 4. 2021 Eastern Pacific Hurricane Season: Outlook and Actual Amounts

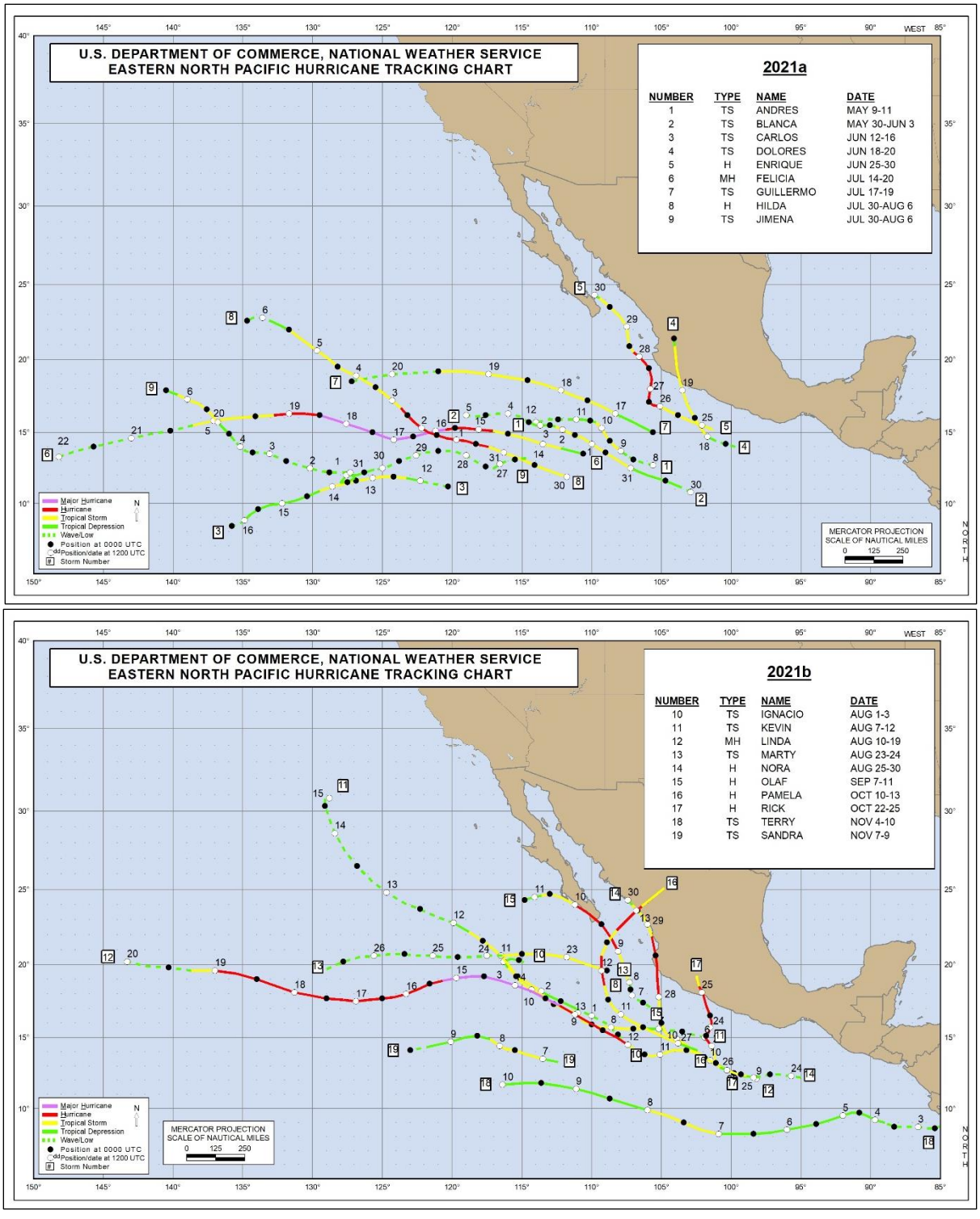
	NOAA May 2021 Outlook	2021 Actual
Named Storms	12-18	19
Hurricanes	5-10	6
Major Hurricanes	2-5	2

Sources: NOAA, "NOAA 2021 Eastern Pacific Hurricane Season Outlook," May 20, 2021, and NOAA, "Eastern North Pacific Hurricane Season Summary Table."

The 2021 eastern Pacific hurricane season began with Tropical Storm Andres forming May 9, 2021. The season featured two major hurricanes: Felicia and Linda.

NOAA predicted the central Pacific would experience two to five tropical cyclones in 2021. The central Pacific basin averaged four to five tropical cyclones per year between 1991 and 2020. One tropical cyclone (Jimena) traveled from the eastern Pacific into the central Pacific basin in 2021 (see Tropical Storm Jimena's track on **Figure 2**).

Figure 2. NOAA's 2021 Eastern Pacific Tropical Cyclone Tracks



Source: NOAA, National Hurricane Center.

Note: Major hurricanes (Felicia, Linda) denoted in purple.

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