Congressional Research Service
Informing the legislative debate since 1914

INSIGHT

2023 Hurricane Outlooks and 2022 Hurricane Season Review

May 30, 2023

Many in Congress have expressed interest in increasing understanding of tropical cyclones and improving forecasts to help their constituents prepare for the yearly hurricane season. These improvements may 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 monitoring tropical cyclones as they develop and issuing 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 the following:

- 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 category 1 or 2 on the Saffir-Simpson Hurricane Wind Scale. Hurricanes may also be called *typhoons* or *cyclones*, depending on the storm's location.
- Major hurricanes—maximum sustained winds of ≥ 111 mph, corresponding to category 3, 4, or 5.

NOAA releases seasonal hurricane outlooks relevant to the United States, including for the North Atlantic, Eastern Pacific, and Central Pacific Oceans, in May before each hurricane season begins. Such outlooks include information on the number of potential named storms, hurricanes, and major hurricanes. The Eastern Pacific season begins May 15, whereas the Atlantic and Central Pacific seasons begin June 1. All seasons run through November 30. 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.

Congressional Research Service
https://crsreports.congress.gov
IN12167

2023 Hurricane Season Outlooks

In May 2023, NOAA issued its initial 2023 Atlantic hurricane outlook (**Table 1**), indicating a 40% likelihood of a near-normal season rather than an above-normal (30%) or below-normal (30%) season. The hurricane season is expected to be less active than in recent years, due to the interaction of several climate factors. These factors include the high potential for the periodic warming of sea surface temperatures in the Central and East-Central Equatorial Pacific (El Niño phenomenon), which would suppress Atlantic hurricane activity. These suppressive factors are expected to compete with warmer-than-average sea surface temperatures and weaker winds in the Atlantic Ocean and an enhanced West African monsoon, which are likely to produce Atlantic storms.

Table 1. 2023 Atlantic Hurricane Season: 1991-2020 Annual Averages and 2023 Outlooks

	1991-2020 Annual Averages	NOAA May 2023 Outlook	NOAA August 2023 Outlook
Named Storms	14	12-17	TBA
Hurricanes	7	5-9	TBA
Major Hurricanes	3	1-4	TBA

Sources: NOAA, "Tropical Cyclone Climatology" (hereinafter, NOAA, "TC Climatology"); and NOAA, "NOAA Predicts a Near-Normal 2023 Atlantic Hurricane Season," May 25, 2023.

Notes: TBA = to be announced.

NOAA released its 2023 outlooks for the Eastern Pacific (**Table 2**) and Central Pacific hurricane seasons in May 2023. NOAA anticipates that the Eastern Pacific area is likely to experience an above-normal season (55%) rather than a near-normal (35%) or below-normal (10%) season. NOAA predicts a 50% chance of an above-normal season for the Central Pacific, rather than a near-normal (35%) or below-normal (15%) season. NOAA expects a total of four to seven tropical cyclones in the Central Pacific in 2023 (the average is four to five tropical cyclones per year).

Table 2. 2023 Eastern Pacific Hurricane Season: 1991-2020 Annual Averages and 2023 Outlook

	1991-2020 Annual Averages	NOAA May 2023 Outlook
Named Storms	15	14-20
Hurricanes	8	7-11
Major Hurricanes	4	4-8

Sources: NOAA, "TC Climatology"; NOAA, "NOAA 2023 Eastern Pacific Hurricane Season Outlook," May 25, 2023.

2022 Hurricane Season

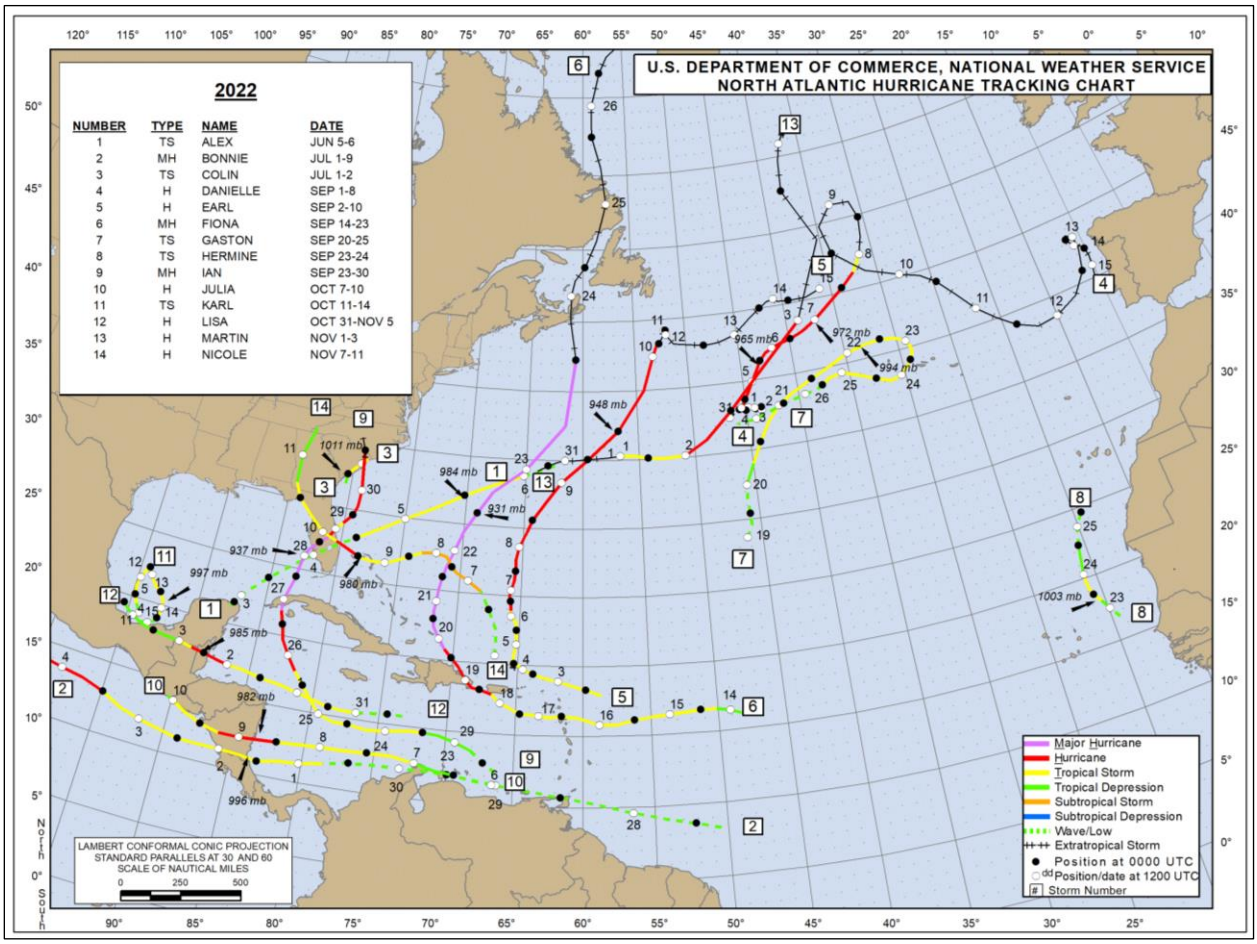
The 2022 Atlantic hurricane season aligned with NOAA's May and August 2022 outlooks (**Table 3**, **Figure 1**). The first storm of the Atlantic season, Tropical Storm Alex, formed from the remnants of Hurricane Agatha, which traveled across Central America from the Eastern Pacific. The season also featured three major hurricanes: Bonnie, Fiona, and Ian, which caused damage across multiple states and countries.

Table 3. 2022 Atlantic Hurricane Season: Outlooks and Actual Amounts

	NOAA May 2022 Outlook	NOAA August 2022 Outlook	2022 Actual
Named Storms	14-21	14-20	14
Hurricanes	6-10	6-10	9
Major Hurricanes	3-6	3-6	3

Sources: NOAA, "NOAA 2022 Atlantic Hurricane Season Outlook," May 24, 2022; NOAA, "NOAA 2022 Atlantic Hurricane Season Outlook," August 4, 2022; and NOAA, "Damaging 2022 Atlantic hurricane season draws to a close," November 29, 2022.

Figure 1. NOAA's 2022 Atlantic Tropical Cyclone Tracks



Source: NOAA, "2022 Atlantic Hurricane Season."

Notes: H = hurricane, MH = major hurricane, TS = tropical storm.

Major hurricanes (Bonnie, Fiona, and Ian) denoted in purple.

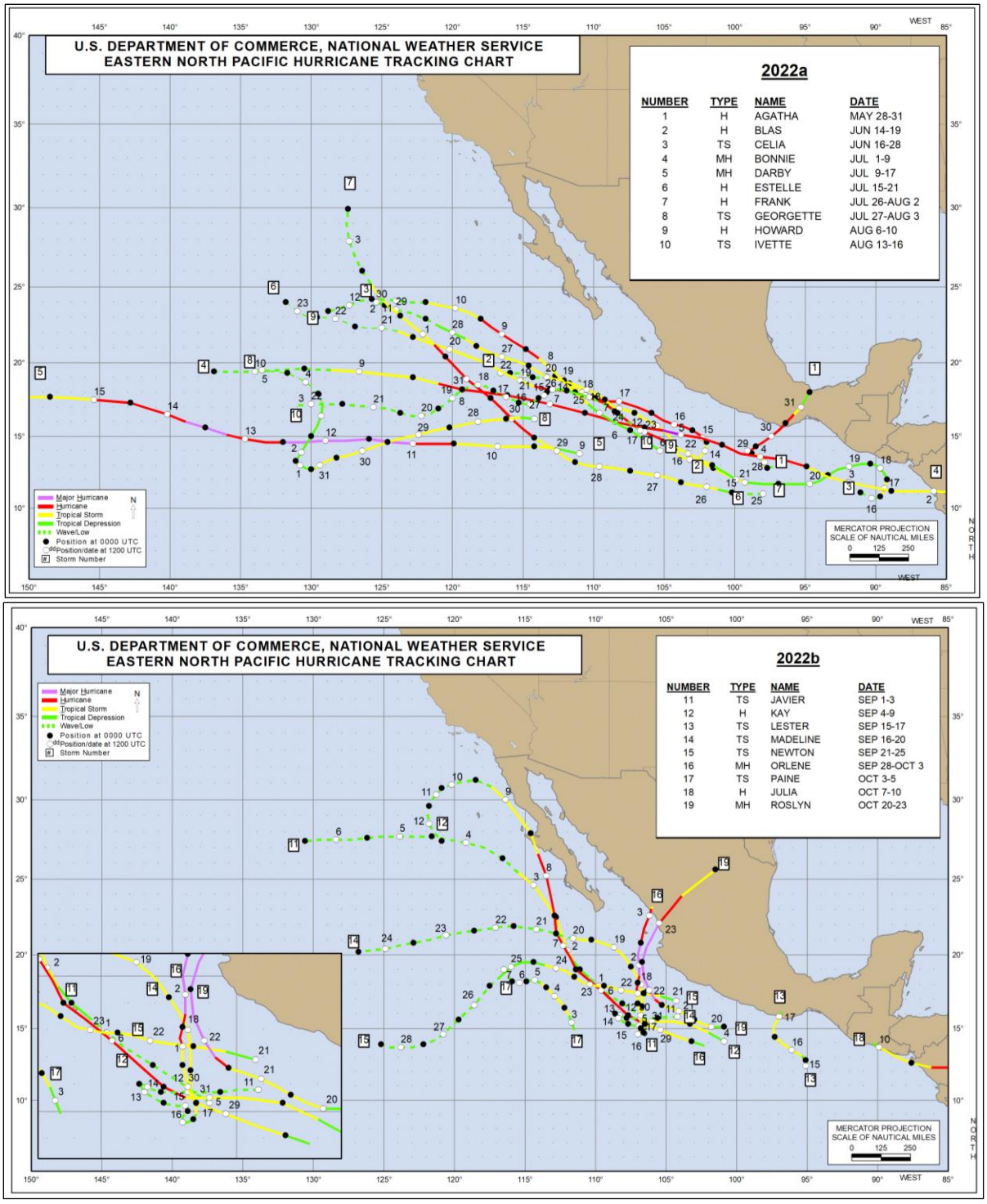
The 2022 Eastern Pacific hurricane season (**Table 4**, **Figure 2**) began with Hurricane Agatha, which formed May 28, 2022. The season featured four major hurricanes: Bonnie, Darby, Orlene, and Roslyn.

Table 4. 2022 Eastern Pacific Hurricane Season: Outlook and Actual Amounts

	NOAA May 2022 Outlook	2022 Actual
Named Storms	12-18	19
Hurricanes	5-10	11
Major Hurricanes	2-5	4

Sources: NOAA, "NOAA 2022 Eastern Pacific Hurricane Season Outlook," May 20, 2021; and NOAA, "2022 Eastern Pacific Hurricane Season."

Figure 2. NOAA's 2022 Eastern Pacific Tropical Cyclone Tracks



Source: NOAA, "2022 Eastern Pacific Hurricane Season."

Note: H = hurricane, MH = major hurricane, TS = tropical storm.

Major hurricanes (Bonnie, Darby, Orlene, and Roslyn) denoted in purple.

NOAA predicted the Central Pacific would experience two to four tropical cyclones in 2022. One major hurricane (Darby) traveled from the Eastern Pacific into the Central Pacific Basin in 2022 (see Hurricane Darby's track on **Figure 2**).

Author Information

Eva Lipiec
Analyst in Natural Resources Policy

Disclaimer