

= 1992 Atlantic hurricane season =

The 1992 Atlantic hurricane season had one of the latest dates on record for the first named storm . The season officially began on June 1 , 1992 , and lasted until November 30 , 1992 . The first storm , an unnamed subtropical storm , developed in the central Atlantic on April 21 , over a month before the official start of hurricane season . The most significant storm of the season was Hurricane Andrew , which at the time was the costliest United States hurricane . After crossing the Bahamas , the hurricane made landfall in Florida and Louisiana . It caused \$ 26 billion (1992 USD) in damage , mostly in Florida , and 65 fatalities . Andrew was also the strongest hurricane of the season , reaching winds of 175 mph (280 km / h) while approaching Florida .

Unusually , Hurricanes Bonnie and Charley produced tropical storm force winds in the Azores , and the former caused one fatality . Tropical Storm Danielle was one of few tropical cyclones known to make landfall on the Delmarva Peninsula . The storm caused minor damage and two fatalities in the Mid @-@ Atlantic and New England regions of the United States . One other hurricane in the season ? Frances ? did not significantly affect land . The system developed in the central Atlantic , and tracked well away from land , and brought only light rainfall to Newfoundland . In addition to the 7 storms , there were three non @-@ developing tropical depressions . The first depression of the season caused flooding in Cuba and Florida while the other two depressions did not affect any land . Collectively , the storms in the 1992 Atlantic hurricane season caused \$ 26 @.@ 502 billion in losses and 73 fatalities .

= = Season summary = =

= = = Pre @-@ season forecasts = = =

Forecasts of hurricane activity are issued before each hurricane season by Dr. William M. Gray and his associates at Colorado State University (CSU) and the Weather Research Center (WRC) . A normal season as defined by the National Oceanic and Atmospheric Administration (NOAA) has 12 @.@ 1 named storms , of which 6 @.@ 4 reach hurricane strength , and 2 @.@ 7 become major hurricanes . In December 1991 , CSU issued its first forecast for the year and predicted that 1992 would see eight named storms , four hurricanes , and one major hurricane . CSU also issued a forecast in April , June and August , however no revisions were made to the numbers of named storms , hurricanes , and major hurricane predicted in 1992 . Prior to the season starting , the WRC predicted that the season would see six named storms , with three of those becoming a hurricane while no forecast was made on the numbers of major hurricanes .

= = = Season activity = = =

The Atlantic hurricane season officially began on June 1 , but activity in 1992 began more than a month earlier with the formation of Subtropical Storm One on April 21 . It was a below average season in which 10 tropical depressions formed . Seven of the depressions attained tropical storm status , and four of these attained hurricane status . In addition , one tropical cyclone eventually attained major hurricane status , which is below the 1981 ? 2010 average of 2 @.@ 7 per season . The low amount of activity is partially attributed to weaker than normal tropical waves , the source for most North Atlantic tropical cyclones . Only two hurricanes and one tropical storm made landfall during the season . However , damage from Hurricane Andrew was astronomical , causing most of the season 's 106 deaths and \$ 26 @.@ 5 billion (1992 USD) damage toll . The last storm of the season , Hurricane Frances , became extratropical on October 27 , over a month before the official end of the season on November 30 .

Tropical cyclogenesis in the 1992 Atlantic hurricane season began with the development of Subtropical Storm One on April 21 . However , over the next three months , minimal activity occurred , with only two depressions developing , one in June and the other in July . Although wind

shear was relatively weak in August , only one tropical cyclone occurred in that month . However , that one tropical cyclone , Hurricane Andrew , was the strongest and costliest of the season . Though September is the climatological peak of hurricane season , an increase in wind shear prevented tropical cyclogenesis in the first half of the month . After September 16 , however , five tropical cyclones developed in a span of nine days , from September 17 to 26 . Thereafter , activity abruptly halted , and only one tropical cyclone developed in October , Hurricane Frances . By October 27 , Frances became extratropical , which was more than a month before the official end of the season on November 30 .

The season 's activity was reflected with an accumulated cyclone energy (ACE) rating of 76 . ACE is , broadly speaking , a measure of the power of the hurricane multiplied by the length of time it existed , so storms that last a long time , as well as particularly strong hurricanes , have high ACEs . ACE is only calculated for full advisories on tropical systems at or exceeding 34 knots (39 mph , 63 km / h) or tropical storm strength . Although officially , subtropical cyclones , such as the first storm , are excluded from the total , the figure above includes periods when storms were in a subtropical phase .

= = Storms = =

= = = Subtropical Storm One = = =

On April 21 , a low pressure area separated from the prevailing westerlies about 600 miles (1 @ , @ 100 km) southeast of Bermuda , and developed into a subtropical depression at 1200 UTC . The system maintained a large comma @ - @ shaped cloud pattern around the low @ - @ level circulation . Operationally it was not classified until 27 hours later . Isolated from strong steering currents , the depression tracked northwestward at 12 mph (19 km / h) , and intensified into a subtropical storm early on April 22 ; this was the first such storm on record in the month . It gradually became better organized , with a large convective band in the eastern semicircle . Reports from a nearby ship indicated peak winds of 50 mph (85 km / h) , with swells of 64 @ . @ 4 feet (19 @ . @ 7 m) .

The National Hurricane Center remarked the potential for the system transitioning into a tropical cyclone . An approaching trough caused the storm to stall and weaken the deep convection . On April 23 , the cyclone weakened to depression status due to strong wind shear . A Hurricane Hunters flight into the system confirmed the weakening , and also reported a 1 @ . @ 8 ° F (1 ° C) temperature rise in the center , suggesting a warm core and some tropical characteristics . Early on April 24 , the subtropical depression turned eastward , maintaining limited convection . At the time , forecasters anticipated the depression would continue east @ - @ northeastward and become an extratropical cyclone . By late on April 24 , the system was too weak to classify using the Dvorak technique , and the NHC ceased issuing advisories . Within 24 hours , the circulation dissipated as the system continued eastward through the westerlies .

= = = Tropical Depression One = = =

A tropical wave emerged off the western coast of Africa on June 12 , and eventually developed into Tropical Depression One in the southeastern Gulf of Mexico . Operationally , the National Hurricane Center designated this system as Tropical Depression Two , which led to confusion because of Subtropical Storm One in April , and then another Tropical Depression Two in July . Outflow from Hurricane Celia in the Pacific Ocean and a trough in the Gulf of Mexico generated wind shear on the depression , which prevented it from intensifying into a tropical storm . The depression curved north @ - @ northeastward and eventually made landfall in near Tampa , Florida on June 26 around 1500 UTC . As it was moving ashore , the National Hurricane Center noted that the depression was too poorly organized to locate the center of circulation , and discontinued advisories on the system .

The depression dropped heavy rainfall in Cuba , peaking at 33 @ . @ 43 inches (849 mm) . Large amounts of precipitation resulted in flooding , which damaged or destroyed hundreds of homes and

caused two fatalities in provinces of Pinar del Río and La Habana . As the system was only a tropical depression , light winds were reported , however , a peak gust of 56 mph (90 km / h) was reported at MacDill Air Force Base . Heavy rainfall fell on the west coast of Florida , with local amounts exceeded 20 inches (510 mm) . Precipitation throughout the state peaked at 25 inches (640 mm) in Arcadia Tower . Heavy rainfall caused flooding in portions of Florida , which in turn , damaged 4 @, @ 000 houses and destroyed 70 houses . In addition , five homes destroyed and twelve were damage by a tornado spawned in Nokomis . Severe crop damage to orange trees was also reported . The depression caused two fatalities in Florida and damage totaled to \$ 2 @. @ 6 million (1992 USD) .

= = = Tropical Depression Two = = =

A squall line which moved offshore New York and southern New England formed a mesoscale convective vortex , which fired new thunderstorm activity each day as it moved within the westerlies across the northern Atlantic . Once it reached mid @- @ ocean , an increasingly northerly steering flow dropped the system down into the subtropics to the east of Bermuda , and it maintained decent organization . By 2100 UTC on July 24 , the National Hurricane Center began classifying the system as Tropical Depression Two . In the first advisory on the depression , it was noted that the previous tropical depression was erroneously classified as Tropical Depression Two .

Due to northeasterly wind shear , the depression failed to intensified or organize further , as predicted . Instead , the depression weakened by late on July 25 , with satellite imagery indicating that much of the deep convection was removed from the surface circulation . By July 26 , the National Hurricane Center issued its final advisory , noting that it was " too weak to classify and is rapidly losing its identity " . The depression dissipated about three hours later .

= = = Hurricane Andrew = = =

A tropical wave moved off the coast of Africa on August 14 , and organized into Tropical Depression Three on August 16 while located about halfway between the Windward Islands and the coast of Africa . It moved to the west @- @ northwest , and strengthened into Tropical Storm Andrew on August 17 . After reaching winds of 50 mph (85 km / h) , strong southwesterly shear weakened the storm , and by August 20 it weakened to a minimal storm with a pressure of 1 @, @ 015 mbar (30 @. @ 0 inHg) . It bypassed the Lesser Antilles completely , and turned to the west in response to a building high pressure system to the north . Upon turning to the west , a trough of low pressure positioned to the southwest of Andrew created an environment with little vertical shear and well @- @ defined outflow . The storm quickly intensified due to its small size , and became a hurricane on August 22 . Andrew rapidly intensified under ideal conditions for development , and on August 23 the hurricane peaked with winds of 175 mph (280 km / h) . It crossed the Bahamas at that intensity , weakened slightly , and re @- @ intensified to a 165 mph (270 km / h) Category 5 hurricane before making landfall near Homestead , Florida . It weakened slightly over the state to a 135 mph (215 km / h) hurricane , but restrengthened to a 145 mph (235 km / h) hurricane over the Gulf of Mexico . A strong mid @- @ latitude trough turned Andrew northward , where it greatly weakened before hitting west of Morgan City , Louisiana on August 26 as a 115 mph (185 km / h) Category 3 hurricane . It turned northeastward , and dissipated over Tennessee on August 28 .

In the Bahamas , Andrew brought high tides , hurricane @- @ force winds , and tornadoes , which caused significant damage in the archipelago , especially on Cat Cays . At least 800 houses were destroyed and left damage to the transport , communications , water , sanitation , agriculture , and fishing sectors . Overall , Andrew caused four fatalities and \$ 250 million in damage in the Bahamas . Throughout the southern portions of Florida , Andrew brought very high winds ; a wind gust of 177 mph (282 km / h) was reported at a house in Perrine , Florida . High winds caused catastrophic damage in Florida , especially in Miami @- @ Dade County , where approximately 117 @, @ 000 houses were either severely damaged or destroyed . In the Everglades , 70 @, @ 000 acres (280 km²) of trees were knocked down and about 182 million fish were killed . Rainfall in Florida was

moderate , peaking at 13 @. @ 98 inches (355 mm) in western Miami @- @ Dade County . Significant damage to oil platforms was reported , with one company losing 13 platforms , had 104 structures damaged , and five drilling wells blown off course . In Louisiana , Andrew produced hurricane @- @ force winds along its path , damaging 23 @, @ 000 homes and destroying 985 homes and 1 @, @ 951 mobile homes . An F3 tornado in St. John the Baptist Parish damaged or destroyed 163 structures . 17 fatalities were reported in Louisiana , six of which were drowning victims offshore . Elsewhere , the storm spawned at least 28 tornadoes , especially in Alabama , Georgia , and Mississippi . Overall , Andrew caused 65 fatalities and \$ 26 billion (1992 USD) in damage , making it the fourth costliest hurricane in U.S. history , behind Hurricane Katrina in 2005 , Hurricane Sandy in 2012 , and Hurricane Ike in 2008 .

= = = Hurricane Bonnie = = =

In mid @- @ September , a tropical low detached from a cold front and developed into Tropical Depression Four late on September 17 , while located about 340 miles (550 km) east @- @ northeast of Bermuda . Early on the following day , the depression intensified into Tropical Storm Bonnie . Due to light vertical wind shear , Bonnie quickly strengthened , and became a hurricane late on September 18 . Further deepening occurred , and at 1800 UTC on September 21 , Bonnie peaked as a 110 mph (175 km / h) Category 2 hurricane . Thereafter , Bonnie became nearly stationary for almost 24 hours . Satellite images indicated that the low @- @ level center became exposed , indicating that Bonnie was significantly weakening while tracking southward . It is estimated that Bonnie weakened to a tropical storm by late on September 24 . Bonnie further deteriorated to tropical depression status on September 26 , but re @- @ strengthened to a tropical storm later that day .

By 1500 UTC on September 27 , the National Hurricane Center declared Bonnie extratropical , since it was losing tropical characteristics . Bonnie re @- @ acquired tropical characteristics , and the National Hurricane Center resumed advisories on the storm by 2100 UTC on September 28 . However , post @- @ analysis indicated that Bonnie remained tropical during that time period . Bonnie re @- @ strengthened to a strong tropical storm before vertical wind shear weakened it while approaching the Azores . Shortly before becoming extratropical on September 30 , Bonnie passed through the Azores as a moderately weak tropical storm . One location in the Azores reported tropical storm force winds . In addition , one man was killed by a rock fall on the island of São Miguel . No damage was reported in association with Bonnie .

= = = Hurricane Charley = = =

On September 20 , METEOSAT imagery indicated an area of convection becoming concentrated while well south of the Azores . It is possible that a mid to upper @- @ level cyclonic circulation interacted with the northern portion of a tropical wave . By the following day , satellite imagery noted a well @- @ defined low @- @ level circulation and thus , Tropical Depression Five while centered about 633 miles (1 @, @ 019 km) south of the Azores . The depression tracked northwestward and satellite imagery began to indicate banding features . As a result , the depression was upgraded to Tropical Storm Charley on September 22 . An eye developed as Charley tracked north @- @ northwestward , and it became a hurricane on September 23 . Further strengthening occurred , and by late on September 24 , Charley peaked as a 110 mph (175 km / h) Category 2 hurricane .

Thereafter , Charley turned eastward and then east @- @ northeastward while tracking over decreasing sea surface temperatures (SST 's) . Early on September 27 , Charley was downgraded to a tropical storm . Later that day , Charley crossed over Terceira Island in the Azores with winds of 65 mph (100 km / h) . Charley gradually lost tropical characteristic , and by 1800 UTC on September 27 , it had transitioned into an extratropical storm . The remnant system accelerated northeastward toward the British Isles , where it merged with another extratropical low on September 29 . While passing through the Azores , Charley produced tropical storm force winds , with the Lajes AFB reporting sustained winds of 53 mph (85 km / h) and gusts reaching 82 mph (

132 km / h) . No other effects from Charley were reported in the Azores .

== Tropical Storm Danielle ==

Tropical Depression Six developed offshore of the Southeastern United States on September 22 from the merger of a surface trough , a tropical wave , and a cold front . The depression quickly intensified and was upgraded to Tropical Storm Danielle six hours later . An approaching trough caused a northeastward movement , but later a high pressure system forced the storm to northwestward , which caused Danielle to execute a small anti @-@ cyclonic loop on September 23 ? 24 . While offshore of North Carolina on September 25 , Danielle reached its peak intensity as a moderately strong tropical storm with maximum sustained winds of 65 mph (100 km / h) . It was initially predicted that Danielle would make landfall in North Carolina , however , the storm curved north @-@ northwestward and made landfall in Maryland on the eastern shore of the Delmarva Peninsula at the same intensity . Danielle continued inland and weakened and dissipated over eastern Pennsylvania on September 26 .

Danielle caused severe beach erosion in North Carolina , Virginia , and Maryland , which resulted in overwash , which in turn , damage or destroyed several businesses and houses in the coastal portions of the three states . In addition , street flooding also closed several roads in the region , most notably , North Carolina Highway 12 . Many states in the Mid @-@ Atlantic and New England also reported rainfall , although rarely exceeding 3 inches (76 mm) . In addition high seas offshore of New Jersey capsized a sailboat , causing two people to drown . Overall , damage from the storm was minimal , with the exception of the damage or destroyed businesses and houses in North Carolina , Virginia , and Maryland .

== Tropical Depression Seven ==

A poorly organized tropical wave emerged off the west coast of Africa on September 23 and quickly developed into Tropical Depression Seven on September 25 , while centered 775 miles (1 @,@ 247 km) southwest of Cape Verde . Because the depression was tracking over warm SST 's , it was predicted to intensify into a tropical storm . However , wind shear exposed the center as indicated by visible satellite images on September 26 , and the National Hurricane Center noted on September 26 that " the depression could be downgraded to a tropical wave later today " . Early on September 27 , the center of the depression became difficult to locate on satellite imagery .

By September 28 , the organization of the depression deteriorated further due to strong vertical wind shear . The center of the depression again became difficult to location by infrared images early on September 29 . Later that day , a few computer models indicated a decrease in wind shear over the depression within two days , thus , it was predicted to strengthen into a tropical storm . However , wind shear exposed the center of the depression again by early on September 30 , though it was still forecast to intensify to tropical storm status . By late on October 1 , satellite imagery noted that the depression dissipated , and the National Hurricane Center issued its final advisory on the system .

== Tropical Storm Earl ==

On September 26 , a tropical wave developed into Tropical Depression Eight while centered about 345 miles (555 km) north of Hispaniola . The depression tracked west @-@ northwestward toward the Bahamas . Initially , the depression remained weak , but after reaching the Gulf Stream it strengthened into Tropical Storm Earl at 1200 UTC on September 29 . Around that time , Earl began to veer east , lessening the threat to Florida . Early on October 1 , Earl reached maximum sustained winds of 65 mph (105 km / h) and a minimum barometric pressure of 990 mbar (29 inHg) . It gradually weakened thereafter , and Earl was downgraded to a tropical depression on October 3 . Later that day , Earl became extratropical about 295 mi (475 km) south of Bermuda .

The threat from Earl prompted a tropical storm watch in the Bahamas and later Bermuda , while a

coastal flood watch was issued in Florida . Because Earl remained offshore , impact was generally minor . Throughout Florida , Earl spawned 11 tornadoes and brought moderately heavy rainfall , peaking at 9 @. @ 38 inches (238 mm) near Canal Point , Florida . In addition , light amounts of precipitation were also reported in Georgia and North Carolina . Above normal tides washed away 30 to 35 ft (9 @. @ 1 to 10 @. @ 7 m) of beaches , and lifeguards on St. Augustine Beach made eight rescues .

= = = Hurricane Frances = = =

A low pressure area developed along the end of a quasi @-@ stationary frontal trough . Initially , vertical wind shear prevented deep convection from forming on the western portion of the system . After wind shear decreased , the system became a gale center late on October 22 . By early on the following day , the gale center had transitioned into a tropical storm , and it is estimated that Tropical Storm Frances developed at 0600 UTC on October 23 . Frances quickly strengthened after becoming a tropical storm , and was upgraded to a hurricane by 1800 UTC on that same day . After becoming a hurricane , Frances curved northeastward , and remained well east of Bermuda . By midday on October 24 , Frances peaked as an 85 mph (140 km / h) Category 1 hurricane .

After reaching peak intensity , Frances began tracking over cooler SST 's , which gradually weakened the storm . The eye featured became indistinct and by late on October 25 , Frances was downgraded to a tropical storm . Over the next two days , Frances began losing tropical characteristics , and was declared extratropical by early on October 27 . One sailor was reported missing , however , it is unknown if it was as a result of Frances . In addition , one person on a sailboat suffered injuries during an encounter with Frances . On land , Frances caused minimal impact , limited to light rainfall across Newfoundland .

= = Storm names = =

The following names were used for named storms that formed in the north Atlantic in 1992 . Subtropical storms were unnamed until 2002 , as a result , the subtropical cyclone in April 1992 did not receive a name . The names not retired from this list appeared again on the naming list for the 1998 season . This is the same naming list used for the 1986 season . Names that were not assigned are marked in gray .

= = Retirement = =

At their meeting in the spring of 1993 , the World Meteorological Organization retired the name Andrew from the list above . The name that replaced it on the naming list for the 1998 season was Alex .

= = Season effects = =

This is a table of all of the storms that formed in the 1992 Atlantic hurricane season . It includes their duration , names , landfall (s) ? denoted by bold location names ? damages , and death totals . Deaths in parentheses are additional and indirect (an example of an indirect death would be a traffic accident) , but are still related to that storm . Damage and deaths include totals while the storm was extratropical or a wave or low , and all of the damage figures are in 1992 USD .