50 Years Ago

HURRICANE DONNA

Rusty Pfoist (former Meteorologist-in-Charge at WFO Miami)

September 2010
1960

- Dwight D. Eisenhower is President
- Cold War
- LeRoy Collins is Governor
- US sends 3500 soldiers to Vietnam
- Soviet missile shoots down U2
- Castro nationalizes US interests in Cuba
- “The Flintstones” premiers
- Tiros I weather satellite
- Kennedy/Johnson elected
Weather Bureau in 1960

- WBAS at the airport
  - W.L. “Tommy” Thompson is CAM
- WBO/NHC at the Aviation Bldg
  - Gordon Dunn is MIC
- WSR-57 installed in 1959
Below average season
June 15 – November 15
Neutral ENSO
Hurricane Donna

- August 29 – September 17
- Record for maintaining major hurricane (Cat 3) status
  - 9 days, September 2-11
- Briefly category 5 on September 4 over Atlantic Ocean
- Direct hits
  - Florida Keys, FL (Marathon, Vaca Key) category 4
  - Fort Myers/Naples, FL category 4
  - Cape Hatteras, NC
  - Long Island, NY and New England
Tropical disturbance
Aug 28-29

French airliner crashed in a “blinding rainstorm” on Aug. 29 attempting to land at Dakar, Senegal

55 passengers and crew of 8 all killed

On Aug. 30, an Air Force plane reported a tropical disturbance near the Cape Verde Islands

No satellite pictures because Tiros I ceased operations in mid June 1960, electrical failure
First advisory – Sep 2

- Located by Navy reconnaissance invest flight
- First advisory 6 PM AST Sep 2 by Hurricane Warning Center, San Juan, PR
- 12 noon AST Sep 3 - Hurricane Watch for Leeward Islands
- 6 PM AST Sep 3 - Hurricane Warning for Leeward Islands, Hurricane Watch for Puerto Rico
- 6 AM AST Sep 4 - Hurricane Warning for Puerto Rico and Virgin Islands
- 9 AM and 12 Noon AST Sep 5 – Hurricane Warnings changed to Gale Warnings for PR and VI
Torrential rains, floods in Puerto Rico

Hurricane Donna
September 3-6, 1960
98 sites

Track

<1

<3

1
3
5
7
10
15

Maximum: 16.23"
Naguabo 6W, Puerto Rico
Donna’s effect on the islands

- Category 5 storm for a short time on Sep 4
- St. Maarten reported 120 mph sustained wind
- St. Maarten – 7 dead, extensive damage, 25% homeless
- Anguilla – 1 dead
- Virgin Islands – 7 dead
- Puerto Rico – over 10 inches of rain produced flash floods, killing 107 people
- By noon on Sep 5, apparent that the center of Donna will miss Puerto Rico to the north
Watches and warnings

- 5 AM EST, Sep 7 - (70 mi north of Grand Turc) Interests on Turks and Caicos Islands and Mayaguana Island advised to prepare for hurricane force winds immediately

- 130 PM EST, Sep 7 - (short distance south of Mayaguana Isl) HURRICANE WATCH issued for Florida from Melbourne to Key West

- 8 PM EST, Sep 7 - (midway between Mayaguana and Crooked Islands, Bahamas)
Donna moves through Bahamas

- 20 inches of rainfall at North Caicos
- Hurricane force for 13 hours at Mayaguana
- Eye passed across Crooked Island
- 150 mph wind gust at Ragged Island, anemometer blew away

Sep 7-8, 1960
Double eyewall structure, SE Bahamas

400 PM EST Sep 6 1960, aircraft radar 10 mi S Turks Isl.
Mayaguana devastation

TOWN CRUSHED—This aerial view of Abraham's Bay, Mayaguana, in the Bahamas, shows how the small town was laid waste by the 150-mile-an-hour winds of Hurricane Donna.

(AP Wirephoto)
Well behaved hurricane?
Hurricane Warning for Florida

- **11 AM EST, Sep 8** - (20 mi W of Ragged Island) Hurricane Warning for Florida Keys from Key Largo to Dry Tortugas, Hurricane Watch Melbourne to Fort Myers
- **8 AM EST, Sep 9** - term EMERGENCY inserted
- **11 AM EST, Sep 9** - (154 mi SSE of Miami) Hurricane Warning extended, Fort Lauderdale to Punta Gorda, Hurricane Watch Melbourne to Cedar Keys
- **5 PM EST, Sep 9** - Carysfort Reef Light 90 mph, Miami 55 mph
- **11 PM EST, Sep 9** - (35 mi E of middle keys) Hurricane Warning extended, Melbourne to Clearwater including Lake Okeechobee
Donna approaching Fla Keys

Hurricane Donna as seen from a Navy aircraft radar @ ~0200 UTC 10 Sept. 1960 (~45 naut. miles from landfall)

900 PM EST Sep 10 1960, aircraft radar
Devastation in the Keys

- 1 AM EST, Sep 10 - 135 mph wind at Tavernier
- 3 AM EST, Sep 10 - eye moving onto Long Key
- 5 AM EST, Sep 10 - eye over Cape Sable, Hurricane Warning extended Daytona Beach to Cedar Keys
- 7 AM EST, Sep 10 - about 25 mi south of Everglades City
- 9 AM EST, Sep 10 - 97 mph gust at MIA
- 1 PM EST, Sep 10 - near Naples
- 3 PM EST, Sep 10 - near Fort Myers
- 7 PM EST, Sep 10 - 30 mi east of Sarasota
Donna in extreme SE Gulf

730 AM EST Sep 10 1960, Miami radar
Islamorada, Sep 10, 1960
Marathon
MARK ON DOOR. TIDE CAME FROM BLACKWATER SOUND IN SECOND PHASE FROM WESTERLY WINDS.

SAN PEDRO CATHOLIC CHURCH:
63 IN ALCOVE ON EAST SIDE.
4.8 IN BACK OF CHURCH.

MARK ON POLE.

MARK ON PALM TREE NE CORNER OF BUILDING

PEAK TIDE LASTED ABOUT 30 MINUTES.

TIDE AT PEAK FOR ABOUT TWO HOURS.

TIDE LEVEL NEAR SWIMMING POOL.

PEAK 2:15 A.M. RECEDITION STARTED AT 2:30 A.M. ON 10 SEP

EYEWITNESS STATED: "TIDE NEAR PEAK FOR ABOUT 30 MINUTES."

TRASH LINE, N & S SIDES, ON HIGHWAY FILL
Donna radar animation

EYE (→) OF
HURRICANE
“DONNA”

10am EST
SEPT. 9th
Donna track
Wind swath of Donna
Everglades damage

- Pineland and mangrove forests sustained extensive damage
  - Labor Day Hurricane – 1935
  - Hurricane Donna – 1960
  - [Hurricane Andrew – 1992]
Everglades damage

- Slow movement (approx 14 mph) subjected Everglades areas to damaging winds for 36 hours
- Flamingo est’d 140 mph gusting to 180 mph
- Max storm tide at Flamingo 12 ft above msl
- Most severe mangrove damage from Madeira Bay to Shark River including Whitewater Bay
- Many trees 2 inches or more in diameter sheared off 6 to 10 ft above ground
- Shark River north to Lostmans River 50-75% killed
- Lostmans River to Everglades City 10-25% killed
Everglades National Park

- 50-90% of foliage torn off
- Winterlike appearance for 1-2 weeks after Donna
- By Sept. 24, springlike appearance, new leaves coming out, pastel shades of green
- Some plants flowered
- 1-5 inches of silt deposited across much of the flooded area
Everglades City
Southwest Gulf coast
Donna near Fort Myers

200 PM EST Sep 10 1960, Key West radar
Naples and Fort Myers

- Storm tide 4 to 7 feet above msl
- Storm tide pushed to center of Naples
- Fort Myers max wind 92 mph gusts to 121 mph
- Gusts to 100 mph as far north as Sarasota
Fort Myers
Torrential Rainfall!
Weakening over central Florida
Donna races north

- 11 PM EST, Sep 10 - 20 mi south of Lakeland, Hurricane Warning extended north to Savannah, GA
- 3 AM EST, Sep 11 - near Orlando
- 5 AM EST, Sep 11 - just northwest of DeLand, Hurricane Warning Vero Beach to Myrtle Beach SC
- 7 AM EST, Sep 11 - Flagler Beach into the Atlantic
- 11 AM EST, Sep 11 - 90 mi northeast of Jacksonville, Hurricane Warning Fernandina Beach to Cape Hatteras
- 8 PM EST, Sep 11 - Cape Fear, NC moving NE 35 mph
North Carolina to New England

- 9 PM EST, Sep 11 - 40 mi east of Wilmington, NC
  Hurricane Warning Beaufort SC to Portsmouth, NH
- 7 AM EST, Sep 12 - 60 mi southeast of Ocean City, MD, Hurricane Warning to Eastport, ME
  - Expected to come ashore on Long Island NY
- 11 AM EST, Sep 12 - 80 mi east of Atlantic City, NJ
- 2 PM EST, Sep 12 - center of Donna passes over Long Island NY
- 5 PM EST, Sep 12 - 40 mi northwest of Boston
- 11 PM EST, Sep 12 - 40 mi northwest of Bangor ME
Effects - Middle Atlantic to New England

- North Carolina - gusts to 103 mph at New Bern NC, rainfall 6.26 inches at Wilmington, NC, Sep 12
- Virginia - gusts to 75 mph at Norfolk Sep 12, tides 7 feet above normal
- Delaware/New Jersey – gusts to 100 mph at Wildwood, 83 mph at Atlantic City, Sep 12, rainfall 3-5 inches
- New York – gust to 82 mph at the WBO Sep 12, tides 6 feet above normal
- Rhode Island – gust to 130 mph at Block Island Sep 12, tides 8-9 feet above normal in Providence
- Massachusetts – gust to 79 at Boston, tides 7-9 feet above normal Sep 12
Summary

- Hurricane Donna 9th costliest storm, damages estimated 6.6 billion (in 2010 dollars)
- 364 direct deaths (over 100 in Puerto Rico, 50 in the United States, 63 in the jet crash)
- Category 5 over the Atlantic, category 4 at landfall
- 35 percent of Florida grapefruit crop lost, 10-15% of the orange crop lost