




Flood Control

RUSSELL H. RHODES, JR.

NEUSE SPORT SHOP

Why am I here?


- ▶ Flood frequency problem
- ▶ Discuss Solutions
 - ▶ Flood Control Act of 1965
- ▶ Stress that you are our only Hope.



“The district engineer finds that there is an immediate and urgent need for improvements to provide flood protection, water supply, water-quality control and recreation in the Neuse River Basin”

R. G. MacDonnell,
Major General,
Corps of Engineers, US Army,
February 19, 1964.

<https://www.dropbox.com/s/eu6sktbj6fyc6cx/USACOE%20Neuse%20Report%201965.pdf?dl=0>

- 
- ▶ Flood control Act of 1965
 - ▶ River and Harbor Act of 1965
 - ▶ Falls of the Neuse Dam



SUBJECT: Neuse River Basin, North Carolina

TABLE 1

Reservoirs Included in General Plan but not Recommended for Construction

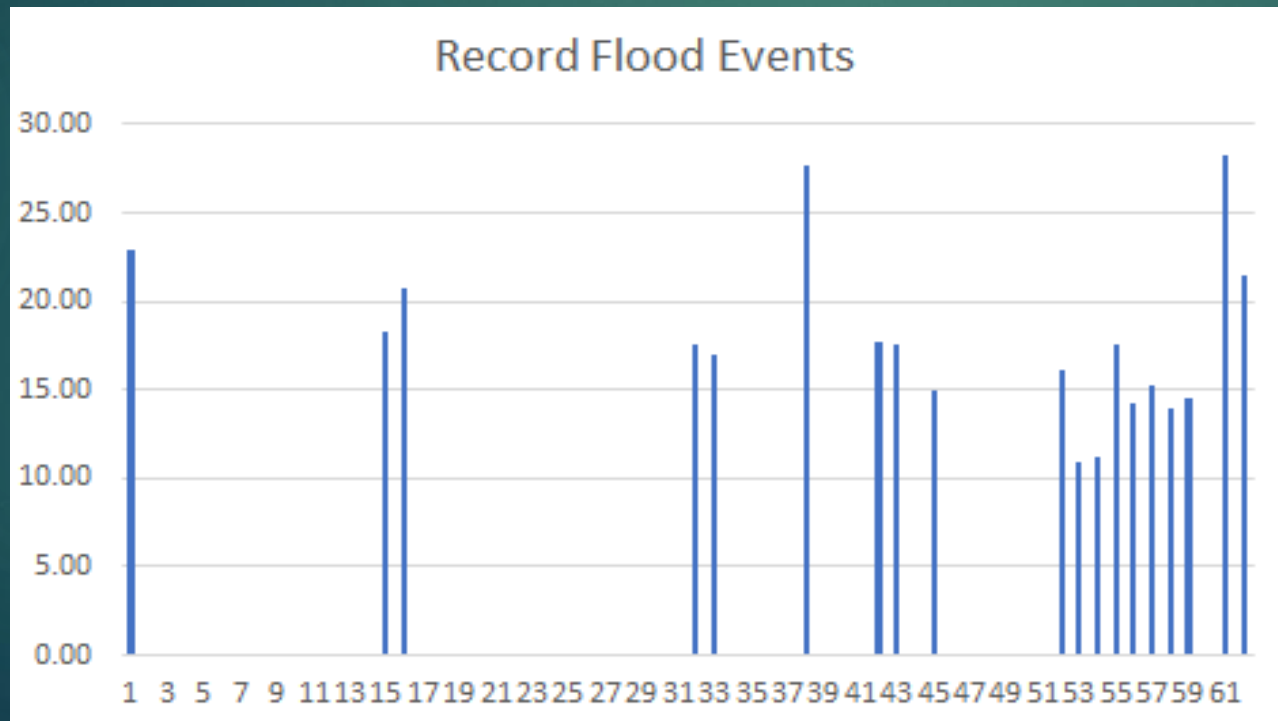
Project	Stream	County	Gross storage (Acre- feet)	First cost	Annual charges	Annual benefits			
						Flood control	Conserva- tion (1)	Recreation: (2)	Total
Wilson Mills	Neuse River	Johnston	201,000	\$ 9,800,000	\$ 427,000	\$ 400,000	\$ 144,000	\$ 387,000	\$ 931,000
Beulahtown	Little River	Johnston	81,000	6,200,000	261,000	239,000	24,000	118,000	381,000
Bakers Mill	Little River	Johnston	36,000	6,600,000	263,000	70,000	36,000	97,000	203,000
Little Buffalo	Little Buffalo Creek	Johnston	13,000	1,100,000	48,000	20,000	10,000	42,000	72,000
Buckhorn	Contentnea Creek	Wilson	119,000	4,500,000	193,000	151,000	122,000	492,000	765,000
Wiggins Mill	Contentnea Creek	Wilson	35,000	6,700,000	277,000	80,000	18,000	255,000	353,000
Stantonsburg	Toisnot Swamp	Wilson	48,000	5,100,000	224,000	99,000	16,000	230,000	345,000
Great Swamp	Great Swamp	Wilson	18,000	1,800,000	77,000	25,000	8,000	115,000	148,000
Black Creek	Black Creek	Wilson	17,000	1,500,000	64,000	28,000	4,000	95,000	127,000
Aycock Swamp	Aycock Swamp	Wilson	7,000	550,000	26,000	8,000	5,000	35,000	48,000
Hillsboro	Eno River	Durham	123,000	8,100,000	330,000	100,000	154,000	301,000	555,000
Orange	Little River	Durham	57,000	3,500,000	143,000	70,000	52,000	106,000	228,000
Total			755,000	\$55,450,000	\$2,333,000	\$1,290,000	\$ 593,000	\$2,273,000	\$4,156,000

(1) Includes water supply, low-flow augmentation and irrigation.

(2) Includes fish and wildlife enhancement.

Flood History Neuse Kinston

- ▶ 21 flood level events since 1964
- ▶ One per year between 2010 and 2013
- ▶ Four in 2014



	Date	Depth	Rank
1	5/3/2017	21.47	6
2	10/14/2016	28.31	1
3	3/15/2014	14.52	19
4	2/27/2014	13.93	21
5	1/19/2014	15.24	17
6	1/6/2014	14.20	20
7	7/21/2013	17.57	13
8	3/29/2012	11.14	22
9	8/30/2011	10.95	23
10	10/7/2010	16.14	16
11	8/24/2004	14.91	18
12	8/19/2003	17.55	14
13	4/18/2003	17.77	11
14	9/23/1999	27.71	2
15	9/17/1996	23.30	4
16	10/15/1995	17.00	15
17	2/27/1995	17.60	12
18	3/8/1979	20.70	8
19	2/1/1978	18.30	10
20	1/29/1978	19.00	9
21	10/13/1964	22.90	5

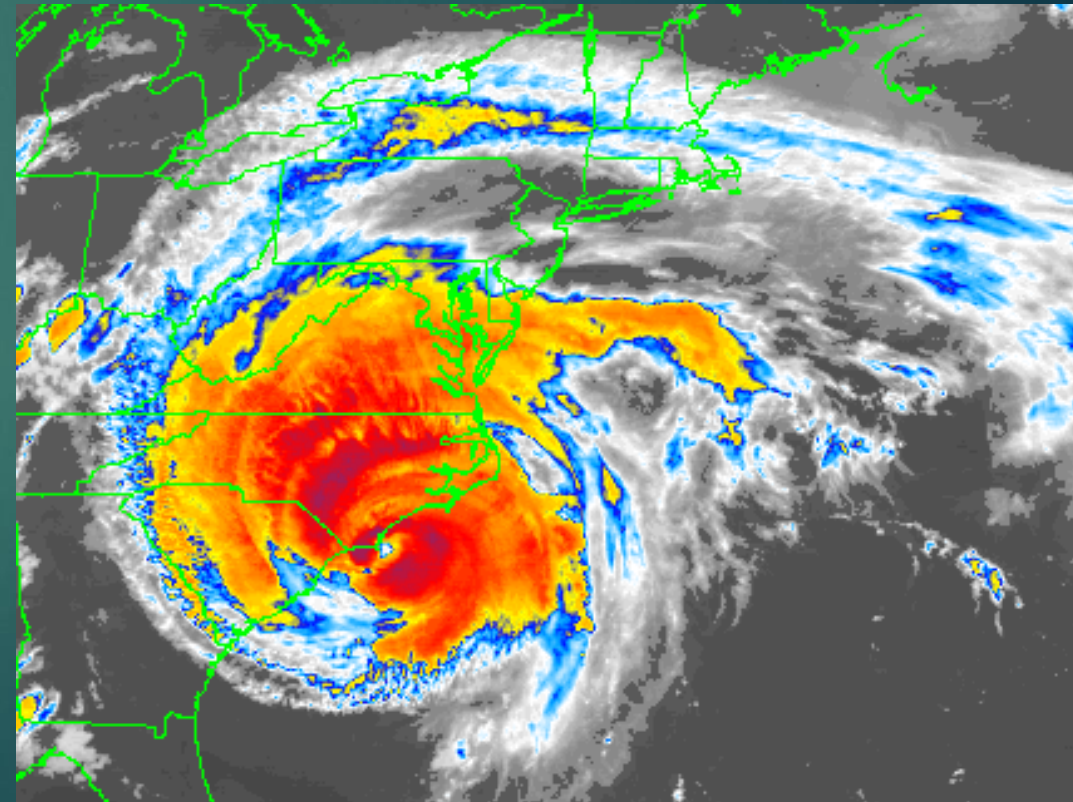






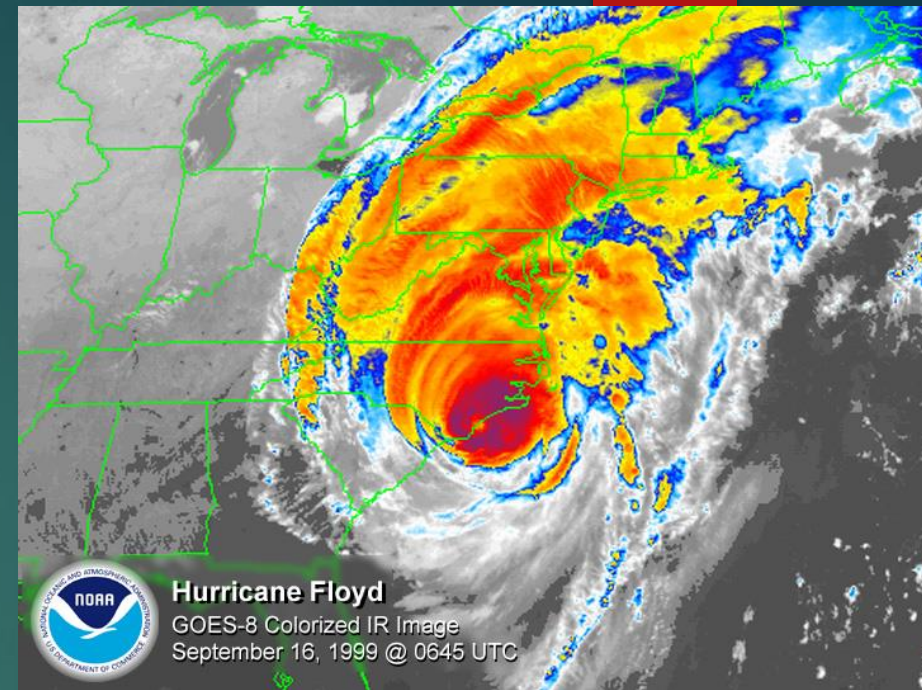
History

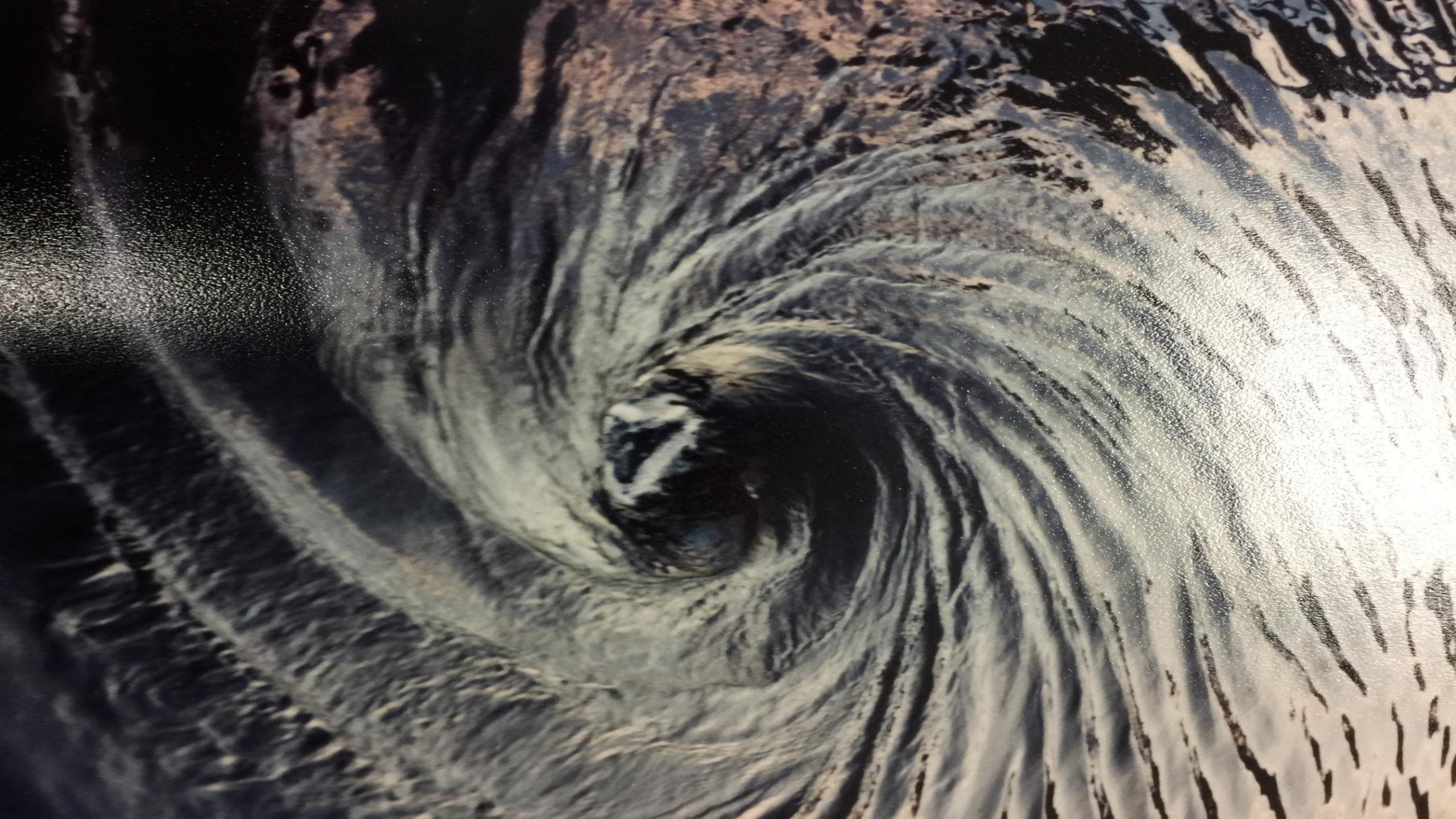
- ▶ Fran, September 17, 1996
 - ▶ Depth of 23.3 feet at the Kinston Neuse River Gauge
 - ▶ Flooded low lying sections of town.
 - ▶ Water was 9 inches from reaching the store.



History

- ▶ Floyd 1999
- ▶ Followed Hurricane Dennis just weeks before.
 - ▶ Filled nearly all of Eastern North Carolina River basins beyond 500 year levels
- ▶ 57 fatalities
- ▶ \$6.9 Billions in losses (1996 dollars) \$9.92 Billion in 2017 terms.
- ▶ Grifton Farmer





History – Floyd at Neuse



Releases from Falls of the Neuse

- ▶ Corps of Engineers only have on leaver to pull.
- ▶ Falls was holding too much water before Dennis.
- ▶ When Floyd arrived they were releasing water that put the river at very high levels.
- ▶ When Floyd hit the river had limited capacity to absorb the deluge.
- ▶ Then with fear of additional rain events and concern for the spillway they continued releasing water.
- ▶ After 3 weeks we began to clean the store only to see water return to the floors due to poorly timed releases from Falls Dam.

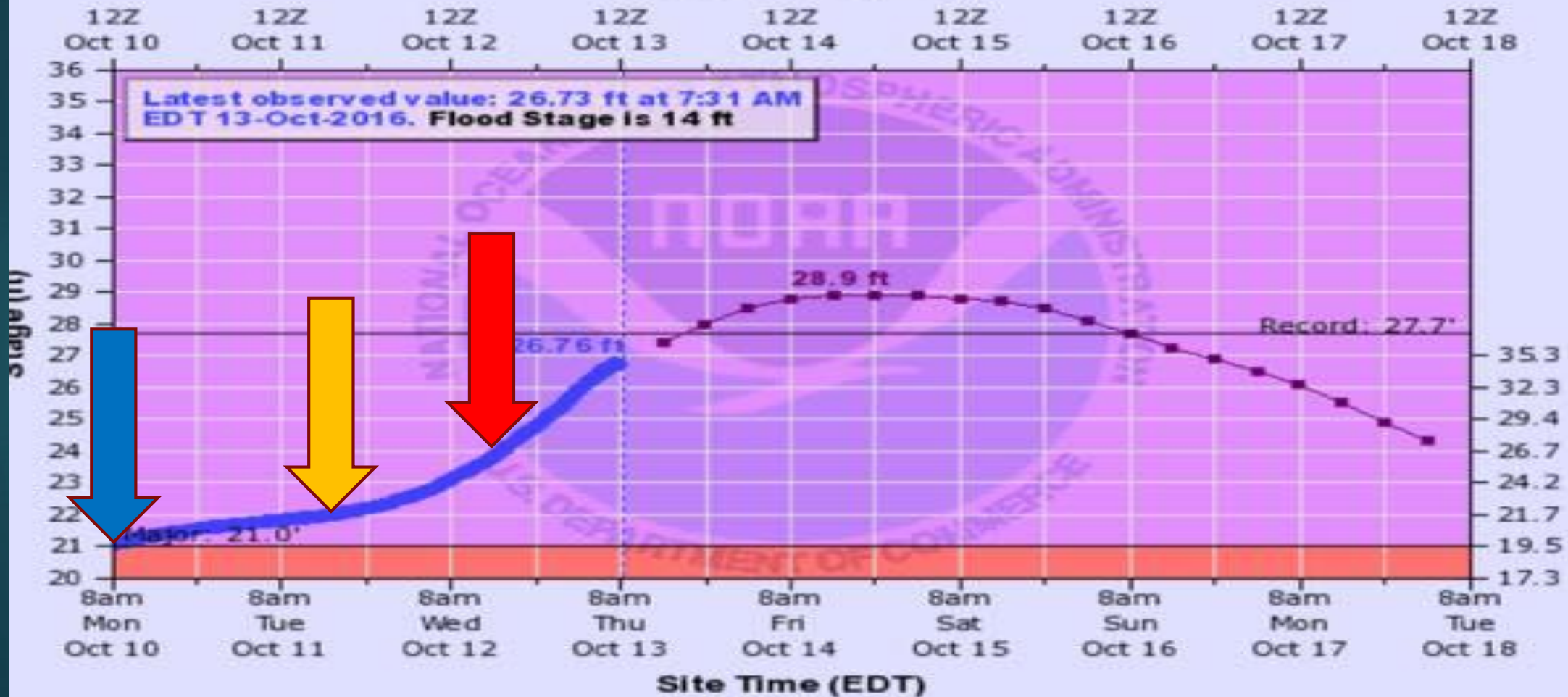
[Hydrograph](#)
[River at a Glance](#)
[Download](#)
[Inundation Mapping](#)
[Probability Information](#)

Auto Refresh: OFF



NEUSE RIVER AT KINSTON

Universal Time (UTC)









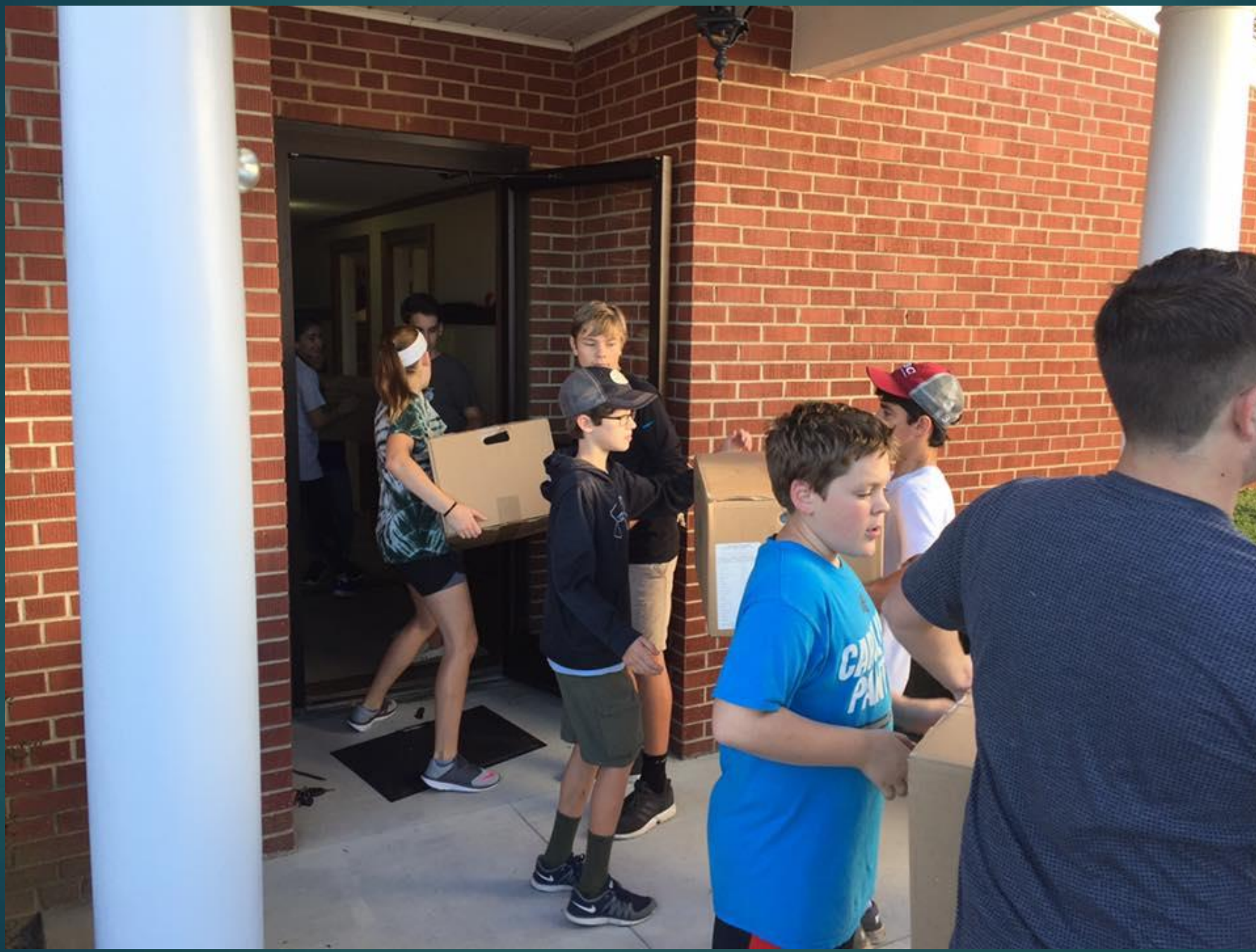








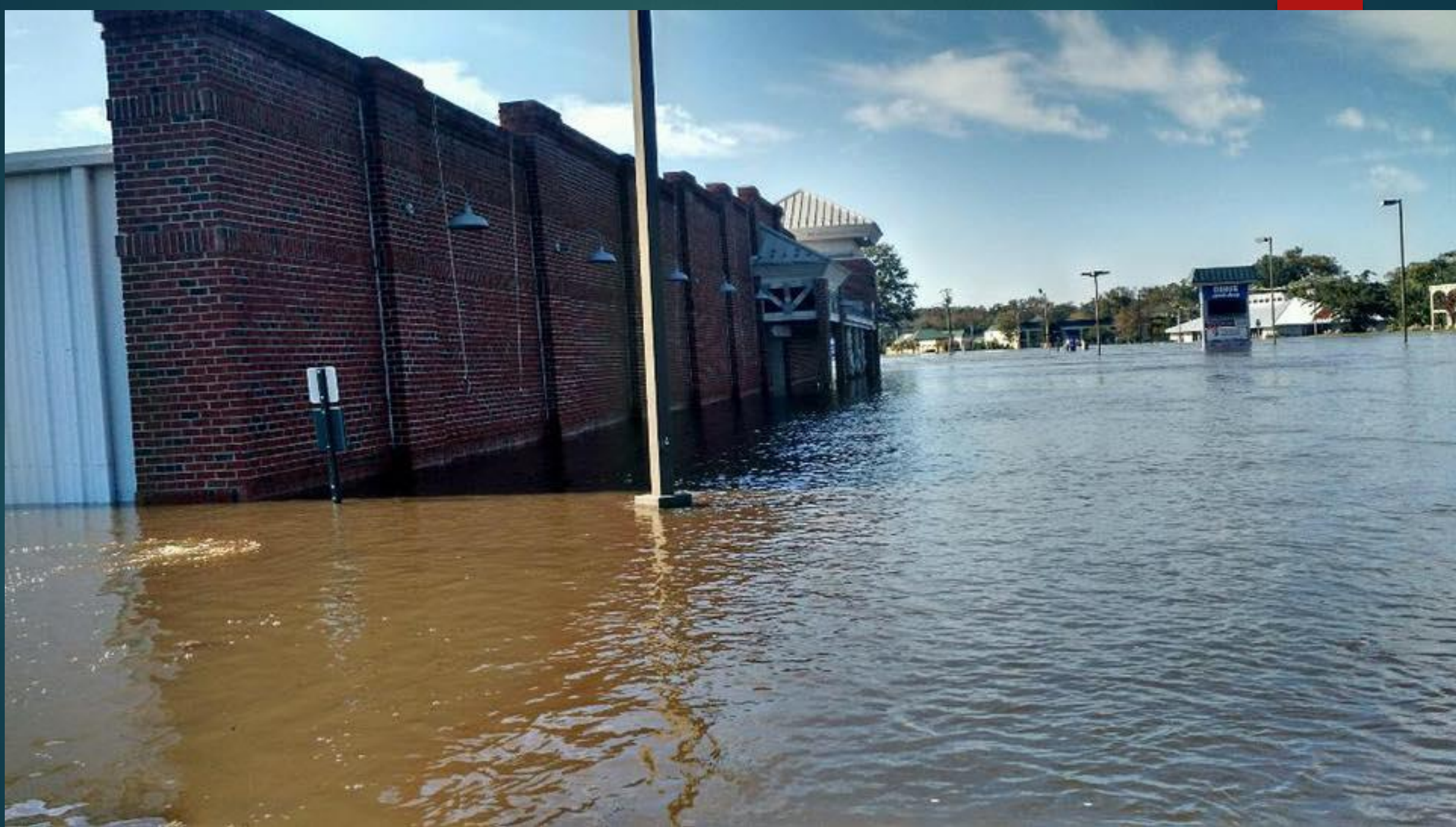














Oct. 13









Slew Way Bridge

US 70 Bridge

170

W New Bern Rd

Sugg-Kivett Rd

Harris Dr

Tynall Park Blvd

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Google Earth



Slew Way Bridge

US 70 Bridge

170

Sugg-Kivett Rd

W New Bern Rd

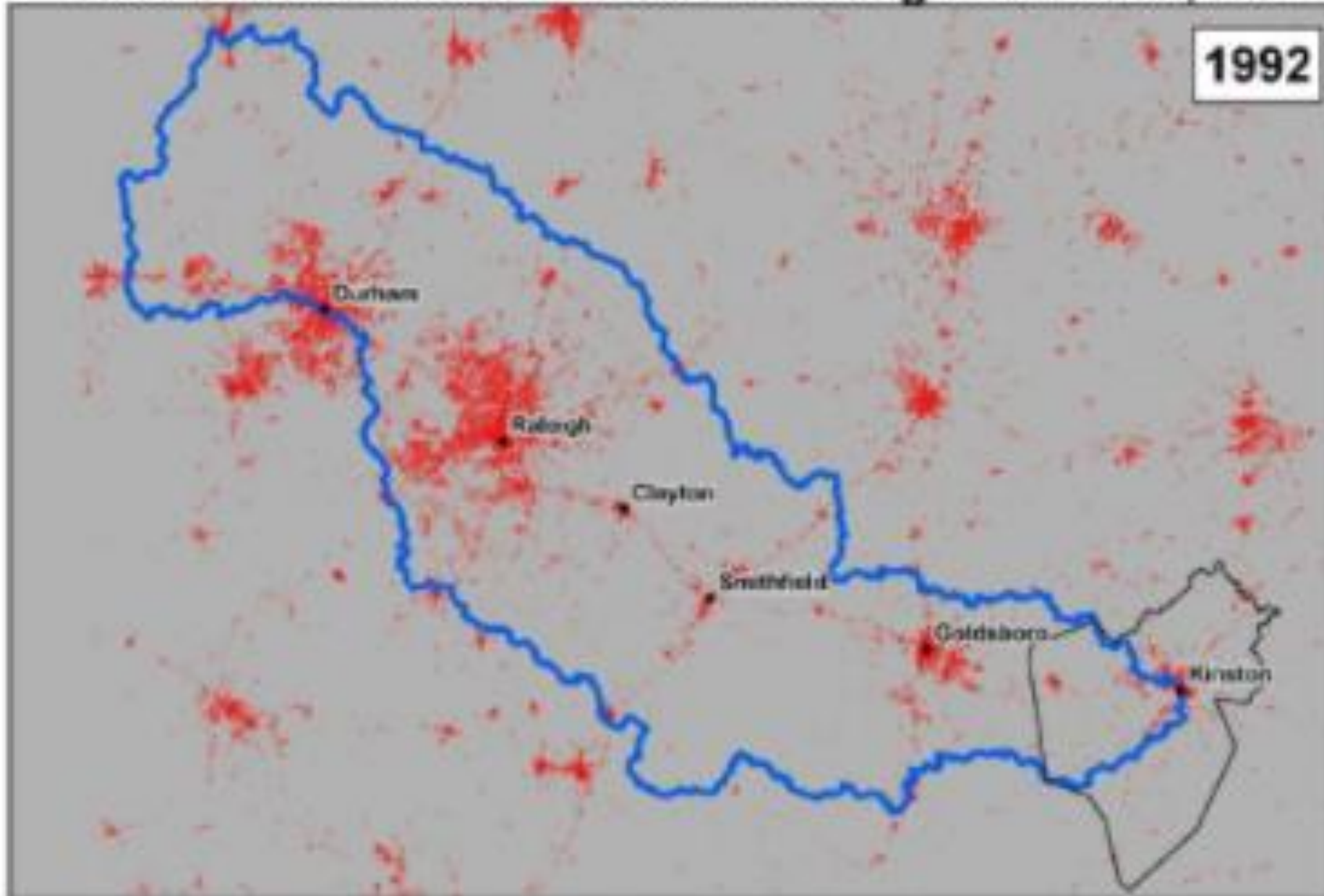
Harris Dr

Tynall Park Blvd

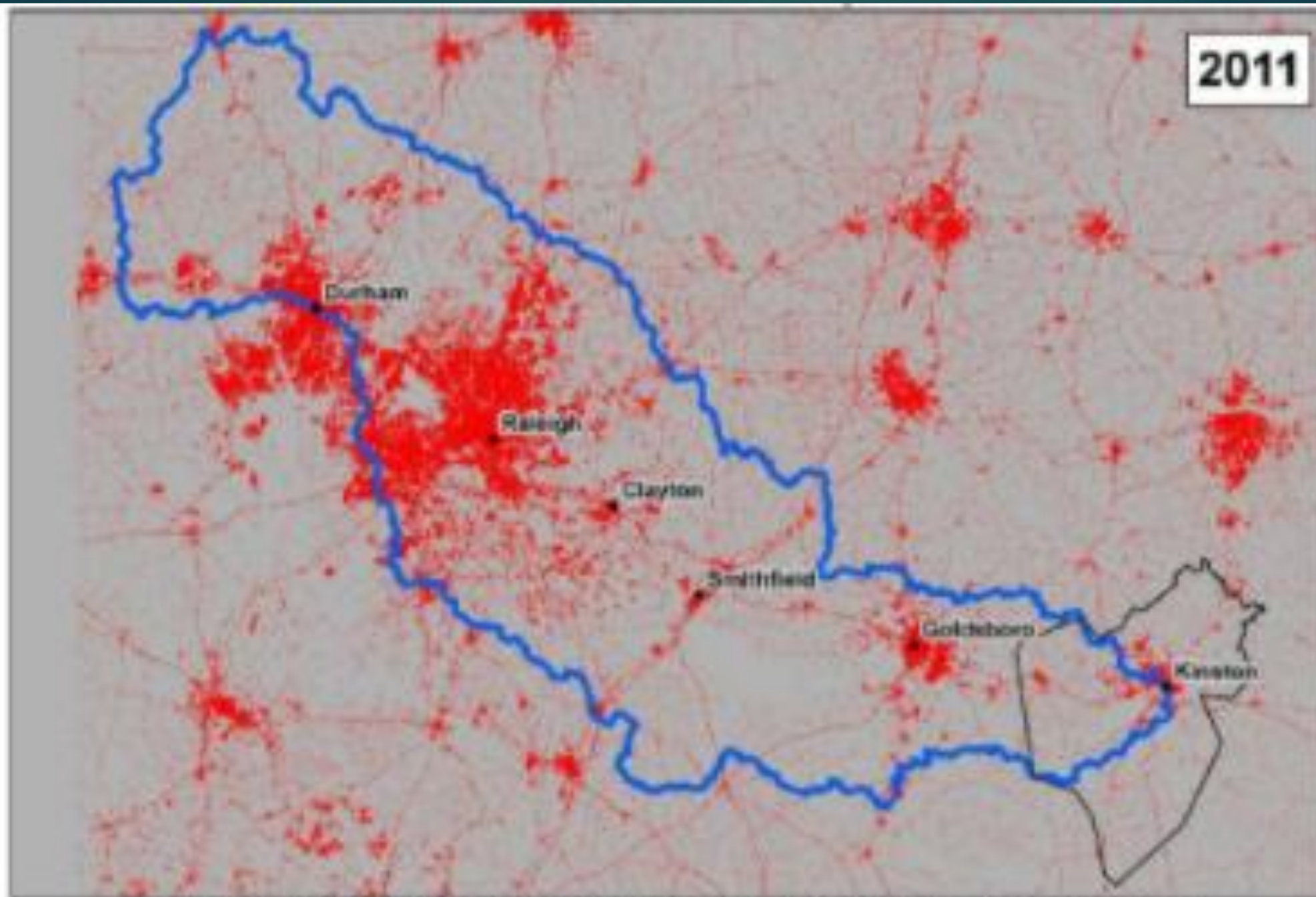
Slew Way Bridge
US 70 Bridge

Developed Landcover Comparison 1992 to 2011

Neuse River Watershed Contributing to Kinston, NC



2011

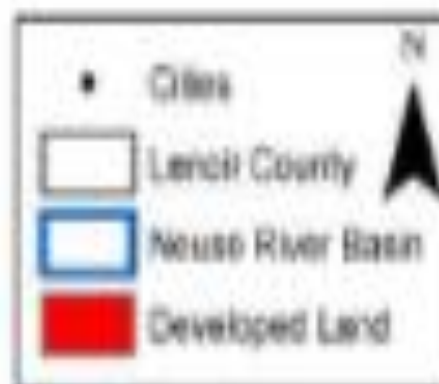


Data Source: National Land Cover Datasets 1991 & 2011 USGS-EROS Map By: NCDOT- Environmental Analysis Unit

Year	Developed Land (%)
1992	7.93
2001	16.94
2006	18.57
2011	19.40

1% of the watershed is
27.11 Square Miles

Developed land increase
between 1992 and 2011 is
equivalent to ~80% of the land
area of Lenoir County.





Pavements



DOT's Affect

- ▶ February 1, 2017
- ▶ Maintained 15,000 miles of Primary Roads (NC, US and Interstate)
 - ▶ Assuming 4 lanes per mile on average.
 - ▶ 5,280 feet per mile
 - ▶ 12 foot width per lane
 - ▶ $5,280 \times 12 = 63,360$ square feet / mile / lane
 - ▶ $63,630 \text{ sf} \times 4 \text{ lanes} = 254,520 \text{ sf/mile}$
- ▶ $254,520 \text{ sf} \times 15,000 \text{ miles} = \mathbf{3,817,800,000}$ square feet of impervious material.

DOT Affect

- ▶ Maintain 65,000 miles of Secondary Roads
 - ▶ Assuming 2 lanes per mile on average.
 - ▶ 5,280 feet per mile
 - ▶ 12 foot width per lane
 - ▶ $5,280 \times 12 = 63,360$ square feet / mile / lane
 - ▶ $63,630 \text{ sf} \times 2 \text{ lanes} = 127,260 \text{ sf/mile}$
- ▶ $127,260 \text{ sf} \times 65,000 = \mathbf{8,271,900,000}$ square feet of impervious material.

DOT Affect

- ▶ Primary and Secondary Roadways impervious material total:
- ▶ $3,817,800,000 + 8,271,900,000 = 12,038,400,000$ square feet of impervious material.
- ▶ Every lane mile = $63,360$ square feet of impervious material.
- ▶ Slow the water's path to the rivers with retention BMPs.

Economic impacts

- ▶ Overall \$15.1 Billion due to Hurricane Matthew, \$5 Billion in NC
- ▶ 47 US lives lost
- ▶ Lenoir County spent \$1.8 million on debris removal
- ▶ Our Shop's losses were over \$1.4 million.
- ▶ This does not put value to lives lost.

What can be done?

- ▶ Build the other 12 flood control projects proposed in the 1965 Flood control act.
- ▶ Improve the onsite retention of water on new developments west of the flooded communities.
- ▶ Slow the water from Roadways heading toward rivers.
 - ▶ Retroactively
- ▶ Lower the water level behind Fall Lake Dam during Hurricane Season.
 - ▶ Pipe potable water from Arura for Raleigh's drinking water.
- ▶ Increase the River's capacity to handle the volume within its banks
 - ▶ Snag, Drag or Dredge.
 - ▶ Modify Banks
- ▶ Bore Sews under the "land bridge" on US 70 approaching the River.

It will happen again!



You are our only hope.