

# Communicating with Data

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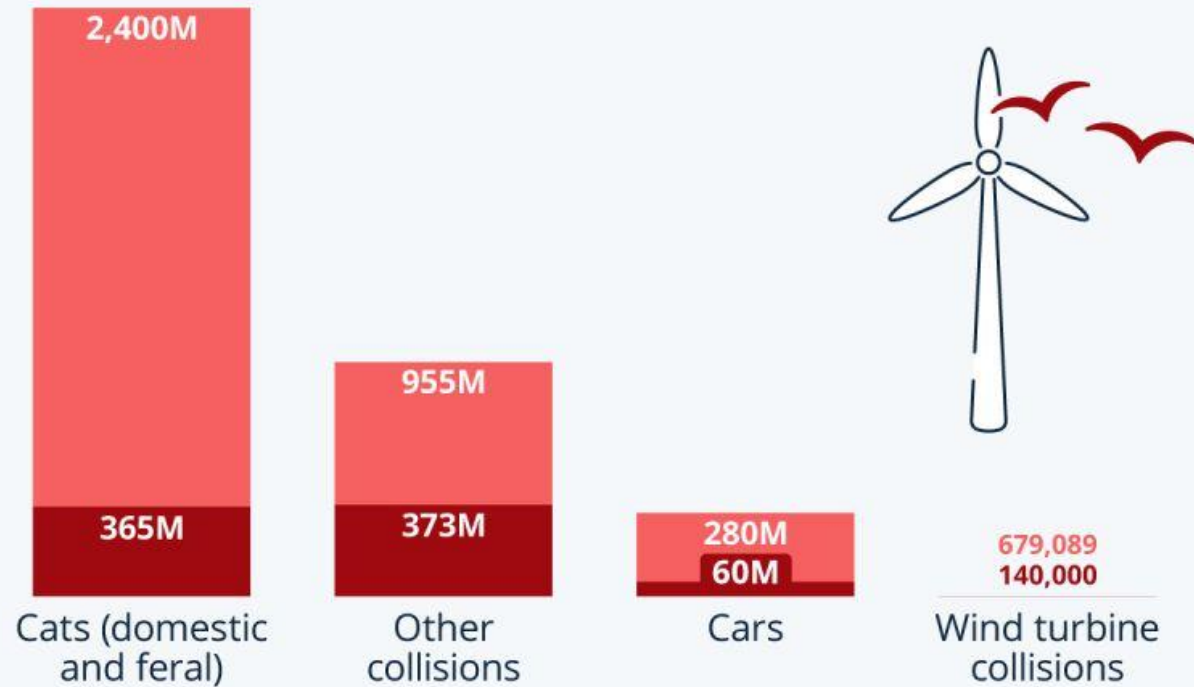
PLAN 678 – Day 3

Spring 2026

# What Is Killing U.S. Birds?

Estimated range of annual human-caused bird deaths in the U.S., by source

■ Lowest estimate ■ Highest estimate



Sources: Subramanian (2012), Smallwood (2013), Erickson et al. (2014), Loss et al. (2013/2014/2015)



statista

# Course Objectives

1. **Data Viz Craft** – Understand the research behind visual communication and develop a vocabulary for effective data visualization.
2. **Data Communication** – Learn how to write and present analysis using plain language and understand the elements of an effective data story.
3. **Data Viz Tools (*Deemphasized*)** – Practice visualizing data using your preferred data viz tools.

# Class Schedule

## Day 1: January 16

- Setting goals for your data visualizations
- Defining your audience
- Visual Processing & Cognitive Load
- How to choose the right visualization for your data (chart bootcamp)

## Day 3: January 30

- Plain language: What it is, why it's important, and how to use it
- Writing about numbers
- What makes a compelling data story
- Mapping your data characters

## Day 2: January 23

- XRAY discussion
- Data Visualization Research: What works
- Enough color theory to get by
- Better legends in your data visualization
- Titles, annotations, and other texts
- “Fix my chart” exercise

## Day 4: February 6

- Accessibility in data visualization
- AI and data visualization
- Data visualization in the workplace
- Workshop time for memos

# Final Memo

Choose an analytical topic and write a memo for a data stakeholder (e.g., a colleague, client, or elected official).

Due Date: February 27

Word Limit: No more than 2,500 words.

Your memo should include:

Use as many charts or visuals as needed but only include those essential to telling your data story.

1. The question or problem you are addressing.
2. Your findings and any potential limitations.
3. The implications of your findings.
4. A brief summary of your data sources and the approach you used to analyze the data.

# Writing about data

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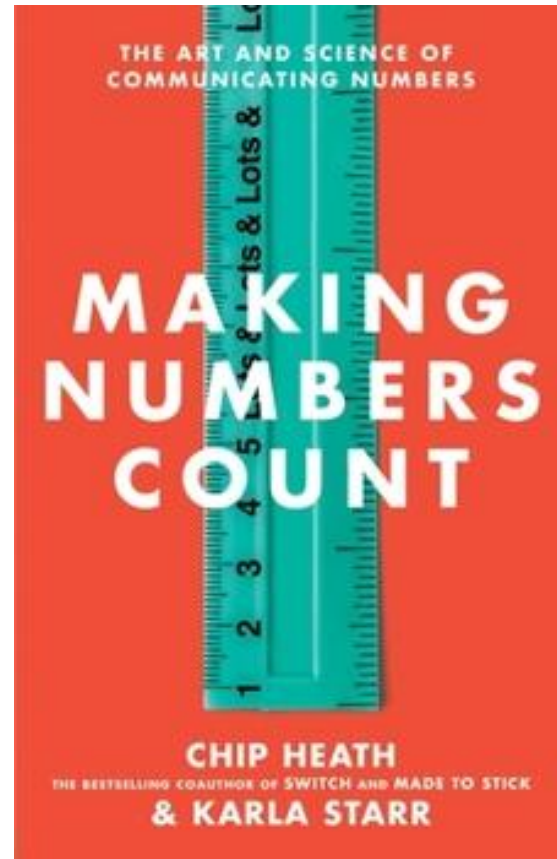
# Writing about data is hard!

## A. DEMOGRAPHIC CHARACTERISTICS AND TRENDS

In 2024, there is an estimated 4,384,359 households in the state of North Carolina. It is projected that the number of households in the state will increase by 5.0% (218,160) between 2024 and 2029. Overall, 80 counties within the state have projected increases in the number of households, with the largest *percent* increases projected to occur in Brunswick (15.3%), Johnston (12.2%), and Currituck (11.3%) counties. While less in terms of percentage, the counties of Wake and Mecklenburg are projected to have the largest *number* increases, totaling 41,241 and 35,676 new households, respectively. Conversely, 20 counties have a projected decrease in the number of households, with individual declines that range from less than 0.1% (Vance County) to 3.0% (Northampton County). The counties with the greatest projected *percent* growth and decline from 2024 to 2029 are shown in the table below, while a map showing changes among all counties is on the following page.

# Luckily, we have excellent teachers

“The Art and Science of Communicating Numbers”



Source: *Making Numbers Count*

## First tip: Avoid numbers

A very small percentage of Fortune 500 CEOs are women.

Among Fortune 500 CEOs, there are more men named James than there are women.

Source: *Making Numbers Count*

## Focus on one at a time

The U.S. national debt is \$27 trillion.

The U.S. national debt is \$27 trillion - \$82,000 per citizen.

Source: *Making Numbers Count*

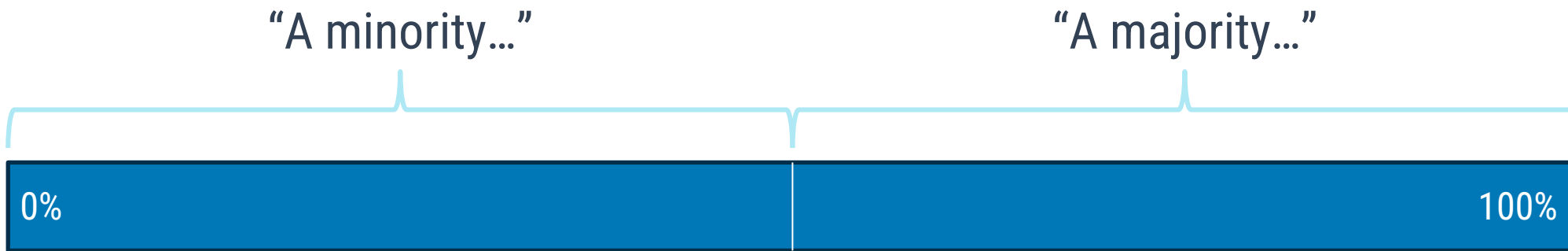
# Round with enthusiasm!

2,842,900  
5.73 times bigger  
9/17

3 million  
6 times bigger  
1/2

Source: *Making  
Numbers Count*

## But don't be too general...



Not very descriptive.

# Favor User-Friendly Numbers

40% of U.S. adults do not always wash their hands after using the bathroom at home.

2 out of every 5 people you shake hands with may have not washed their hands between using the toilet and touching your hands.

Source: *Making Numbers Count*

## Help people understand through simple, familiar comparisons

The geographic area of Pakistan is about the size of 5 Oklahomas.

The geographic area of Pakistan is about twice the size of California.

Source: *Making Numbers Count*

## Help people understand through simple, familiar comparisons

In 2020, the global video games market reached \$180 billion. By comparison, in the movie business, world box office revenues were \$42 billion in 2019 (pre-COVID), while world music revenues were \$22 billion.

The video game industry is more than 4 times the size of the movie industry, and about 9 times the size of the music industry.

Source: *Making Numbers Count*

# Measure in Small Equal Baskets

A tip from data viz hero Florence Nightingale



In [the war's] first 7 months,  
7,857 troops died out of 13,095.

*Nightingale's translate: We had  
600 deaths per 1,000 troops.*

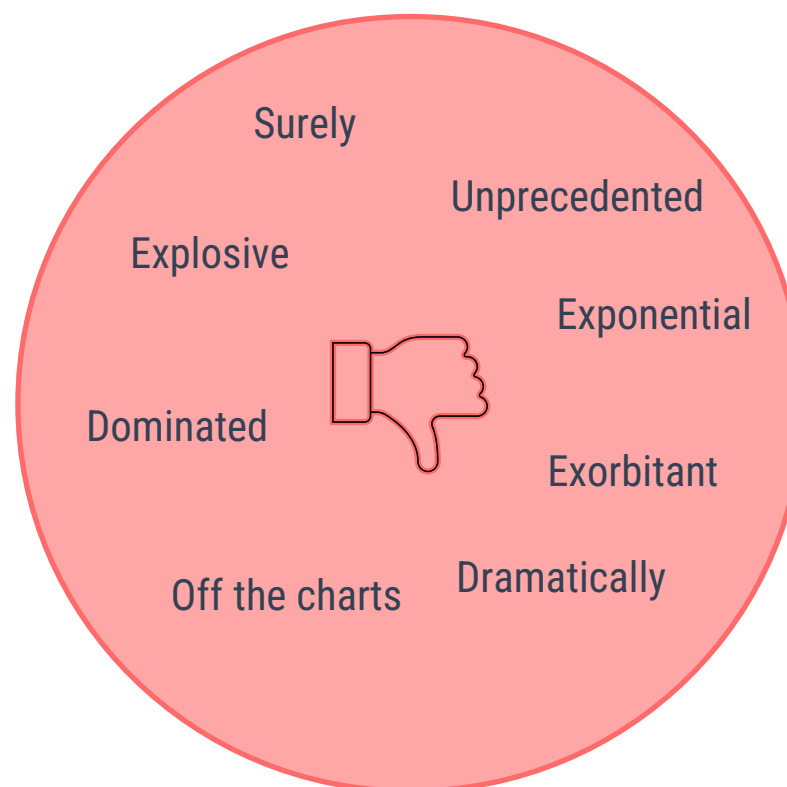
Source: *Making  
Numbers Count*

# It's *usually* more appropriate to use measured words for data analysis

## Data analysis words



## Used car salesman words

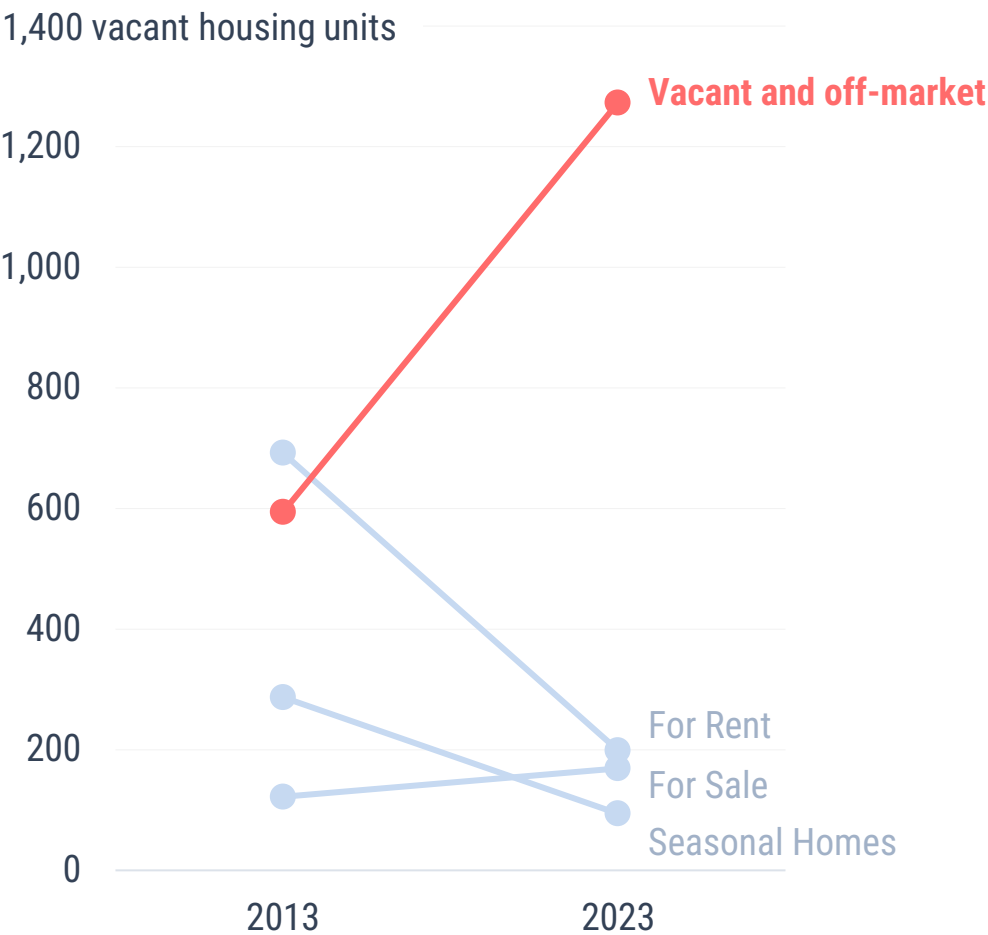


# Let the visual do the talking

Housing market data for Kinston, North Carolina.

“The number of vacant and off-market housing units in Kinston nearly doubled over the past 10 years.”

## Off-market housing units have doubled since 2013



Source: American Community Survey (5-Year Estimates)

## **My personal strategy: Use the one-two method**

- Sentence 1: Declare something without data.
- Sentence 2: Evidence.

## Use the one-two method

1. Despite substantial job growth, housing construction in Jacksonville has lagged over the past decade.
2. According to Census estimates, Jacksonville permits the same number of units as Swansboro and North Topsail Beach, despite having more than ten times the population.

# Plain Language

It's the law!

Public Law 111–274  
111th Congress

## An Act

To enhance citizen access to Government information and services by establishing that Government documents issued to the public must be written clearly, and for other purposes.

Oct. 13, 2010  
[H.R. 946]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

Plain Writing Act  
of 2010.  
5 USC 301 note.

### SECTION 1. SHORT TITLE.

This Act may be cited as the “Plain Writing Act of 2010”.

### SEC. 2. PURPOSE.

5 USC 301 note.

The purpose of this Act is to improve the effectiveness and accountability of Federal agencies to the public by promoting clear Government communication that the public can understand and use.

### SEC. 3. DEFINITIONS.

In this Act:

(1) AGENCY.—The term “agency” means an Executive agency, as defined under section 105 of title 5, United States Code.

(2) COVERED DOCUMENT.—The term “covered document”—  
(A) means any document that—

(i) is necessary for obtaining any Federal Government benefit or service or filing taxes;

(ii) provides information about any Federal Government benefit or service; or

(iii) explains to the public how to comply with a requirement the Federal Government administers or enforces;

(B) includes (whether in paper or electronic form) a letter, publication, form, notice, or instruction; and

(C) does not include a regulation.

(3) PLAIN WRITING.—The term “plain writing” means writing that is clear, concise, well-organized, and follows other best practices appropriate to the subject or field and intended audience.

Source:  
[PlainLanguage.gov](http://PlainLanguage.gov)

# Avoid hidden verbs

|                                                                                                                                                               |                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <p>To trace the missing payment, we need to carry out a review of the Agency's accounts so we can gain an understanding of the reason the error occurred.</p> | <p>To trace the missing payment, we need to review the Agency's accounts so we understand the reason the error occurred.</p> |
| <p>If you cannot make the payment of the \$100 fee, you must make an application in writing before you file your tax return.</p>                              | <p>If you cannot pay the \$100 fee, you must apply in writing before you file your tax return.</p>                           |
| <p>This means we must undertake the calculation of new figures for the congressional hearing.</p>                                                             | <p>This means we must calculate new figures for the congressional hearing.</p>                                               |
| <p>The production of accurate statistics is important for the committee in the assessment of our homelessness policy.</p>                                     | <p>Producing accurate statistics is important to the committee in assessing our policy on homelessness.</p>                  |

Source:  
*PlainLanguage.gov*

# Use active voice

| ✗ Passive voice                                                                                 | ✓ Active voice                                                                       |
|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| The lake was polluted by the company.                                                           | The company polluted the lake.                                                       |
| New regulations were proposed.                                                                  | We proposed new regulations.                                                         |
| The following information must be included in the application for it to be considered complete. | You must include the following information in your application.                      |
| Bonds will be withheld in cases of non-compliance with all permits and conditions.              | We will withhold your bond if you don't comply with all permit terms and conditions. |
| The permit must be approved by the agency's state office.                                       | Our state office must approve your permit.                                           |

Source:  
[PlainLanguage.gov](https://www.plainlanguage.gov/)

# Add useful headings

## Question headings

Question headings are useful if you know what questions your audience will ask. Most people come to government documents with questions. If you know those questions, use them as headings. They will help the audience find the information they are looking for quickly. Using the question-and-answer format helps your audience scan the document and find specific information.

Example:

Why do we use headings?

Source:  
*PlainLanguage.gov*

# Use lists

## ✗ Before

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Each completed well drilling application must contain a detailed statement including the following information: the depth of the well, the casing and cementing program, the circulation media (mud, air, foam, etc.), the expected depth and thickness of fresh water zones, and well site layout and design.

## ✓ After

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With your application for a drilling permit, provide the following information:

- Depth of the well
- Casing and cementing program
- Circulation media (mud, air, form, etc.)
- Expected depth and thickness of fresh water zones
- Well site layout and design

Source:  
*PlainLanguage.gov*

# Highlight important concepts

You can also add **bold** and *italics* to emphasize important concepts within a particular section. While it is difficult to use visual emphasis in regulations, it helps bring out important information in other writing. Only emphasize important information, otherwise you'll dilute its impact.

PUTTING EVERYTHING IN CAPITAL LETTERS IS NOT A GOOD EMPHASIS TECHNIQUE. ALTHOUGH IT MAY DRAW THE USER'S ATTENTION TO THE SECTION, IT MAKES IT HARDER TO READ. AND ONLINE, IT'S CONSIDERED SHOUTING.

Similarly, underlining will draw the user's attention to the section, but it makes it hard to read.

Besides, when reading online, people expect underlined text to be a link. It's better to use **bold** and *italics* for important issues.

Source:  
*PlainLanguage.gov*

# Data Storytelling

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# The Art of Data Storytelling

From a former scientist / movie producer.



The path of your analysis does not have to be your story. Just because you made one leap from one idea to another doesn't mean that is the most compelling way of showing information.

Source: *Houston, We Have a Narrative*

# The universal story structure: And, But, Therefore

Or “ABT”

Act 1 (agreement) – Set the scene. The main character is introduced, along with any necessary story context.

Africa’s animal kingdom is ruled by lions,  
**AND** Simba is a young lion who will succeed his father (Mufasa) as king.

Act 2 (contrast) – Provide the tension. It causes the narrative to change direction in some way.

**BUT** when Simba’s uncle Scar murders Mufasa, Simba is tricked into thinking he is responsible and flees his homeland.

Act 3 (consequences) – Explain the consequences of what happened in Act 2, and the story comes to some kind of resolution.

**THEREFORE,** Simba needs to overcome his guilt before he can take his rightful place as king.

Source: *The Data  
Storyteller’s Handbook*

# The universal story structure: And, But, Therefore

Or “ABT”

Hey, I just met you, **AND** this is crazy.  
**BUT** here's my number, **SO** call me, maybe.

Source: *The Data  
Storyteller's Handbook*

# Building blocks for storytelling

| <u>Agreement</u> | <u>Contradiction</u> | <u>Consequence</u> |
|------------------|----------------------|--------------------|
| And              | But                  | Therefore          |
| Also             | Despite              | So                 |
| Equally          | However              | Thus               |
| Identically      | Yet                  | Consequently       |
| Uniquely         | Conversely           | Hence              |
| Like             | Rather               | Thereupon          |
| Moreover         | Whereas              | Accordingly        |
| As well as       | Although             | As a result        |
| Furthermore      | Otherwise            | Henceforth         |
| Likewise         | Instead              | For this reason    |
| Similarly        | Albeit               | In that case       |

Source: *Houston, We Have a Narrative*

# The ABT Narrative Structure (of this class)

Planners are increasingly asked to solve complex problems **AND** provide data to help guide decisions.

**BUT** these efforts sometimes fall short because not enough emphasis is placed on effectively communicating the results to diverse audiences, leaving key stakeholders uninformed or misinformed.

**THEREFORE**, I'm teaching this class to help students better communicate data and make their analysis more actionable and impactful.

# Effective storytelling from the NC State Climate Office

Using “and”, “but”, “therefore” structure.

September 30, 2024 | Climate Blog, Events

## Rapid Reaction: Historic Flooding Follows Helene in Western NC

By Corey Davis

At 5 pm on Wednesday, September 25, Hurricane Helene was at Category-1 strength with its center just north of Cancun, Mexico, more than 500 miles and 30 hours away from its eventual landfall along the coast of Florida.

**But** it was already raining in Asheville by then, as a line of slow-moving showers along a stalled cold front – fed by tropical moisture from the fringes of Helene to the south – had set up from Atlanta through the southern Appalachians.

By midnight on Thursday, the Asheville Airport totaled 4.09 inches, and stream flows were already running at daily record high levels in upstream, upslope parts of the French Broad River basin.

**So** the rain continued all day on Thursday as the frontal boundary had barely moved and Helene’s outer rain bands were closing in, adding even more moisture to the mix. More than nine inches fell that day across southern Yancey County.

As mountain streams became overrun with moisture, that water rushed down the rivers and into towns such as Asheville, all while the heaviest rain from Helene was just beginning to fall.

Source: NC State  
Climate Office

## For next class

- Write an introductory paragraph for your memo using the “ABT” story structure.

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PLAN 678

Spring 2026