

Activity 4.1**Analyzing physical factors*****The physical factors of risk***

When most people think of cities that are at risk from hurricanes, they think of places like Miami, New Orleans, or maybe Charleston, South Carolina. These cities have had either direct hits or very close calls with major hurricanes in recent memory, and seem to be threatened nearly every year. Few, if any, people associate New York City and hurricanes, believing that New York is too far north, or too far inland, to be in any real danger from a major hurricane.


The reality is that New York City was hit by major hurricanes in 1635, 1815, 1821, and 1893, and escaped with near misses in 1938, 1985 (Gloria), and 1999 (Floyd). Sooner or later, a “Big One” will make a direct hit on New York City, and because of characteristics of the shoreline and the distribution of people in the city, chances are good that the hurricane’s impact on the city will be severe.

Probability of a major strike

Hurricanes DO strike New York City, although not as frequently as they hit coastal cities farther south. To begin, you will look at the probability that New York City will be hit by a named storm during any given year. Then you will determine the likelihood of New York City being hit by a major hurricane of H3 or higher.

- ▶ Launch the ArcView GIS application, then locate and open the **cyclones.apr** project file.
- ▶ Open the **Hurricane Probability** view.

This view shows the probability that an area in the Eastern US will get at least one named storm during any given year.

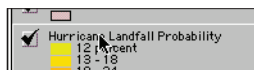
- ▶ To determine the hurricane probability for New York City:
 - Activate the **Hurricane Landfall Probability** theme.
 - Using the Identify tool , click on New York City.
 - In the Identify Results window, read the **Probability** field to find the hurricane probability for New York City.

1. What is the probability, in percent, that New York City will be hit by a named storm in any given year?

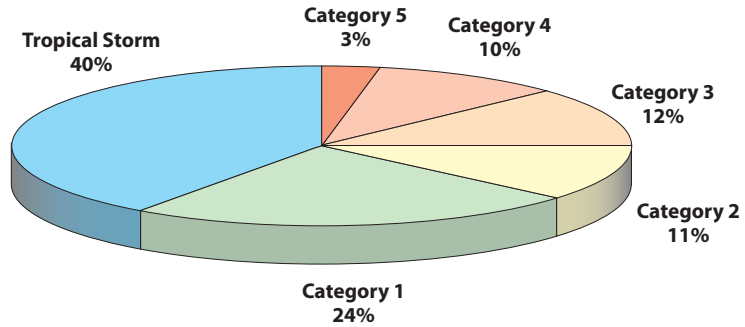
“Named” storms

When a storm reaches tropical storm intensity, it is assigned a name. The first storm of the season begins with an A, the second with a B, and so on. Each tropical cyclone basin has a standard set of names that are used on a rotating five-year cycle.

To activate a theme, click on its name in the Table of Contents.



Atlantic Tropical Cyclones by Category (1950–2000)



Use this chart to answer the following questions:

2. What percentage of Atlantic tropical cyclones were minor (i.e., tropical storms, H1, or H2)? What percentage were major hurricanes (H3 or greater)? Record your answers in the table:

Storm Category	% of Atlantic Storms in Category
Minor tropical cyclones: tropical storms, H1 and H2 hurricanes	
Major tropical cyclones: H3, H4, and H5 hurricanes	

The percentage you found in question 1 represents the likelihood that a named storm will hit New York City in any given year. The percentages determined in question 2 tell the percentages of named storms that are minor and major hurricanes.

3. Determine the probability that New York City will be hit by a major hurricane (H3-H5) in any given year. To find this, multiply the percentages (as decimals) obtained in the first two questions:

$$\begin{aligned} & \underline{\hspace{2cm}} \text{ (probability of a named storm hitting NYC in any year)} \\ \times & \underline{\hspace{2cm}} \text{ (probability of a named storm being a major hurricane)} \\ = & \underline{\hspace{2cm}} \text{ (probability of a major hurricane hitting NYC in any year)} \end{aligned}$$

4. Determine the probability that New York City will be hit by a minor hurricane (Tropical Storm-H2) in any given year. To find this, multiply the percentages obtained in the first two questions:

$$\begin{aligned} & \underline{\hspace{2cm}} \text{ (probability of a named storm hitting NYC in any year)} \\ \times & \underline{\hspace{2cm}} \text{ (probability of a named storm being a minor hurricane)} \\ = & \underline{\hspace{2cm}} \text{ (probability of a minor hurricane hitting NYC in any year)} \end{aligned}$$

These probabilities indicate the number of major and minor hurricanes, on average, that could hit New York City each year.