# North Carolina Climate Science Report — Errata

The preliminary version of the North Carolina Climate Science Report was released on March 11, 2020.

A revised version was published in May 2020 following a final copyedit. In addition to minor edits for style and clarity, the revised version included several substantive changes to text and figures to clarify information or correct errors. Changes to improve the communication of the scientific findings regarding droughts and projected changes in hurricanes were made in response to helpful comments on a draft of Chapter 3 of the state's "March 2020 North Carolina Risk Assessment and Resilience Plan," which incorporates portions of this report.

In September 2020, the report was updated to enhance the accessibility of the report by adding alternative text descriptions for all figures and images and to improve the tab and reading order structure of the PDF for those using screen readers and other assistive technology. Four figures in Appendix B were also corrected, and more information on the base period used in Figure 1.6 was added to the figure caption.

All of the substantive changes are described below. Page numbers refer to the March 2020 version.

## Report Findings

### Page 6

In the temperature section, the description of the threshold value for "very hot" days has been corrected to 95°F rather than 90°F, and the text has been clarified to indicate that all of the threshold values are inclusive. The corrected third bullet reads: "North Carolina has not experienced an increase in the number of hot (daytime maximum temperature of 90°F or higher) and very hot (daytime maximum temperature of 95°F or higher) summer days since 1900. However, it has seen an increase in the number of warm (nighttime minimum temperature of 70°F or higher) and very warm nights (nighttime minimum temperature of 75°F or higher)." The last bullet now reads: "It is ***likely*** that the number of cold days (daytime maximum temperature of 32°F or lower) will decrease."

### Page 7

The finding regarding projected changes in the intensity of the strongest hurricanes has been revised to note that there is ***medium*** confidence in regional-scale changes and to clarify the implications for North Carolina. The revised text reads: "On a global scale, the intensity of the strongest hurricanes is ***likely*** to increase with warming. The confidence in this outcome is ***high***. For individual regions such as North Carolina, the confidence in this outcome is ***medium***. While confidence for North Carolina is lower than for the entire globe, there is no known reason that North Carolina would be protected from stronger hurricanes, and this potential risk should be considered in risk assessments."

### Page 7

The text on projected changes in drought has been revised to note that there are multiple forms of drought and that droughts are projected to become more frequent as well as more intense. The

revised text reads: “It is ***likely*** that future severe droughts in their multiple forms in North Carolina will be more frequent and intense due to higher temperatures leading to increased evaporation. As a result, it is ***likely*** that the frequency of climate conditions conducive to wildfires in North Carolina will increase.”

## Executive Summary

### Page 21

The text describing projected changes in hurricane intensity has been clarified (see note under “Report Findings” above). The revised text reads: “For individual regions such as North Carolina, the confidence in this outcome is ***medium***. While confidence for North Carolina is lower than for the entire globe, there is no known reason that North Carolina would be protected from stronger hurricanes, and this potential risk should be considered in risk assessments.

### Page 22

The paragraph on drought was expanded to note more impacts and explain in more detail why droughts are projected to become more frequent and severe. The revised paragraph reads: “Drought can have major impacts on the state, including agricultural production, water availability in rivers, lakes, and aquifers, and wildfires. The impacts on these different sectors and systems vary depending on the duration and spatial scale of the precipitation deficits. Although overall precipitation is projected to increase, this is principally a result of larger amounts during heavy rain events. Intervening dry periods are projected to become more frequent, and higher temperatures during those dry periods will more rapidly deplete soil moisture. Thus, it is ***likely*** that major droughts in their multiple forms will become more frequent and severe because of higher temperatures that will increase evaporation rates. As a result, it is ***likely*** that the climate conditions conducive to wildfires in North Carolina will increase in the future.”

## Chapter 1

### Page 38

A note was added to the caption of Figure 1.6 to emphasize the fact that the projections shown in the figure are related to the period 1986–2015 rather than the 1996–2015 period used throughout the rest of this report.

## Chapter 2

### Page 69

The following paragraph was added to provide more detail on the mechanics of drought: “Drought is a complex phenomenon. Precipitation deficits occur over a range of time and spatial scales, and the physical effects of such deficits vary depending on these scales and the magnitude of the deficits. Deficits on time scales of weeks (sometimes referred to as ‘flash droughts’) that occur during the warm season deplete root-zone soil moisture and can negatively affect agriculture. Deficits on time scales of months to seasons to years can deplete moisture at deeper levels. If they occur over large areas, they can lead to reductions in river flows, lake levels, and water tables. The designation of a dry period as a ‘drought’ depends on the impact of interest and is sometimes labeled as such (e.g., agricultural drought, hydrologic drought). Severe droughts usually have multi-sectoral impacts.”

### Page 86

The assessment statement regarding projected changes in the intensity of the strongest hurricanes has been revised to note that there is ***medium*** confidence in regional-scale changes and to clarify the implications for North Carolina. The text now reads:

"1. The intensity of the strongest hurricanes is ***likely*** to increase with warming, and this could result in stronger hurricanes impacting North Carolina. Confidence in this result is ***high*** for changes in tropical storms (including hurricanes) globally. For individual regions such as North Carolina, the confidence in this outcome is ***medium***. While confidence for North Carolina is lower than for the entire globe, there is no known reason that North Carolina would be protected from stronger hurricanes, and this potential risk should be considered in risk assessments."

## Chapter 3

## Revised Figures

The following figures were revised to correct an issue with how data points aligned with the x-axis labels (there were no changes to the actual data values): 3.2, 3.13, 3.15, 3.18, 3.20, 3.21, 3.23, 3.29, 3.31, 3.33, 3.34, 3.36, 3.37, 3.39, 3.45, 3.47, 3.49

### Section 3.2.2, Pages 98–99

The text and figure caption describing Figure 3.5 had not been updated to match the final version of the figure. The figure caption has been corrected to indicate a long-term average of 6 very warm nights per year rather than 8, and the paragraph preceding the figure now reads: "The region sees a long-term average of about 6 very warm nights per year. The changes over the period of record (Figure 3.5) have been similar to the pattern in annual average temperatures (Figure 3.2), with an increasing trend since 1970. Most years since 1985 have been at or above the long-term average, and the last four years (2014–2018) all saw more than double the long-term average number of very warm nights."

### Sections 3.2.9, 3.3.9, and 3.4.9, Pages 115, 138, and 161

References to "cyclones" have been changed to "winter storms" for consistency with other sections of the report. A revised sentence appearing in all three regional sections now reads: "Regional studies of trends in winter storms are challenged to provide definitive results regarding changes in the frequency or intensity of storms, but regardless of these properties, it is ***very likely*** that winter storms of even similar intensity will produce heavier precipitation (e.g., Marciano et al. 2015, Michaelis et al. 2017)." A sentence appearing only in the Coastal Plains section (p. 115) has been revised to read: "Also, with rising sea levels, coastal flooding from winter storms is ***very likely*** to increase (e.g., Colle et al. 2015, Zhang and Colle 2018, Roberts et al. 2017)."

### Section 3.3.9.1, Pages 138

A sentence about arctic amplification included a phrase from an earlier draft of the report. The corrected sentence reads: "As noted earlier, a definitive understanding of the effects of arctic amplification on midlatitude winter weather remains elusive (Cohen et al. 2020), and this adds some uncertainty to future projections of winter climate in North Carolina."

### Section 3.4.9, Page 161

The following sentence about coastal flooding was inadvertently copied from the Coastal Plains section and has been deleted from the Western Mountains section: "Also, with rising sea levels, coastal flooding from cyclones is ***very likely*** to increase (e.g., Colle et al. 2015, Zhang and Colle 2018, Roberts et al. 2017)."

## Chapter 4

### Section 4.6, Page 175

The following sentence has been corrected to refer to Table 4.2 rather than Table 4.1: "North Carolina has five gauges with sufficiently long records to provide stable estimates of trends in RSL (Table 4.2)."

## Chapter 5

### Section 5.1, Page 187

The following sentence has been corrected to refer to Figure 2.18 rather than 2.19: "At the state level, increases in the frequency of heavy rainfall are projected, particularly for the higher scenario (RCP8.5; see Figure 2.18 and associated text)."

### Section 5.2.3, Pages 189–190

Text preceding Figure 5.1 and in the Figure 5.1 caption has been revised to refer to a consistent list of years in which high values of acreage burned corresponded to severe drought conditions: 1985, 1986, 2008, 2011, and 2016.

### Figure 5.1, Page 190

The figure has been corrected so that the data for acres burned aligns properly with the dates on the x-axis.

### Figure 5.4, Page 193

The caption has been corrected to note that the map shows rankings out of 125 seasons (rather than 124 seasons) over 1895–2019 (rather than 1895–2018).

### Section 5.2.5, Page 195

The values originally provided for mid- and end-of-century projected temperature changes (2°–6°F for mid-century and 3°–11°F by 2100) were based on a slightly different computation used in an earlier draft of the report. The corrected sentence reads: "By mid-century, annual average temperature in North Carolina is projected to increase by 2°–5°F and by 2°–10°F by the end of the century, depending on the scenario (see Figure 2.3)."

### Section 5.3, Page 196

The wording of the last sentence in the section ("may no longer exist") was ambiguous as to the timing of the change. The sentence has been revised to read: "The cool temperatures to which these forests have adapted may cease to exist in the southern Appalachians in the future, putting the viability of the high-elevation ecosystems at risk."

## Appendix B

### Figures B.9a, B.9b, B.13b, and B.14b, Pages 221, 227, and 229

The images for four figure panels were incorrect and have been updated with the correct images. The original B.9a and B.9b images showed the hottest maximum and coldest minimum *single-day* temperatures each year (already shown in Figure 3.9) rather than the temperatures for the hottest maximum and coldest minimum *five-day periods* each year. Figure B.13b showed the annual number of days with maximum temperatures greater than or equal to *90°F* (already shown in 3.38a) rather than greater than or equal to *95°F*. Figure B.14b showed annual number of days with minimum temperatures greater than or equal to *70°F* (already shown in 3.38b) rather than greater than or equal to *75°F*.