

**NC STATE UNIVERSITY**



**CHHE**  
Center for Human Health  
and the Environment

# **North Carolina Survey on Human Health and the Environment *Overview Report of 2020 Data Collection***

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### **I. Introduction**

What are the biggest environmental health problems as viewed by North Carolinians in 2020? How are these problems viewed as personal versus collective health threats? And how do North Carolinians feel about the information they need—and may or may not have—to protect themselves successfully from environmental health threats?

These questions, among others, motivated the first survey of North Carolina residents on environmental health conducted by the Center for Human Health and the Environment (CHHE) at NC State University. The mission of the center is to understand how human health, at both the individual and population level, is impacted by environmental factors and to implement this knowledge to reduce the adverse impacts of environmental factors on human health. We work in one of the center's many cores, which all emphasize different aspects of environmental health. The Community Engagement Core tackles many projects, including the collection of social science data through this survey. We see these survey data as fulfilling part of our goals to provide information to individuals, communities, and educators to develop the capacity of community members to understand and respond to environmental health concerns.

Our aims in conducting the survey were (1) to get a sense of how residents of North Carolina experience environmental health threats and (2) to gauge their specific reactions to two major health threats facing the state in 2020. Our survey questionnaire was guided by the academic literature on health communication and environmental health literacy. We included a handful of central ideas that provide benchmarks to assess how North Carolinians might encounter information about environmental health topics, whom they trust for such information, and how much they feel equipped in terms of their motivation and ability to protect themselves from environmental health threats.

For the two topics in our second aim, we focused on COVID-19 and per- and polyfluoroalkyl substances (PFAS). COVID-19, of course, has had some impact on everyone in the state of North Carolina. We could have approached this topic from many different perspectives, and we focused primarily on how well North Carolinians felt they were equipped to prevent exposure to the novel coronavirus. PFAS has received substantial attention in the state of North Carolina due to the contamination of the Cape Fear River basin. These chemicals have also been the focus of research by CHHE members since 2017, for example through the GenX Exposure Study funded by the National Institute for Environmental Health Sciences.

In this overview report, we describe how North Carolina residents reported their views on the above topics in mid-2020, as well as their sense of environmental problems in general and their levels of trust in information sources, among other variables. Details on the survey methodology are included in the final section of the report.

## II. Environmental Problems in North Carolina

One key interest we have is establishing a better understanding of how residents of North Carolina generally view environmental problems that may impact their health. We asked a question with nine discrete response options, based on a past survey (Smith, Marsden, & Hout, 2013), that allowed respondents to choose the *most important environmental problem facing North Carolina as a whole*.

Climate change emerged as the problem selected by the most respondents overall (see Figure 1), followed by water pollution. Notably, the fifth most popular choice was “none of these,” with just under 10% of respondents selecting that option.

Although we asked about North Carolina specifically, it could be revealing how residents of different *regions* of North Carolina might view these problems differently. We therefore report the same results broken down according to three regions: Mountains (Western NC), Piedmont (Central NC), and Coastal Plains (Eastern NC). These regional results are depicted in Figure 2. Results suggest fairly similar patterns in responses. For example, aggregate responses revealed chemicals and pesticides, using up our natural resources, and genetically modified foods as having similar proportions and similar rankings across the regions. Some geographical differences also emerged in these rankings. Residents of the Coastal Plains identified water pollution more often than climate change. Residents in the Mountains viewed

Figure 1. Most important environmental problem (N = 755)

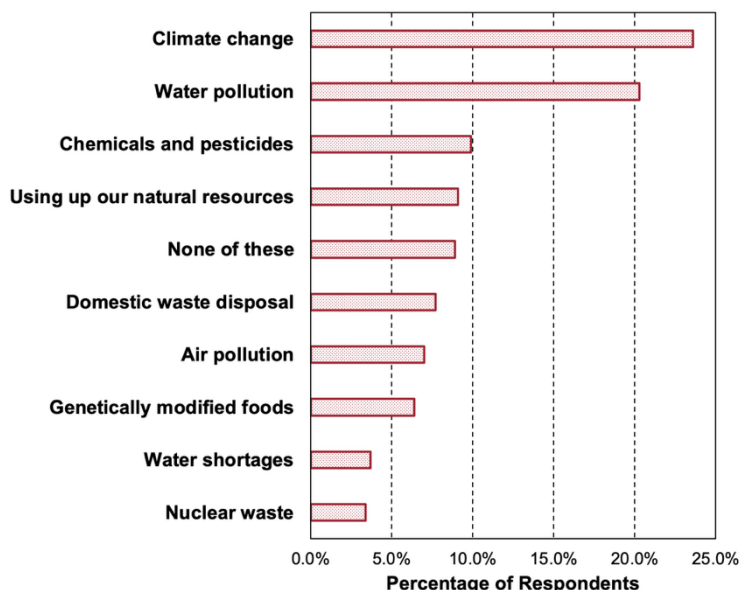
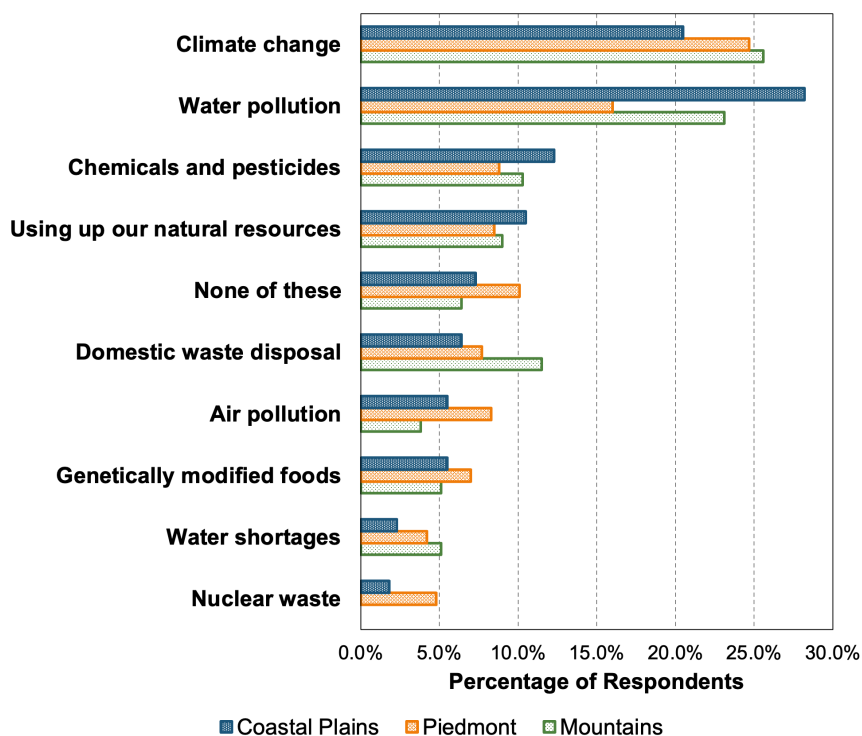


Figure 2. Most important environmental problems by region of North Carolina (N = 755)



domestic waste disposal as the third most important problem. And Piedmont residents were the most willing to select “none of these” in response to the question.

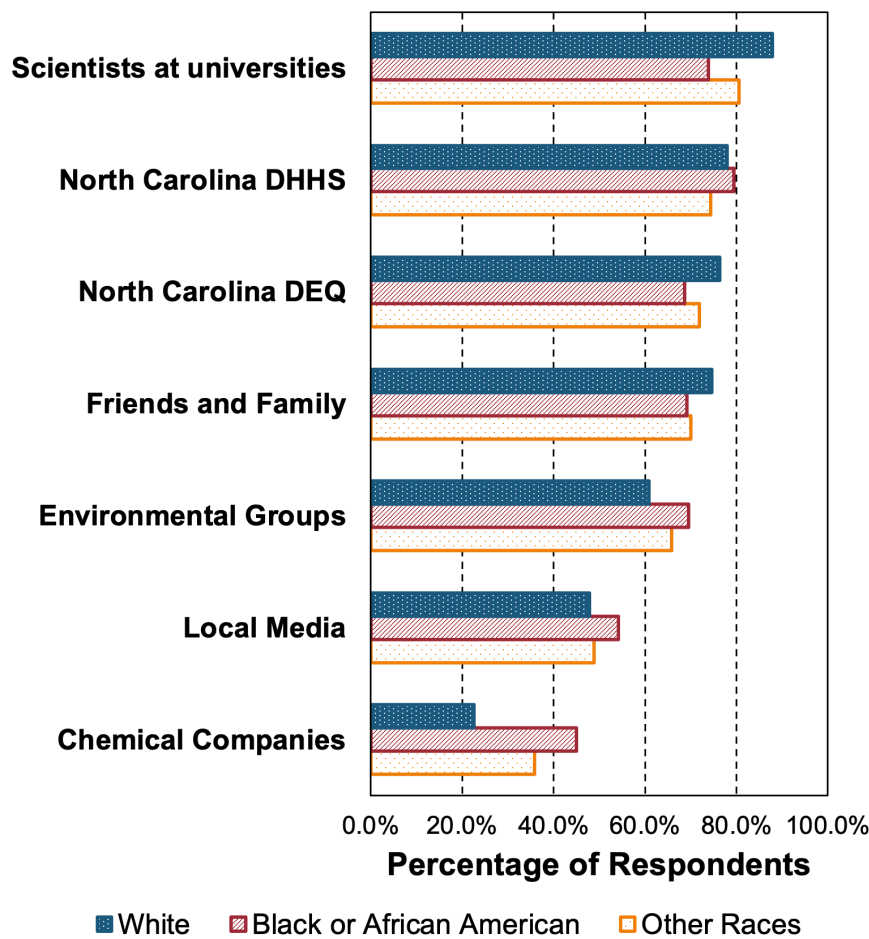
We asked this question in an additional, alternate format for the other half of the survey sample (N = 750). Those respondents received the same question with a blank space where they could simply volunteer what came to mind when they thought of an environmental problem. We are currently coding those responses into categories for comparison to the version of the question with a fixed list of responses reported above.

**Figure 3. Trust in different sources of health information accounting for racial group of respondent (N = 1,505)**

**III. Trust in Information Sources**

Because of our center’s focus on serving groups vulnerable to environmental hazards, we were interested in comparing trust in health information sources by racial groups. Our survey respondents identified as American Indian or Alaska Native (0.9%), Asian (2.9%), Black or African American (20.5%), Native Hawaiian or Pacific Islander (0.1%), White (68.8%), Something else (2.9%), or 2 or more races (3.8%). Respondents were asked to rate their level of trust in a variety of information sources on a scale from 1 (no trust at all) to 5 (complete trust).

The overall trend (not shown) indicates that scientists in universities are moderately to completely trusted sources of



health information for North Carolina residents (84.2%). In descending order of trust, we found two state agencies of North Carolina—North Carolina Department of Health & Human Services (DHHS) and North Carolina Department of Environmental Quality (DEQ)—with 78.0% and 74.4% respectively. The lowest percentage of residents reported moderate to complete trust for environmental groups (63.1%), local media (49.1%), and chemical companies (28.7%).

Some major differences did emerge from these data, however, when we considered how residents identifying with different racial groups saw these sources of information. White respondents, who were a majority of total respondents (68.8% of the sample), reflected the same levels of trust as the overall trends (Figure 3). Black or African American respondents reported their highest levels of trust in North Carolina DHHS (79.4%), followed by scientists in universities (73.9%) and North Carolina DEQ (68.7%). Notably, local media and chemical companies were more trusted among Black participants (54.1% and 45.0%) and among Asian, American Indian or Alaska Native, Native Hawaiian or Pacific Islander, two or more races, and a “something else” category (48.8% and 35.8%) than among White participants.

When considering geographical regions of North Carolina, there was little variation in these patterns of trust. The only real differences we found were in trust in chemical companies—residents of the Mountains region reported lower levels of trust (18.0%) than the Piedmont (30.5%) and Coastal Plains (28.0%) regions.

#### **IV. Two Important Issues Facing North Carolinians in 2020**

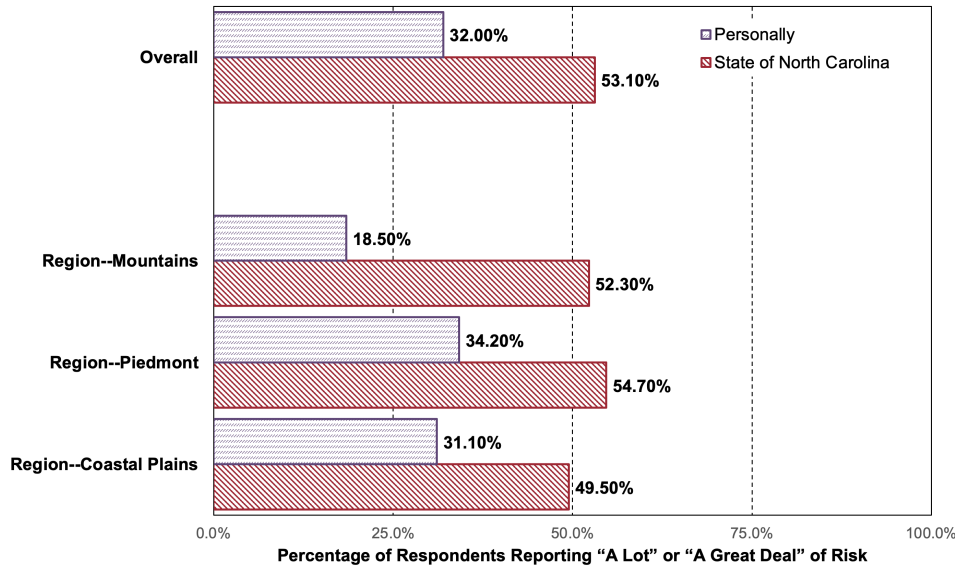
In addition to getting a general idea of how people felt about environmental problems and about different sources of information, we were interested in investigating how North Carolinians were responding to two important problems in 2020: COVID-19 and per- and polyfluoroalkyl substances (PFAS). The first problem is familiar to almost all residents of North Carolina (in our survey, only 2.3% of respondents indicated they had not heard of COVID-19 before receiving our survey questionnaire). The second problem may be less familiar statewide. PFAS and water contamination has been a salient issue in parts of the state—for example, within the Cape Fear River basin—but not throughout the state. Therefore, understanding how North Carolinians view these two problems and how well equipped they feel to protect themselves became a focus.

##### ***A. The Novel Coronavirus (SARS-CoV-2) and COVID-19***

In all the public debate surrounding COVID-19 and how to contain its spread and reduce infection rates, one recurring question has been how people view the disease as an individual threat versus as a collective threat. After all, many of the recommendations from public health officials depend on the idea that individuals will participate in necessary collective behaviors to combat the pandemic.

In our survey, we measured how people viewed COVID-19 in terms of its threat to them personally and its threat to the state of North Carolina. On the first question, we found that only one-third (32.0%) of respondents indicated they saw the novel coronavirus as harmful *to them personally* (“a lot” or “a great deal” of harm compared to “a moderate amount,” “a little,” or “not

**Figure 4. Personal and statewide perceptions of COVID-19 risk by region (N = 779)**



at all”). In contrast, on the second question, over half (53.1%) of respondents viewed COVID-19 as posing “a lot” or “a great deal” of harm to North Carolina as a whole.

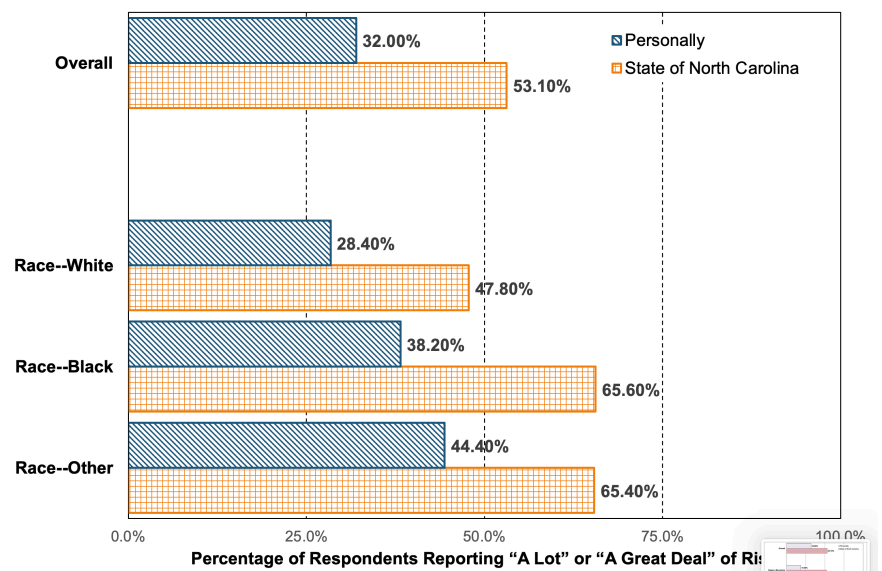
While these overall statistics give us some idea of how people perceive the risk of COVID-19, they may hide important distinctions within various subgroups. We

looked at geographical differences, racial differences, and ideological differences to get a better sense of the nuance underlying the overall percentages. A few aspects of COVID-19 inform our analysis of the geographical differences among residents of the state. For example, there is the idea that the coronavirus would be unlikely to respect political boundaries (like state borders), let alone regional boundaries.

We found only slight variation between the three regions of North Carolina and respondents’ views (Figure 4). Very near 50.0% of respondents in each region saw the harm of COVID-19 to the state as a whole. There was one notable difference among responses about individual harm: a large degree of harm among residents of the Mountains was only selected by 18.5% of that group.

Differences among racial groups were more pronounced than geographic differences (Figure 5). Generally speaking, Black or African-American and other people of color expressed greater concern about coronavirus than White respondents (both in terms of personal risk and statewide

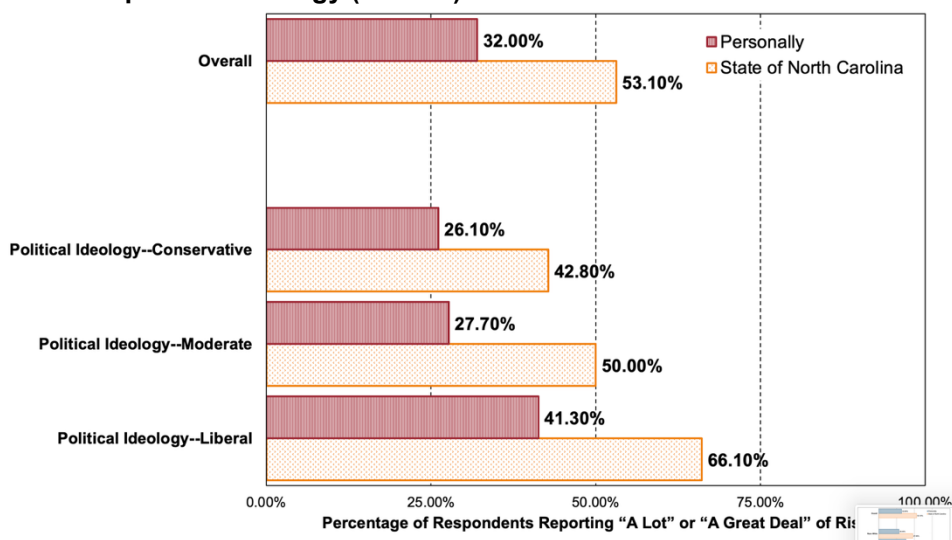
**Figure 5. Personal and statewide perceptions of COVID-19 risk by racial group (N = 779)**



impacts). Notably, around half of respondents overall expressed a lot or a great deal of concern about coronavirus risk for the state; looking at groups separately, nearly two thirds of both Black respondents and other races expressed higher levels of concern. Given the differential impact of the coronavirus on these groups throughout the COVID-19 pandemic in the United States (CDC, 2020), these differences in residents' perceptions of negative impacts are perhaps not surprising.

The last comparison of groups we conducted was based on ideological differences. Respondents identified their political ideology regarding both social and economic issues, and these responses were then averaged and divided into three groups: conservative, moderate, and liberal.

**Figure 6. Personal and statewide perceptions of COVID-19 risk by political ideology (N = 779)**



In terms of personal risk, both self-identifying conservatives and moderates were much less concerned about coronavirus (26.1% and 27.7% respectively) compared to their liberal counterparts (41.4%). On the question of statewide concern, the three groups were more distinct: conservatives expressed the least concern (42.8%), followed by moderates

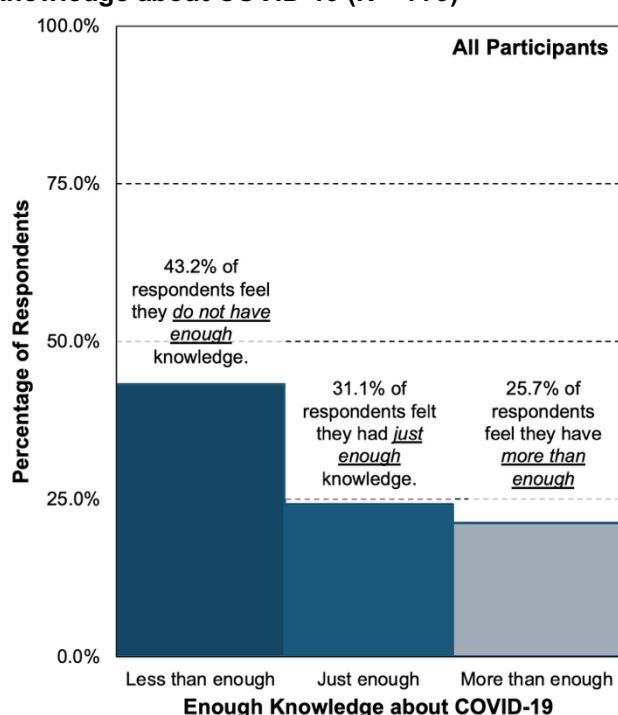
(50.0%), and liberals (66.1%). Considering the stark differences in how political leaders of the two major political parties in the United States have responded to the pandemic, these ideological differences among residents of North Carolina seem to fall in line with such differences elsewhere in the United States. For example, North Carolina Governor Roy Cooper, a Democrat, was running for re-election in November 2020 against then-Lieutenant Governor Dan Forest, a Republican. Immediately following Cooper's lockdown announcement that closed bars, restaurants, and businesses in March 2020, Forest issued a statement focusing on the threat of a lockdown to the economy and employment rather than on benefits of the government action to public health (Doran, 2020). Such competing political discussions echoed those happening at the broader, national level with the presidential election.

Of course, these questions of how respondents viewed the risks of coronavirus were an important *perceptual* measure in our survey. In conducting our survey, we were also interested in what respondents felt they *knew* about the virus. Knowledge, especially a self-assessment of knowledge, is a prerequisite for making good decisions about one's health. We therefore asked

about this self-assessed knowledge in two steps. First, we asked them to tell us how much they felt they *currently knew* about coronavirus on a scale from 0 (nothing at all) to 100 (as much as a person could possibly know). Second, we asked them to tell us how much they felt they *needed to know* about coronavirus to make a good decision about their health, using the same scale. The difference between these two questions represents where each respondent sits in terms of their current compared to their desired knowledge, ranging from +100 (knowing more than enough to make a decision) to -100 (not knowing enough at all to make a decision).

The distribution for across that range is shown in Figure 7. As indicated, over half of respondents felt they had exactly enough (a score of zero, or no difference between current and desired knowledge; 31.1% of respondents) or more than enough (25.7%) information to make a

**Figure 7. Current knowledge relative to desired knowledge about COVID-19 (N = 779)**



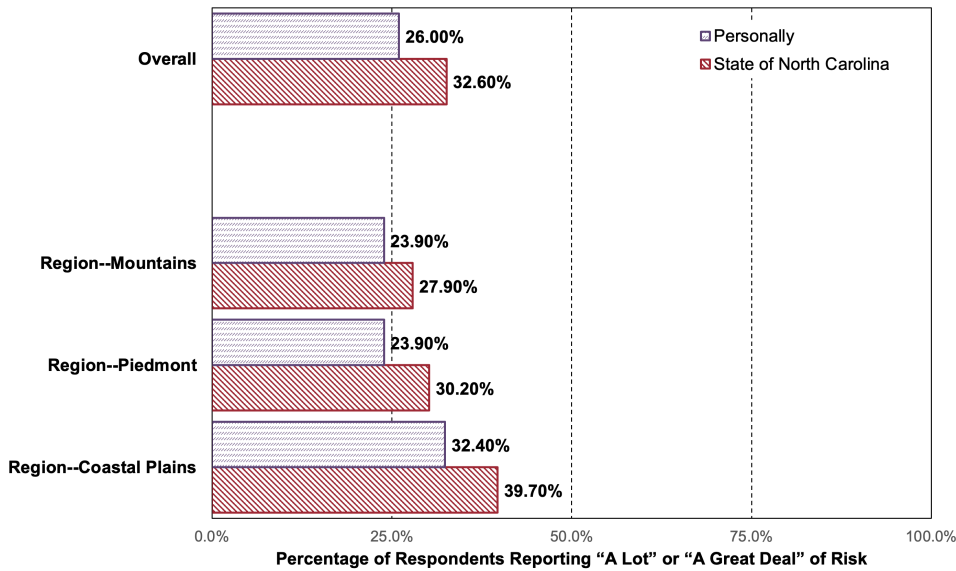
good health decision about coronavirus. The remaining respondents (43.2%) did NOT feel like they had enough information to make a decision. As the distribution shows, however, the respondents who both felt they did and did not have enough information fell tightly around the middle (fairly close to zero or “almost enough”). At the time of our data collection, four months into the pandemic in the United States, it seems that many people were starting to feel that they had enough information to make decisions about their health and behavior.

### ***B. Per- and Polyfluoroalkyl Substances (PFAS)***

Per- and polyfluoroalkyl substances (PFAS) have been emerging as a major public health issue across the US and in North Carolina for several years (CDC, 2017). PFAS have unique chemical properties that make them resistant to degradation, include almost 5,000 different compounds, and are ubiquitous in the environment. Still, much remains unknown about PFAS toxicity and their impact on environmental and human health. Under these circumstances, clear public health messaging and actions have been difficult. In our survey, we were interested in measuring how people viewed PFAS in terms of its threat to them personally and the threat to the state of North Carolina.

Per- and polyfluoroalkyl substances (PFAS) have been emerging as a major

**Figure 8. Personal and statewide perceptions of PFAS risk by region (N = 751)**

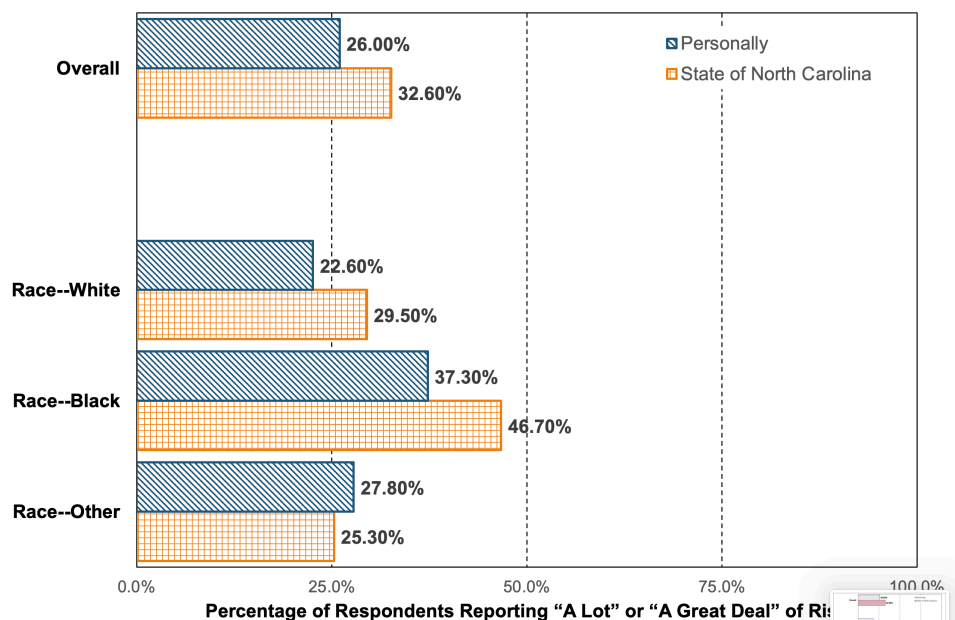


In general, our respondents tended to view PFAS as more harmful to the state overall, than to them personally (see Figure 8). About a quarter of respondents (26.0%) reported that PFAS are personally harmful (“a lot” or “a great deal”), while almost a third (32.6%) saw PFAS as harmful to North Carolina as a whole. The discovery

and subsequent news coverage of PFAS in the state have been concentrated in certain communities and regions of North Carolina. Given the news coverage that PFAS such as GenX have been getting in Wilmington and other areas along the Cape Fear River since 2017, it may not be surprising that 32.4% of respondents from the Coastal Plain reported seeing PFAS as personally harmful, and 39.7% saw it as harmful to the state overall. Both of these shares of respondents were significantly higher than in the other two regions.

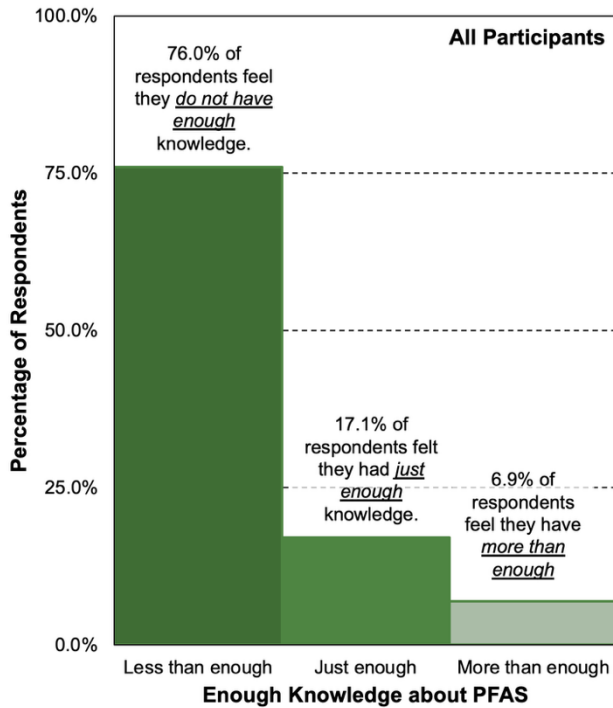
As with many environmental exposures, PFAS affect different communities and segments of the population differently. We know that not everyone has equal access to municipal drinking water, in-home filtration systems, or bottled water.

**Figure 9. Personal and statewide perceptions of PFAS risk by racial group (N = 751)**



When looking at risk perceptions by racial group, Black respondents viewed PFAS as significantly more harmful, both to them personally (37.3%) and to the state overall (46.7%). In respondents of other non-White racial backgrounds, 27.8% view PFAS as personally harmful, and 25.3% view them as harmful to North Carolina (Figure 9.)

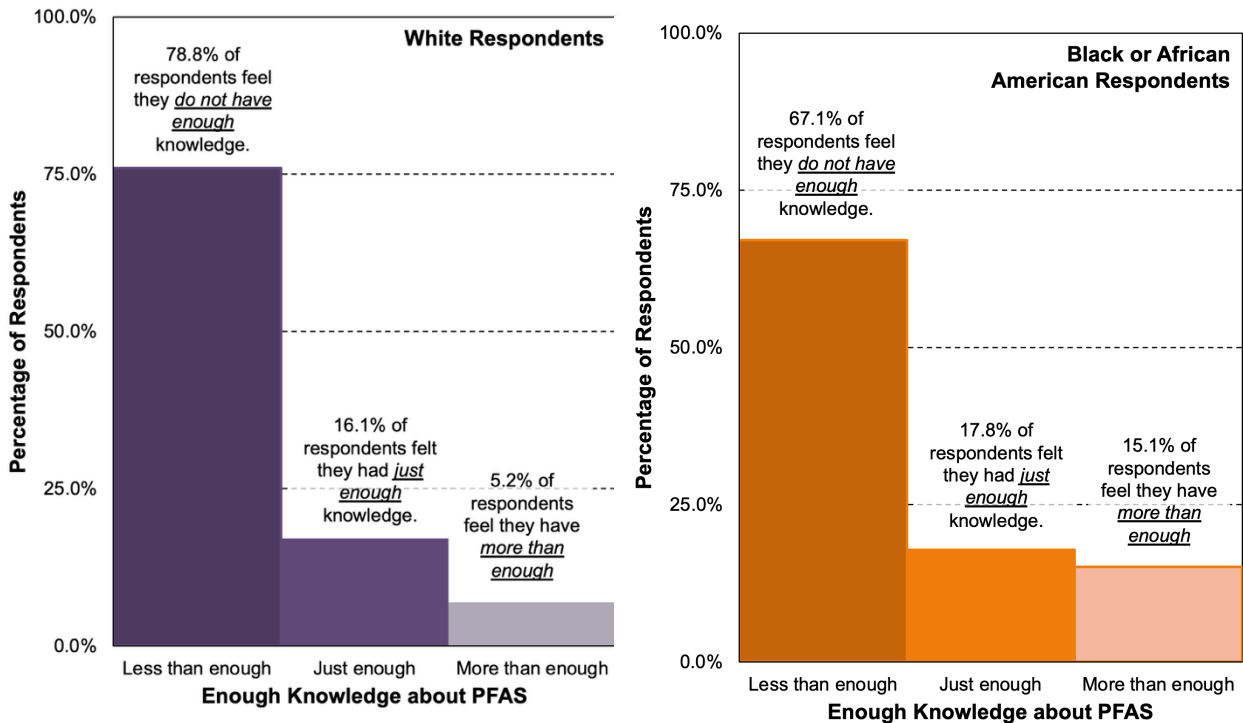
**Figure 10. Current knowledge relative to desired knowledge about PFAS (N = 751)**



White respondents saw PFAS as more harmful to North Carolina (29.5%) than to themselves (22.6%). In general, survey respondents who are people of color saw PFAS as more of a threat to themselves personally compared to White respondents, and almost half of all Black respondents see PFAS as a threat to the state.

As we did with COVID-19, we wanted to know about about respondent’s “subjective” knowledge in two steps. First, we asked them to tell us how much they felt they currently knew about PFAS on a scale from 0 (nothing at all) to 100 (as much as a person could possibly know). Then we asked them to tell us how much they felt they needed to know about PFAS in order to make a good decision about their health, using the same scale.

**Figure 11. Sufficiency threshold for knowledge about PFAS comparing White to Black or African American respondents (N = 751)**



The distribution for the composite value, ranging from +100 (knowing enough) to -100 (not knowing enough), is shown in Figure 10. As indicated, 76% of respondents felt they did not have enough knowledge to make a good health decision about PFAS. About a quarter of respondents (24.0%) had enough information.

When looking at differences by race, the majority of both Black (67.1%) and White (78.8%) respondents felt that they did not have enough information on PFAS. Notably, Black respondents feel that they have significantly more knowledge than they need compared to White respondents. As seen in Figure 11, 32.9% of Black respondents reported having “enough” or “more than enough” information on PFAS, while only 21.3% of White respondents felt that way. This provides important insight for messaging and outreach related to PFAS.

## **V. Conclusions**

We began this report with four overarching questions regarding important environmental problems, trust in information sources, views on specific health threats to North Carolinians, and feelings about the information needed to make good decisions. Keeping the results we have reported above in mind, we offer some observations on three different themes we see emerging from this initial data collection.

Based on our data, it is clear that different segments of North Carolina’s population view environmental health issues with varying levels of concern. Responses may highlight the environmental justice aspects inherent to both COVID-19 and PFAS. Non-white respondents viewed COVID-19 and PFAS as more personally harmful and more harmful to the state overall, than did white respondents. We know that COVID-19 has been disproportionately impacting people of color, and reducing personal exposure to PFAS in drinking water requires purchasing bottled water and in-home filtration systems, disproportionately burdening low-income residents.

And while some respondents’ perceptions of personal and statewide risk may be due to a lack of information on the topic, in many cases, respondents reported having enough information to make health-protective decisions. More than half (56.8%) of respondents felt they had enough or more than enough information on COVID-19 to understand the issue and make protective decisions about their health. As such, at least for COVID-19, the difference in levels of risk perception are not likely from a deficit in information. There may, however, be a deficit in information and effective communication around PFAS. Both Black and White respondents overall felt that they did not have enough information on PFAS to make informed health-protective decisions (67.1% and 78.8%, respectively). This suggests an opportunity for more effective communication and engagement on the issue.

Moving forward, addressing the disparities in information needed to make health-protective decisions (in particular, PFAS information) might require an increase in strategic communication and engagement strategies. One of our aims in the Community Engagement Core is to collaborate with groups in vulnerable communities in order to increase access to good

information about environmental health threats; such collaboration would mean that North Carolina residents are less reliant on information sources like scientists interviewed in news media, and more reliant on each other and community leaders for that information.

We face several challenges in this endeavor. One is making sure the information is available where people are looking for it—from government agencies, from their healthcare providers, even from church and other community groups in which they are active members. A second is motivating people successfully to protect themselves by offering practical solutions that can be enacted on different levels (individual, community, state) to address pressing community problems like infectious disease and water contamination.

## VI. Methodological Notes

The survey data was collected from June 15 to June 20, 2020, at North Carolina State University using the Qualtrics survey platform. NC State University contracted with Dynata, a survey research firm, to reach participants who reside in North Carolina. Dynata recruits diverse participants through programs that offer rewards points for completion of survey questionnaires and other activities. This nonprobability-based sample was not an ideal method to collect responses, but we could not employ our planned mail survey due to the onset of the COVID-19 global pandemic. In order to approximate a representative sample, respondents were recruited using quotas for biological sex, age, race, and ethnicity based on U.S. Census population estimates for 2019 in the state of North Carolina. The total sample size of verified (through ZIP code) North Carolina residents was 1,505, yielding a margin of sampling error of +/- 2.526%. The total sample was split between the two topics COVID-19 (N = 779, margin of error +/- 3.511%) and PFAS (N = 751, margin of error +/- 3.576%).

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