

# ADAPTATION & RESILIENCE



Communities across the country are facing extreme weather events, including wildfires, hurricanes, and flooding which are intensified by climate change.<sup>1</sup> The devastation caused by these events surface prominently in our nation's schools. Amplified by the impact of COVID-19, the nation has become aware of the educational, social, and psychological support functions that public schools provide. In many cases, especially in low-income communities, schools have been the hub to provide essential services to meet the basic needs of children and families.

Extreme weather events affect all aspects of the school community, including school infrastructure, and most importantly, the people who learn and work in schools. Families and communities experience trauma and uncertainty in the wake of natural disasters, which in turn, impacts the way schools support their communities. Two case studies, the Camp Fire and Hurricane Maria, illustrate the harm caused by extreme weather events and the need for resilient school systems in the face of increasing climate change threats.



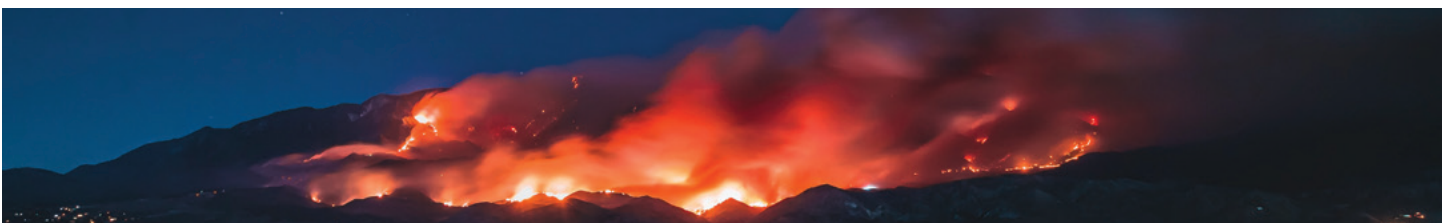
## **CASE: The Camp Fire and Paradise Unified School District**

During the 2018 Camp Fire in California, 5,000 students and 540 teachers in Butte County lost their homes to the wildfire.<sup>2</sup> Families whose homes were destroyed had to make difficult decisions about where to go. The fire also destroyed six schools and severely damaged eight schools in Paradise Unified School District.<sup>3</sup> Schools in the district were closed for weeks, affecting over 4,000 students and their families.<sup>4</sup>

Many students transferred into new school districts while others decided to stay in Butte County, where administrators struggled to come up with the resources and logistics to continue student learning.<sup>5</sup> Some classes shifted online while others temporarily relocated to shopping centers, warehouses, and vacant facilities in other school districts.

The shifts in schedule and location presented a difficult academic transition for students who were already facing trauma from the effects of the wildfire on their families and communities. Education leaders emphasized the need for trauma-informed care for students, bringing in child trauma experts for staff training and receiving additional help from mental health professionals around the state.<sup>6</sup> Months after the fire, many students and families continued to live in tents and trailers, with limited access to critical materials like textbooks and Wi-Fi.<sup>7</sup>

Paradise Unified School District is still in the process of rebuilding over a year after the fire. At the start of 2020, the district had an estimated 1,700 active students—nearly half of its pre-fire enrollment.<sup>8</sup> The district is considering strategies to increase the resilience of its school system throughout its recovery process.





## Extreme Weather Impact on Schools

- During the 2018–19 school year, California wildfires caused a record number of 1,900 schools to close, effecting approximately 1.1 million students statewide.<sup>18</sup>
- In 2017, Puerto Rican students missed an average of 78 school days after Hurricanes Irma and Maria, and 1.4 million Texas students along the Gulf Coast missed at least the first week of school.<sup>19, 20</sup>
- Flooding, the most common natural disaster, impacts schools across the country. Over 6,000 schools serving 3.5 million students are located in a flood zone.<sup>21</sup>



### CASE: Hurricane Maria

In September 2017, Hurricane Maria devastated Puerto Rico. Thousands of Puerto Ricans lost their lives. Many lost their homes and their livelihoods. Students, parents, and educators all experienced trauma related to the storm and its effects on their families and communities.

The hurricane also impacted student learning and supports for Puerto Rico's nearly 350,000 students. Schools were forced to close in the aftermath of the storm, with the average student missing 78 school days.<sup>9</sup> Like much of Puerto Rico's infrastructure, many school buildings were severely damaged by the storm and lacked power for long stretches of time. Others were converted to shelters where families displaced from their homes came to live and cook. To date, the school system is still trying to recover.<sup>10</sup>

Over 200,000 Puerto Ricans relocated in the wake of the storm to states including Florida, without work or knowledge of the local education system.<sup>11</sup> School districts throughout the state needed to respond rapidly to enroll children in schools. To enroll an influx of approximately 10,000 new students across the state, Florida school districts sought to hire additional educators as well as provide services to support students and families through the transition.<sup>12</sup>

In Orange County Public Schools, district personnel welcomed families at the airport and helped them through the process of enrolling their children. The district worked to hire educators from Puerto Rico and supported the teachers upon arrival in applying for employment at the schools.<sup>13</sup> Miami-Dade Public Schools collaborated with Puerto Rico's Department of Education to align curriculum standards and graduation requirements to facilitate a smooth academic transition for all students.<sup>14</sup>

School administrators in Florida found it difficult to identify and respond to academic, social, and cultural needs of the new student population.<sup>15</sup> While Florida government officials welcomed displaced families, state funding and programming efforts were inadequate in covering the basic needs of students and families who had been displaced.

Typically, funding for districts is based on annual fall enrollment. The Florida Department of Education issued guidance allowing schools and districts to request a second enrollment survey to capture the influx of new students.<sup>16</sup> Those that met a certain minimum threshold for enrollment increases could receive additional funding. A year after the hurricane, the federal government provided Florida with \$95.8 million in reimbursements for the additional costs associated with the increased enrollment of Puerto Rican students.<sup>17</sup>





## CONNECTION TO CLIMATE CHANGE

Climate change is leading to more extreme weather events all across the country, increasingly resulting in school closures. Hurricanes, tornados, snowstorms, flooding, and wildfires have devastated communities in the last few years. Communities hit hard by severe weather can face long-term disruptions in student learning and widespread negative effects on children's mental and physical health.

Extreme weather caused by climate change has dangerous implications for students' health and wellbeing.<sup>24</sup> Children whose families experience homelessness, food insecurity, and other traumas as a result of extreme weather events are at risk for mental health conditions such as Post-Traumatic Stress Disorder (PTSD), anxiety, and depression.<sup>25</sup> Air pollution, high heat, and other effects of climate change are particularly harmful to children due to their ongoing physical and behavioral development.<sup>26</sup> Climate change also impacts the food supply chain, leading to food insecurity, which threatens child nutrition.<sup>27</sup>

In addition to extreme weather events, the US is projected to experience more and more hot days on average during the year. Higher temperatures are detrimental to learning

and health, with students performing worse academically on hot days.<sup>22</sup> Extreme heat has led to school closures and adapted schedules. In June 2018, some schools in the northeast and Midwest cut school days short due to high heat and insufficient air conditioning in buildings.<sup>23</sup> These negative health and learning impacts have a disproportionate effect on schools serving low-income communities with insufficient or outdated air conditioning.

As climate change continues, schools will need to confront increasing challenges to students' health, safety, and learning. Considering ways to continue providing learning opportunities, student services, and supports for families and educators can help build a more resilient education system in preparation for learning disruptions and negative impacts related to climate change. Currently, many of the policy changes to respond to extreme weather have occurred in the aftermath of disasters. One way some states have built in flexibility to continue student learning is through state virtual learning policies—a practice considerably more widespread with the COVID-19 pandemic.



Photo by Allison Shelley for American Education: Images of Teachers and Students in Action.





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## Virtual Learning Policies

To prepare for learning disruptions related to extreme weather, some states have developed policies related to virtual learning days. Schools that are able to implement virtual learning days rather than completely forgoing instruction due to extreme weather events can minimize both short- and long-term disruptions to student learning.

### WHAT IS VIRTUAL LEARNING?

Virtual learning provides opportunities for schools to continue educating students while school buildings are not physically open. Prior to COVID-19, virtual learning was relatively rare in public school systems.

While virtual learning is now widespread due to the pandemic, there are large disparities in access by income, urbanicity, and race. In late March 2020, only a third of districts with over 75% low-income students reported being able to provide online learning to all students, compared to nearly three-quarters of districts with less than 25% low-income students.<sup>28</sup> In April, 31% of parents in rural communities and 30% of parents in urban communities reported that their children were somewhat or very likely to need public Wi-Fi for schoolwork because they do not have a reliable internet connection at home, compared to 14% of parents in suburban communities.<sup>29</sup> In late May, nearly twice as many Black students were rarely or never able to access a device for learning compared to white students.<sup>30</sup>

Prior to the pandemic, some states and school districts started to utilize virtual learning days in order to minimize lost instructional time due to school closures related to weather such as heat, storms, and flooding. States require a minimum number of instructional learning days or hours and utilizing virtual learning when schools are closed allows schools to not fall below that minimum threshold.

### STATE POLICIES

Thirteen states have policies on virtual learning days or nontraditional instructional days. Some policies may allow “blizzard bags” or other options for schools to provide instruction through non-digital methods such as packets. Two states (IL, SC) have piloted virtual learning days beginning with a small number of districts.

Some states with virtual learning policies have certain limits on how the days may be used. Six states (IL, MO, OH, PA, RI, WY) require district virtual learning plans to go through a state or district approval process prior to implementation. Five states (MN, MO, OH, PA, WV) limit how many instructional days or hours may be completed through virtual learning. Ohio allows virtual learning for inclement weather only if schools will fall below the required minimum instructional days or hours due to weather events.

Some states allow waivers for school districts that cannot meet the minimum required instructional days or hours due to emergencies, including extreme weather events. These provisions, however, do not encourage continuity of education for students.

In response to the COVID-19 pandemic, at least one state (PA) has made policy changes to allow school districts to implement Flexible Instructional Days and increased the number of days that may be used. We have yet to see how the pandemic and immediate shifts to virtual, remote, and hybrid learning plans will impact permanent policy changes at the state-level to utilize virtual learning in schools.

*Reviewed by Chi Kim, CEO, Pure Edge, Inc.*



Photos by Allison Shelley for American Education: Images of Teachers and Students in Action.



## BRIGHT SPOTS

- Marshall Public Schools (MN) developed e-learning days to prevent learning interruptions due to snow or other inclement weather.<sup>31</sup> The state education agency approved the district to use up to five virtual learning days in place of snow days. Educators prepare for virtual learning days beginning in the fall and have specific hours they will be available to communicate with students.
- Miami-Dade County Public Schools' susceptibility to hurricanes and related school closures led the district to invest in education technology through a \$1.2 billion school bond referendum passed in 2012.<sup>32</sup> The district's one-to-one technology program, professional development on technology, and prior family engagement initiatives enabled the district to be more prepared for the shift to virtual learning due to the pandemic.



# DOES STATE HAVE POLICY REGARDING VIRTUAL LEARNING?

	YES	NO
Alabama		X
Alaska		X
Arizona		X
Arkansas		X
California		X
Colorado	✓	
Connecticut		X
Delaware		X
District of Columbia		X
Florida		X
Georgia		X
Hawaii		X
Idaho		X
Illinois	✓	
Indiana	✓	
Iowa		X
Kansas		X
Kentucky	✓	
Louisiana		X
Maine		X
Maryland		X
Massachusetts		X
Michigan		X
Minnesota	✓	
Mississippi		X
Missouri	✓	
Montana		X

Nebraska		X
Nevada		X
New Hampshire		X
New Jersey		X
New Mexico		X
New York		X
North Carolina		X
North Dakota		X
Ohio	✓	
Oklahoma		X
Oregon		X
Pennsylvania	✓	
Rhode Island	✓	
South Carolina	✓	
South Dakota		X
Tennessee		X
Texas		X
Utah		X
Vermont		X
Virginia		X
Washington		X
West Virginia	✓	
Wisconsin	✓	
Wyoming	✓	
TOTALS	13	38
PERCENT	25%	75%

**Note:** Percentages are out of 51 (includes DC)



# References

1. U.S. Global Change Research Program, "Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II," ed. Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart, 2018, doi: 10.7930/NCA4.2018
2. Alexa Lardieri, "Another Victim of the California Wildfire: Education," *U.S. News and World Report*, October 31, 2019, <https://www.usnews.com/news/education-news/articles/2019-10-31/another-victim-of-the-california-wildfires-education>
3. Ibid
4. "Paradise Unified," *Cal Matters*, accessed September 25, 2020, <https://disasterdays.calmatters.org/california-school-closures/school-district/paradise-unified/>
5. David Washburn and Diana Lambert, "After the fire, a school district gone," *EdSource*, November 16, 2018, <https://edsources.org/2018/after-the-fire-a-school-district-gone/605038>
6. David Washburn, "Trauma in Paradise: A California school system focuses on mental health after devastating fire," *EdSource*, January 15, 2019, <https://edsources.org/2019/trauma-in-paradise-how-a-california-school-system-plans-to-cope-with-devastating-loss-after-fire/607216>
7. Brianna Sacks, "Students Live In Tents, Do Homework Under Flashlights, And Deal Without Textbooks Months After California's Massive Camp Fire," *Buzzfeed News*, April 25, 2019, <https://www.buzzfeednews.com/article/briannasacks/students-displaced-camp-fire>
8. Michael Patterson, "Paradise superintendent says teacher layoffs are expected but not catastrophic," *KCRC News*, January 28, 2020, <https://krcrtv.com/news/local/paradise-superintendent-says-teacher-layoffs-are-expected-but-not-catastrophic>
9. Andrew Ujifusa, "Average Puerto Rican Student Missed 78 Days of School After Maria, Study Finds," *Education Week*, September 25, 2018, <http://blogs.edweek.org/edweek/campaign-k-12/2018/09/puerto-rico-student-missed-class-special-education-hurricane-maria.html>
10. "Putting Puerto Rico's Schools Back on Track," *Education Week*, February 6, 2018, <https://www.edweek.org/ew/collections/puerto-rico-hurricane-maria-aftermath/>
11. Amanda Rosa, "Thousands of Puerto Rican students relocate to Florida, report says," *Alligator*, January 19, 2018, [https://www.alligator.org/news/thousands-of-puerto-rican-students-relocate-to-florida-report-says/article\\_ea8538e8-fcc4-11e7-b959-bf01bd556e97.html](https://www.alligator.org/news/thousands-of-puerto-rican-students-relocate-to-florida-report-says/article_ea8538e8-fcc4-11e7-b959-bf01bd556e97.html)
12. Ibid
13. Mark Keierleber, "Puerto Rico Teachers Fleeing Hurricane Maria Arrived at Orlando's Airport with Nothing. They Left with Jobs," *The 74 Million*, October 10, 2017, <https://www.the74million.org/article/puerto-rico-teachers-fleeing-hurricane-maria-arrived-at-orlandos-airport-with-nothing-they-left-with-jobs/>
14. Ibid
15. Molly Hamm-Rodríguez, "The Effects of Displacement on Puerto Rican K-12 Students in Florida after Hurricane Maria," *Natural Hazards Center*, University of Colorado Boulder, 2018, <https://hazards.colorado.edu/quick-response-report/the-effects-of-displacement-on-puerto-rican-k-12-students-in-florida-after-hurricane-maria>
16. Florida Department of Education, "Guidance to School Districts for Enrolling Students Displaced by Hurricane Maria," October 6, 2017, <http://www.fldoe.org/core/fileparse.php/5673/urlt/HurricaneMariaQA10617.pdf>
17. Scott Powers, "Florida, schools getting \$95.8 million for Puerto Rico students," *Florida Politics*, September 4, 2018, <https://floridapolitics.com/archives/273811-florida-schools-getting-95-8-million-for-puerto-rico-students>
18. Ricardo Cano, "What wildfire did to one California town's schools in four years," *CalMatters*, September 16, 2019, <https://calmatters.org/projects/california-school-closures-wildfire-middletown-paradise-disaster-days/>
19. Andrew Ujifusa, "Average Puerto Rican Student Missed 78 Days of School After Maria, Study Finds," *Education Week*, September 25, 2018, <http://blogs.edweek.org/edweek/campaign-k-12/2018/09/puerto-rico-student-missed-class-special-education-hurricane-maria.html>
20. David McClendon, "Hurricane Harvey keeps 1.4 million students out of public schools for at least a week," *Children at Risk*, August 31, 2017, <https://childrenatrisk.org/hurricane-harvey-keeps-1-4-million-students-out-of-public-schools-for-at-least-a-week/>
21. The Pew Charitable Trusts, "Flooding Threatens Public Schools Across the Country," August 2017, [https://www.pewtrusts.org/~media/assets/2017/08/fpc\\_flooding\\_threatens\\_public\\_schools\\_across\\_the\\_country.pdf](https://www.pewtrusts.org/~media/assets/2017/08/fpc_flooding_threatens_public_schools_across_the_country.pdf)
22. Shankar Vedantam, "Hidden Brain: Heat and Learning. What's the Connection," *NPR*, May 29, 2020, <https://www.npr.org/2020/05/29/864699459/hidden-brain-heat-and-learning-whats-the-connection>
23. Laura Fay, "With Many Schools Lacking Air Conditioning, Heat Wave Leads to Early School Closures," *The 74 Million*, June 19, 2018, <https://www.the74million.org/with-many-schools-lacking-air-conditioning-heat-wave-leads-to-early-school-closures/>
24. Center for Climate, Health, and the Global Environment, "Climate Change and Mental Health," Harvard T.H. Chan School of Public Health, accessed September 14, 2020, <https://www.hsph.harvard.edu/c-change/subtopics/climate-change-and-mental-health/>
25. Substance Abuse and Mental Health Services Administration, "Disaster Technical Assistance Center Supplemental Research Bulletin: Behavioral Health Conditions in Children and Youth Exposed to Natural Disasters," September 2018, <https://www.samhsa.gov/sites/default/files/srb-childrenyouth-8-22-18.pdf>
26. American Public Health Association, "Making the Connection: Climate Changes Children's Health," accessed September 14, 2020, [https://www.apha.org/-/media/files/pdf/topics/climate/childrens\\_health.ashx?la=en&hash=02D821C65EDCAB093A48AD7B101EC73080A216BF](https://www.apha.org/-/media/files/pdf/topics/climate/childrens_health.ashx?la=en&hash=02D821C65EDCAB093A48AD7B101EC73080A216BF)
27. Centers for Disease Control and Prevention, "Climate Effects and Health: Food Security," June 18, 2020, [https://www.cdc.gov/climateandhealth/effects/food\\_security.htm](https://www.cdc.gov/climateandhealth/effects/food_security.htm)
28. Benjamin Herold, "The Disparities in Remote Learning Under Coronavirus (in Charts)," *Education Week*, April 10, 2020, <https://www.edweek.org/ew/articles/2020/04/10/the-disparities-in-remote-learning-under-coronavirus.html>
29. Emily A. Vogels, Andrew Perrin, Lee Rainie, and Monica Anderson, "53% of Americans Say the Internet Has Been Essential During the COVID-19 Outbreak," *Pew Research Center*, April 30, 2020, <https://www.pewresearch.org/internet/2020/04/30/53-of-americans-say-the-internet-has-been-essential-during-the-covid-19-outbreak/#fn-25577-1>
30. Victoria Collis and Emiliana Vegas, "Unequally disconnected: Access to online learning in the US," *The Brookings Institution*, June 22, 2020, <https://www.brookings.edu/blog/education-plus-development/2020/06/22/unequally-disconnected-access-to-online-learning-in-the-us/>
31. Marshall Public Schools, "E-Learning Days," August 23, 2019, <https://www.marshall.k12.mn.us/Page/5162>
32. Elizabeth Heubeck, "Virtual Teaching: Skills of the Future? Or Not So Much?", *Education Week*, April 20, 2020, <https://www.edweek.org/ew/articles/2020/04/20/virtual-teaching-skill-of-the-future-or.html>