# New Hampshire Climate Impacts and Costs

Climate change poses many costly risks to New Hampshire residents, including an increase in severe storms, extreme winter weather, hotter temperatures, and sea level rise.[1] Even if fossil fuel emissions and atmospheric concentrations of greenhouse gasses eventually stabilize through aggressive climate action, the severity of these events will continue to rise as we adjust to the new reality of the climate crisis. Below we outline the impacts of climate change New Hampshire faces and some of the potential costs associated with adapting to these impacts. This list is not exhaustive and other costs may be incurred as a result of additional necessary climate change adaptations.

## Severe Storms

Climate change has led to a warmer atmosphere that can hold more water. As such, average rainfall and the frequency of extreme storms has increased since the 1950's in New Hampshire. Extreme precipitation, defined as the amount of rain falling on the top 1% of days with precipitation, in the north-eastern United States has already increased over 50% from 1996-2014, as compared to 1901-1995.[2] The number of days with over 5 inches of rain has doubled in the last 64 years.[3] This will only continue to get worse — extreme events are predicted to increase another 50% by the end of this century.[4]

**Table 1:** Average precipitation in New Hampshire from 1901-1960, as compared to 1991-2020, modified from Lemcke-Stampone et al. (2022); Table 2.[5]

| | Average Precipitation (Inches; 1901-1960) | Average Precipitation (Inches; 1991-2020) | Percent Increase |
|---|---|---|---|
| Annual | 42.7 | 47.9 | 12% |
| Winter | 9.5 | 10.5 | 11% |
| Spring | 10.6 | 11.4 | 8% |
| Summer | 11.6 | 13.2 | 14% |
| Fall | 10.9 | 12.9 | 18% |

1 EPA, "What Climate Change Means for New Hampshire," 2016, https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-nh.pdf.

2 Huanping Huang et al., "Total and Extreme Precipitation Changes over the Northeastern United States," *Journal of Hydrometeorology* 18, no. 6 (June 1, 2017): 1783–98, https://doi.org/10.1175/JHM-D-16-0195.1.

3 Mara Hoplamazian, "National Climate Assessment Shows Extreme Precipitation Has Increased Most in the Northeast," *New Hampshire Public Radio*, November 20, 2023, sec. NH News, https://www.nhpr.org/nh-news/2023-11-20/national-climate-assessment-shows-extreme-precipitation-has-increased-most-in-the-northeast.

4 Christopher J. Picard et al., "Twenty-First Century Increases in Total and Extreme Precipitation across the Northeastern USA," *Climatic Change* 176, no. 6 (May 30, 2023): 72, https://doi.org/10.1007/s10584-023-03545-w.

5 Mary D. Lemcke-Stampone, Cameron P. Wake, and Elizabeth Burakowski, "New Hampshire Climate Assessment 2021" (The Sustainability Institute, 2022), https://scholars.unh.edu/cgi/viewcontent.cgi?article=1071&context=sustainability.

According to NOAA, extreme weather events that cost over a billion dollars, or "billion-dollar events," have been increasing. Billion-dollar flooding events cost an average of $4.6 billion per event and billion-dollar severe storms cost an average of $2.4 billion per event.[6] A recent analysis by Swiss Re, a reinsurance company, found that severe storms in the U.S. incurred $34 billion in insured losses during the first half of 2023.[7] Severe storms are increasingly causing insurance companies to lose money.[8] In July 2023, an extreme storm delivered over 5 inches of rain in parts of New Hampshire and led to the worst flooding in New England since Tropical Storm Irene.[9] In fact, the summer of 2023 was the wettest summer ever recorded in New Hampshire with more than 21 inches of rain in June, July, and August, according to NOAA.[10]

Winter storm size and intensity have also increased since the 1950's.[11] In December 2023, heavy rain caused severe damage across New England, including flash flooding in the White Mountains of New Hampshire, which led to water rescues and evacuations.[12] In April 2024, a nor'easter left 60,000 New Hampshire residents without power for the second time in two weeks.[13]

Mary Stampone, the state climatologist, recently said these climate-fueled storms are here to stay and the infrastructure currently in place "wasn't designed for the patterns [of precipitation] we're seeing today, let alone what is projected for the future."[14] Communities across the state were left with a bill for millions of dollars in disaster recovery from just the extreme precipitation last summer.[15]

## Potential Costs Related to Severe Storms

### Structure and Infrastructure Projects

- Remove, relocate, acquire, or demolish structures to minimize future flood losses.
- Install, reroute, increase capacity, or implement a routine cleaning plan of the storm drainage system.

6 National Atmospheric and Oceanic Administration (NOAA), "NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters," 2023. https://doi.org/10.25921/stkw-7w73.

7 The Associated Press, "Surge in U.S. Thunderstorms Has Caused 'unprecedented' $34B US in Insured Losses This Year." https://www.cbc.ca/news/business/swiss-re-insurance-damage-1.6932920

8 Christopher Flavelle and Mira Rojanasakul, "As Insurers Around the U.S. Bleed Cash From Climate Shocks, Homeowners Lose," *The New York Times*, May 14, 2024, sec. Climate, https://www.nytimes.com/interactive/2024/05/13/climate/insurance-homes-climate-change-weather.html.

9 Judson Jones and Lazaro Gamio, "See How Much Rain Fell in the Northeast," *The New York Times*, July 11, 2023, sec. U.S., https://www.nytimes.com/interactive/2023/07/11/us/vermont-ny-rainfall-totals-floods.html.

10 "When It Rained, It Poured: 2023 Was NH's Wettest Summer Yet," *New Hampshire Public Radio*, September 22, 2023, https://www.nhpr.org/environment/2023-09-22/when-it-rained-it-poured-2023-was-nhs-wettest-summer-yet.

11 Stanley A. Changnon, "Catastrophic Winter Storms: An Escalating Problem," *Climatic Change* 84, no. 2 (September 1, 2007): 131–39, https://doi.org/10.1007/s10584-007-9289-5.

12 Tik Root and Derrick Bryson Taylor, "New England Storm Leaves Nearly 600,000 Without Power - The New York Times," *New York Times*, December 19, 2023, https://www.nytimes.com/2023/12/19/us/new-england-power-outages-storm.html.

13 Remy Tumin, "Thousands in New England Still Without Power After Spring Snowstorm," *The New York Times*, April 5, 2024, sec. U.S., https://www.nytimes.com/2024/04/05/us/power-outages-snow-maine-new-hampshire.html.

14 Amanda Gokee, "Extreme N.H. Weather Is Caused by Climate Change — and It's Here to Stay - The Boston Globe," *BostonGlobe.Com*, April 11, 2024, https://www.bostonglobe.com/2024/04/11/metro/nhs-extreme-weather-caused-by-climate-change/.

15 "When It Rained, It Poured."

- Add extra culverts, increase dimensions of existing culverts, or implement routine cleaning and repairing.
- Install detention or retention basins, relief drains, spillways, drain widening/dredging or rerouting, etc.
- Inspect and maintain drainage systems and flood control structures (dams, levees, etc.).
- Inspect bridges in order to identify and/or implement repairs or retrofits or clean under low bridges.
- Resurface roads with more permeable pavement and concrete and/or pavement able to withstand heavier precipitation.
- Stabilizing bridges against scour by hardening abutments and piers.
- Protect rural communities from flooding by installing flood control structures.
- Elevate roads and bridges above the base flood elevation (BFE)[16] to maintain dry access.
- Elevate structures above the BFE, or relocate utilities, water heaters, etc. above BFE.
- Floodproof inside of municipal buildings, for example by installing check valves, sump pumps, or backflow prevention devices.
- Floodproof wastewater treatment facilities located in flood hazard areas.
- Floodproof water treatment facilities located in flood hazard areas.
- Protect emergency operations by requiring or moving all emergency operations centers, police stations, and fire department facilities outside of flood-prone areas.
- Protect critical and emergency facilities by requiring all critical facilities be built one foot above the 500-year flood elevation (to meet requirements of FEMA Executive Order 11988).[17]
- Protect critical and emergency facilities from floods using any other technique, for example, raising components above BFE, installing pumping systems or back-up generators for pumping, building dikes, or stabilizing banks.
- Construct floodwalls, small berms, revetments, bioengineered bank stabilization, or other small structural mitigants.
- Implement severe storm strategies for the future like burying utility lines underground.

**Natural Flood Mitigation**

- Protect and enhance natural floodplain mitigation features (such as wetlands, dunes, and vegetative buffers) to help prevent flooding in other areas and increase water quality.

16 Base flood elevation (BFE), as defined by FEMA, is "the elevation of surface water resulting from a flood that has a 1% chance of equaling or exceeding that level in any given year."

17 Federal Emergency Management Agency, "Executive Order 11988: Floodplain Management," www.fema.gov/executive-order-11988-floodplain-management.

**Public Health**

- Protect public water supplies from harmful algal blooms.
- Increased hospitalizations related to water-borne illness.

**Local Planning and Regulation**

- Update flood risk maps and flood zones.
- Develop a floodplain management plan.
- Adopt a stormwater management or drainage plan.
- Adopt, apply, and enforce building codes to ensure buildings can withstand flooding.
- Obtain easements to use privately-owned land for temporary water retention and drainage.
- Join or improve compliance with the National Flood Insurance Program (NFIP) if needed. [18]
- Preserve floodplains as open space using any of several land use planning tools: develop a plan that targets hazard areas for acquisition, reuse, and preservation, a land banking program, use of transfer of development rights to keep floodplains vacant, easements to prevent development, or acquiring properties in the floodplain and turning them into open space.

**Education and Awareness Programs**

- Increase public outreach to encourage flood insurance purchase; educate residents in flood safety, flood mitigation, technical assistance availability, funding sources, and best practices.
- Increase public outreach to provide awareness of harmful algal blooms and their health impacts.
- Locate new utilities and critical facilities outside of susceptible areas.

**Summary of Costs from Increased Precipitation and Severe Storms**

Floodproof buildings, relocate infrastructure in especially flood prone areas, improve drainage systems and flood control structures, elevate infrastructure (buildings, roads, and bridges) where needed, restore natural flood protection, develop and implement comprehensive flood management plans, preserve floodplains, increase public awareness of flooding.

## Hotter Temperatures

The average annual temperature in New Hampshire has increased about 2°F since 1971, with the highest increases in average temperature observed in the fall and winter months.[19] New Hampshire has a multi-million dollar winter recreation industry. As the winters continue to warm, snowpack has decreased throughout the state. At one station in the Lake Winnipesaukee watershed, snowpack has decreased by

18 U.S. Federal Emergency Management Agency (FEMA), The National Flood Insurance Program (NFIP), at www.fema.gov/national-flood-insurance-program Policy Information by State (https://nfipservices.floodsmart.gov//reports-flood-insurance-data), accessed March 31, 2024; New Hampshire has over $1.8 billion in total coverage and over 7,000 policies, but local governments should make sure they comply.

19 Lemcke-Stampone, Wake, and Burakowski, "New Hampshire Climate Assessment 2021."

over 90% since 1971.[20] This past December through February, New Hampshire was 9°F warmer than the average winter over the past century (1896-2000).[21] This led to the sixth winter in a row with below average snowfall in Concord, NH, despite the town experiencing the fourth wettest winter on record.[22]

Professor Burakowski at the University of New Hampshire found that winters are about three weeks shorter now than 100 years ago, which is especially problematic for the winter recreation and tourism industry. The New Hampshire ski industry alone brings in about $500 million annually and generates about 10,000 jobs. The state has already lost 172 ski areas.[23] This past winter Whaleback Mountain in Enfield received only 27 inches of snow, a far smaller amount than the usual 100 inches.[24]

The number of extreme heat days, days with a heat index above 90°F has doubled since 1980 — up from eight to 15 days per year. By 1950, New Hampshire could see as many as 30 extreme heat days per year.[25] General warming of temperatures leads to many adverse impacts, like increasing mosquito and tick populations, both of which spread vector-borne illnesses, such as West Nile Virus and Lyme disease.[26] In May 2023, the governor of New Hampshire "proclimam[ed] May 2023 Lyme Disease Awareness Month," as New Hampshire has the third-highest increase in reported cases of Lyme disease.[27] By March 2024, after an unseasonably warm winter, New Hampshire residents had already begun seeing ticks.[28]

20 Lemcke-Stampone, Wake, and Burakowski.

21 Mara Hoplamazian, "This Winter Was the Warmest on Record for New Hampshire," *New Hampshire Public Radio*, March 13, 2024, sec. Climate Change, https://www.nhpr.org/climate-change/2024-03-12/this-winter-was-the-warmest-on-record-for-new-hampshire.

22 Matt Hoenig, "New Hampshire Will End Winter with Below-Average Snowfall, Lots of Rain," *WMUR*, March 12, 2024, sec. News, https://www.wmur.com/article/new-hampshire-winter-snowfall-rain-31224/60179464.

23 Beatrice Burack, "NH Skiing in the Age of Climate Change," *Business New Hampshire*, March 18, 2024, https://www.businessnhmagazine.com/article/nh-skiing-in-the-age-of-climate-change.

24 Kate Dario, "How New Hampshire Is Weathering a Short and Sparse Ski Season," *New Hampshire Public Radio*, March 7, 2024, sec. Climate Change, https://www.nhpr.org/climate-change/2024-03-07/how-new-hampshire-is-weathering-a-short-and-sparse-ski-season.

25 New Hampshire Department of Health & Human Services, "Health Impacts," New Hampshire Department of Health and Human Services, 2024, https://www.dhhs.nh.gov/programs-services/environmental-health-and-you/climate-health/health-impacts.

26 Pien Huang, "The U.S. Is Unprepared for the Growing Threat of Mosquito- and Tick-Borne Viruses," *NPR*, December 15, 2023, sec. Public Health, https://www.npr.org/sections/health-shots/2023/12/15/1219478835/arboviruses-mosquito-tick-borne-viruses-tropical-disease.

27 Governor Sununu, "Governor Sununu Proclaims May 2023 Lyme Disease Awareness Month In New Hampshire," *Governor Christopher T. Sununu*, accessed May 24, 2024, https://www.governor.nh.gov/news-and-media/governor-sununu-proclaims-may-2023-lyme-disease-awareness-month-new-hampshire.

28 Arielle Mitropoulos, "People in New Hampshire Start Seeing Ticks after Warm Winter," *WMUR*, March 6, 2024, sec. News, https://www.wmur.com/article/new-hampshire-ticks-warm-winter-3524/60102457.

**Table 2:** The average number of days below (heating degree days) and above (cooling degree days) 65°F in New Hampshire from 1901-1960, as compared to 1991-2020, modified from Lemcke-Stampone et al. (2022); Table 2.[29] An increase in heating or cooling degree days correlates to an increase in energy usage to heat or cool buildings.

| | 1901-1960 | 1991-2020 | Percent Increase |
|---|---|---|---|
| Heating Degree Days | 8082 | 7454 | -8% |
| Cooling Degree Days | 202 | 298 | 48% |

New Hampshire is one of the states that is projected to have the highest learning losses per student because of low air conditioning coverage in schools.[30] In June 2021, schools in Manchester, which lack air conditioning, closed due to temperatures over 90°F.[31] In September 2023, schools in New Hampshire closed early due to extreme heat.[32]

## Potential Costs Related to Hotter Temperatures

### Structure and Infrastructure Projects

- Energy efficiency retrofits in public and private buildings and housing, including costs for the design and development of standards.
- Increased cooling costs for all public buildings, including green roofs or cool roofing systems on public buildings and new AC installation or upgrade costs for schools.
- Increased road damage due to more frequent extreme heat events.
- Plan for and increase capacity for increased energy demands due to both increased daytime and nighttime temperature.
- Increase high-albedo surfaces on buildings, roads, and other locations where feasible.

### Public Health Projects

- Build and manage more cooling centers, including staffing and tracking of high-risk individuals.
- Increased demand for publicly-financed air conditioning targeted to low-income families and public housing.
- Control the increase of vector borne illness using education and physical and chemical controls for ticks and mosquitoes.
- Treat victims of vector borne illness.

29 Lemcke-Stampone, Wake, and Burakowski, "New Hampshire Climate Assessment 2021."

30 Anna Phillips and Veronica Penney, "Schools That Never Needed AC Are Now Overheating. Fixes Will Cost Billions.," *Washington Post*, May 24, 2024, https://www.washingtonpost.com/climate-environment/interactive/2024/school-temperatures-heat-climate-change/.

31 Nathan Graziano, "Manchester Schools Closed June 7 Due to 'extreme Heat' | Manchester Ink Link," *Manchester Ink Link*, June 6, 2021, https://manchesterinklink.com/manchester-schools-closed-june-7-due-to-extreme-heat/.

32 "Some NH Schools to Release Students Early Friday, Cancel Classes Due to Extreme Heat," *Yahoo News*, September 8, 2023, https://www.yahoo.com/news/nh-schools-release-students-early-023413751.html.

- Treat an increase in asthma attacks requiring hospitalization (resulting from increased heat and ground level ozone, and the increase in airborne allergens).
- Reduce the urban heat island effect by planting trees.
- Protect drinking water supplies from hazardous algae blooms.

**Economic Losses**

- Winter recreation and tourism industry losses due to shorter winters and less snowpack.

**Summary of Costs from Hotter Temperatures**

Public health costs (e.g., medicare/medicaid), AC installation and upgrades where needed, and lost winter revenue.

## Sea Level Rise

Globally, sea levels are rising due to climate change,[33] as glaciers melt and ocean waters expand.[34] Despite a relatively short New Hampshire coastline, about 13 miles long,[35] sea level rise poses a huge threat to infrastructure and residents. Sea level has risen 7 inches along the New Hampshire coast since 1950 and is projected to rise up to an additional 1.3 feet by 2050[36] and up to an additional 5 feet by 2100.[37] During 2005-2014, New Hampshire experienced 41 days of coastal flooding due to sea level rise, which is about six times higher than the seven days New Hampshire experienced from 1965-1974.[38]

New Hampshire has a population of around 4,500 people living within 5 feet of present day sea level. This area contains a total of about 1,900 homes valued around $622 million at risk from sea level rise.[39] A sea level rise vulnerability assessment of Seabrook, NH, found that sewage station pumps, a nuclear power station, an elementary-middle school, a wastewater treatment plant, and local roadways were all threatened by sea level rise.[40]

In January 2024, a severe storm swept through Hampton Beach, flooding entire neighborhoods from both extreme precipitation and coastal flooding. A state of emergency was declared and Ocean Boulevard was

33 Ekwurzel et al., "The Rise in Global Atmospheric CO2, Surface Temperature, and Sea Level from Emissions Traced to Major Carbon Producers." https://doi.org/10.1007/s10584-017-1978-0

34 Miller et al., "A Geological Perspective on Sea-Level Rise and Its Impacts along the U.S. Mid-Atlantic Coast." https://onlinelibrary.wiley.com/doi/abs/10.1002/2013EF000135

35 OP US EPA, "Seabrook, NH Plans for Sea-Level Rise," Overviews and Factsheets, September 24, 2021, New Hampshire, https://www.epa.gov/arc-x/seabrook-nh-plans-sea-level-rise.

36 New Hampshire Fish and Game Department, "Rising Sea Levels," State of New Hampshire Fish and Game, 2024, https://www.wildlife.nh.gov/wildlife-and-habitat/climate-change-and-wildlife/rising-sea-levels.

37 "Surging Seas Risk FInder: New Hampshire, USA," Climate Central, accessed May 24, 2024, http://riskfinder.climatecentral.org.

38 "Surging Seas Risk FInder: New Hampshire, USA."

39 "Surging Seas Risk FInder: New Hampshire, USA."

40 US EPA, "Seabrook, NH Plans for Sea-Level Rise."

closed to traffic.[41] Not even two months later, Hampton Beach was flooded again by another storm surge and high tide.[42] This event flooded dozens of homes, leading to major structural damage, as water levels reached over 12 feet.[43]

Not only does sea level rise threaten coastal infrastructure, it also threatens valuable marsh ecosystems. A recent study found that coastal marshes, which help protect against storm surge and provide various other benefits,[44] have been losing elevation at a rate of 2.1 mm/year due to sea level rise.[45]

## Potential Costs Related to Sea Level Rise

**Structure and Infrastructure Projects**

- Stabilize susceptible coastal slopes and cliffs and shorelines using grading techniques, planting vegetation, riprap or geotextile fabric, or bioengineering.
- Remove, relocate, acquire, or demolish structures to minimize future flood losses.
- Install, reroute, increase capacity, or implement a routine cleaning plan of the storm drainage system.
- Add extra culverts, increase dimensions of existing culverts, or implement routine cleaning and repairing to divert high-tide flood water.
- Install detention or retention basins, relief drains, spillways, drain widening/dredging or rerouting, green infrastructure, etc.[46]
- Inspect and maintain drainage systems and flood control structures (dams, levees, etc.).
- Elevate structures above BFE, or relocate utilities, water heaters, etc. above BFE.
- Floodproof inside of municipal buildings, for example by installing check valves, sump pumps, or backflow prevention devices.
- Floodproof wastewater treatment facilities located in coastal areas.
- Floodproof water treatment facilities located in coastal areas.
- Protect emergency operations by requiring or moving all emergency operations centers, police stations, and fire department facilities outside of coastal, flood-prone areas.

41 Asher Klein, "Flood Emergency in Hampton Beach, NH, with Scores of Homes Underwater," *NBC Boston*, January 10, 2024, https://www.nbcboston.com/news/local/flood-emergency-in-hampton-beach-nh-with-scores-of-homes-underwater/3242334/.

42 "Drone Video Shows Coastal New Hampshire Town Flooded | Latest Weather Clips," MovingImage, Fox Weather (Fox Weather), accessed May 20, 2024, https://www.foxweather.com/watch/play-6ff9a9cd3000254.

43 Ian Livingston, "Floodwaters Inundate Maine, New Hampshire for Fourth Time since December," *Washington Post*, March 11, 2024, https://www.washingtonpost.com/weather/2024/03/11/maine-new-hampshire-northeast-coastal-flooding/.

44 National Oceanic and Atmospheric Administration, "What Is a Salt Marsh?," National Ocean Service, accessed May 24, 2024, https://oceanservice.noaa.gov/facts/saltmarsh.html.

45 Andrew R. Payne, David M. Burdick, and Gregg E. Moore, "Potential Effects of Sea-Level Rise on Salt Marsh Elevation Dynamics in a New Hampshire Estuary," *Estuaries and Coasts* 42, no. 6 (September 1, 2019): 1405–18, https://doi.org/10.1007/s12237-019-00589-z.

46 Giese et al., "Assessing Watershed-Scale Stormwater Green Infrastructure Response to Climate Change in Clarksburg, Maryland." https://ascelibrary.org/doi/full/10.1061/%28ASCE%29WR.1943-5452.0001099?casa_token=XUXNexpXVioAAAAA%3AhGupZ8-_DSW_LpmJeH70D1zfz1RD_rMKFl9a_vwxzycN0fgN22inasD2c39yMqyiAbBA__RYYpM

- Protect critical and emergency facilities from floods using any other technique, for example, raising components above BFE, installing pumping systems or back-up generators for pumping, building dikes, or stabilizing banks.

**Coastal Protection**

- Protect critical infrastructure using techniques like beach nourishment, jetties, and seawalls.
- Restore natural wetland areas.

**Local Planning and Regulation**

- Identify, map, and track coastal erosion and flood hazards.
- Develop and enforce a coastal zone management plan.
- Develop site and building standards.

**Education and Awareness Programs**

- Increase awareness by disclosing location of high-risk areas to current and future property owners; offer mitigation technique information.
- Locate new utilities and critical facilities outside of susceptible areas.
- Identify, map, or track erosion hazard areas.
- Other education and awareness programs.

**Summary of Costs from Sea Level Rise**

Implement flood management infrastructure and structure projects in coastal areas, install coastal protection, restore natural flood protection, develop and implement a comprehensive coastal zone management plan, and increase public awareness of sea level rise risks.

## Other Potential Costs

Other plausible impacts from climate change that would incur public health costs are increased allergen levels, food- and water-borne infections, and zoonotic diseases.[47] Since New Hampshire's climate is historically moderate, New Hampshire is also likely to see an influx of climate refugees, which will incur costs as they plan for and accommodate more residents.[48]

47 Carmen Milanes et al., "Indicators of Climate Change in California" (Office of Environmental Health Hazard Assessment, 2022), https://oehha.ca.gov/media/downloads/climate-change/document/2022caindicatorsreport.pdf.

48 Annie Ropeik, "As Climate Change Drives Migration To N.H., Towns Face Tension And Opportunity," *New Hampshire Public Radio*, January 11, 2021, sec. Climate Change, https://www.nhpr.org/climate-change/2021-01-11/as-climate-change-drives-migration-to-n-h-towns-face-tension-and-opportunity.