Rising air temperatures, more extreme heat waves, and increased wildfire risk across the state may increase risk of heat-related illnesses and reduce air quality, impacting the physical and mental health of Shoreline residents. Emergency services may be more in demand due to these impacts.

Shoreline communities are likely to face the following impacts of a changing climate:

- **Heat-related Illnesses**
  - HIGH VULNERABILITY
  - More extreme temperatures may increase risk of heat-related illnesses, especially in areas with more paved surfaces that absorb heat.

- **Air Quality**
  - HIGH VULNERABILITY
  - Warmer temperatures and higher risk of wildfire smoke may cause more pollution and reduce air quality.

- **Mental Health Stress**
  - MODERATE VULNERABILITY
  - Climate change impacts may increase anxiety, depression, and other mental health stress for all populations.

- **Emergency Services**
  - LOW VULNERABILITY
  - More demand for emergency services due to public health and safety risks.

- **Vector-borne Diseases**
  - LOW VULNERABILITY
  - More rainfall and warmer temperatures may increase vector populations.
People and Climate Change

Climate change will affect different people in different ways. Some people may feel ill because of higher heat, have trouble breathing because of poor air quality, or worry about the future. For example:

- Children, older adults, and people with chronic medical conditions may be more sensitive to climate change impacts.
- People working or living outdoors, like construction crew, landscapers, or people experiencing homelessness, are more exposed to extreme weather, like high heat.
- People who have fewer resources, like low-income households and people without health insurance, may have a harder time preparing for the impacts of climate change.

It’s important to look out for our neighbors and work together to make sure our community is healthy and safe.

HEAT RELATED ILLNESSES

High vulnerability due to the need for resources to protect residents from exposure to extreme heat.

Increasing summertime temperatures and high heat days are expected to increase the risk of heat-related illnesses, and potentially death, in the Puget Sound region. Between 1980-2010, high-heat days caused a 10 percent increase in risk of death for all ages in King County, with a higher risk for people age 65 and older.

Heat waves in the Puget Sound region are expected to become more frequent and more severe, with the hottest days of the year projected to be 6.5°F warmer by the mid-21st century compared to the 1970-1999 average. The coolest nights are projected to be 5.4°F warmer by mid-century, indicating less relief from daytime heat and more risk of heat-related illnesses.

URBAN HEAT ISLANDS

In Shoreline, most urban heat islands occur at schools and commercial centers like Shoreline Place where parking lots and large roofs absorb heat and fewer trees are present to reflect heat and provide shade.

Children may be more exposed to heat stress at schools where many urban heat islands are located. Because this population is more sensitive to heat stress, they may be more vulnerable to increasing temperatures from climate change.

As Shoreline’s community continues to grow, a transition from single-family homes—with lawns, trees, gardens, and landscaping—to denser housing developments with relatively less green space has the potential to exacerbate heat impacts. This transition may be most significant in areas currently developed at 40 percent or less of their zoned capacity.

What are urban heat islands?

Areas where roofs, pavement, and other dark-colored hard surfaces absorb heat, causing some areas of a city to be warmer compared to shaded or vegetated areas (like forested parks) or surrounding rural landscapes. Urban heat islands already exist in Shoreline and many other cities. As temperatures rise with climate change, people, plants, animals, and infrastructure in urban heat islands may be more vulnerable.
AIR QUALITY

High vulnerability due to the need for preventative measures and more treatment for people affected by allergies and wildfire smoke.

Air pollutants, such as vehicle exhaust and wildfire smoke, negatively impact outdoor air quality. Poor air quality can harm human health—especially for people who are more sensitive, such as children, people who are older, and people with existing respiratory conditions, heart conditions, or asthma. In 2018, King County experienced 11 days when ground-level ozone (an indicator of air quality) was unhealthy for sensitive groups—a slight increase from the annual average of eight days between 2013 and 2017. Ground-level ozone increases with higher temperatures.

As the climate changes, warmer temperatures are expected to reduce air quality, especially during summer months, posing a greater risk of asthma, bronchitis, heart attacks, and premature death. By mid-21st century in the Greater Seattle area, there may be nearly twice as many deaths per year from ozone compared to the 1997-2006 average.

WILDFIRE SMOKE
Wildfire smoke has worsened local air quality in recent years. In 2017 and 2018, the Seattle area had 24 days of increased air pollution due to wildfire smoke, with several days during both years considered unhealthy for all populations. As climate change is expected to increase the risk of wildfire in Washington, Shoreline may experience more days when wildfire smoke reduces air quality in the future.

ALLERGIES
Warmer seasonal temperatures and fewer days with frost are expected to lengthen the pollen season. More carbon dioxide in the atmosphere has allowed plants to produce more pollen, making the pollen season more severe. These impacts could worsen allergy symptoms and may contribute to more asthma attacks.

INDOOR AIR QUALITY
Increased amounts of ground-level ozone due to higher temperatures can worsen indoor air quality as ozone enters buildings through windows, doors, cracks, and other openings. More extreme rainfall during the fall, winter, and spring—along with warmer temperatures—may cause more mold growth indoors. Worse indoor air quality may be especially stressful on residents’ health when outdoor air quality conditions are also poor, like during the summer.

MENTAL HEALTH STRESS

Moderate vulnerability due to a potential increase in mental health stress and anxiety associated with the impacts of climate change.

Increased exposure to climate change impacts may directly and indirectly worsen mental health illnesses and anxiety-related conditions. According to a 2017 American Psychological Association report, climate change can affect mental health due to trauma from extreme weather as well as emotions like fear, powerlessness, and anger related to the long-term changes in climate.

- Experiences with an extreme weather event or natural disaster can cause post-traumatic stress disorder.
- Uncertainty about future conditions, feelings of losing control over a situation can lead to anxiety and depression.
- Indigenous communities in particular may experience grief, depression, and anxiety from loss of culturally important resources, traditions, or sites.
EMERGENCY SERVICES

**Low vulnerability** due to adequate capacity of service providers to respond to higher demand for emergency response from extreme events.

As climate change impacts increase risks to public health and safety, demand for emergency medical services in Shoreline may increase. Local researchers found that high-heat days in King County increased the risk of calls for emergency medical services among people of all ages, including working-aged people between 15 and 64 (a group that is generally considered relatively resilient to health risks).

Heavier winter precipitation can increase the risk of flooding, landslides, and other natural hazards, which may also increase demand for emergency response services. However, these events may also make it more difficult for service providers to reach people in need, especially if flooding covers major thoroughfares and arterial roads. Fortunately, medical services are relatively accessible to Shoreline residents, with several urgent care clinics located in the Aurora Avenue corridor and emergency rooms located about four miles away in Edmonds and Northgate.

VECTOR-BORNE DISEASES

**Low vulnerability** due to capacity to treat and prevent the current low prevalence of diseases from mosquitoes and other vectors, even if they become more common.

Vectors are organisms like mosquitoes, ticks, flies, and fleas that can transmit infectious diseases between humans or from animals to humans. **Vector-borne diseases** are human illnesses caused by parasites, viruses, and bacteria that are transmitted by vectors. Lyme disease and West Nile Virus are among the vector-borne diseases that have been observed in Washington.

Warmer temperatures may increase populations of vectors and can expand the area where vectors are able to survive—and therefore, where diseases are found. Given that the current prevalence of vector-borne diseases in Shoreline is relatively low, and there are no specific projections that it will increase in the future, vector-borne diseases represent a lower source of climate vulnerability for Shoreline.

**WHAT IS SHORELINE DOING?**

- In 2019, the City prepared an updated Hazard Mitigation Plan Annex to identify risks and vulnerabilities from severe weather, floods, wildfire, and other hazards, as well as comprehensive mitigation strategies.

Additional strategies that Shoreline is planning or could pursue to build resilience include:

- **Establishing cooling centers** for communities to use during extreme heat events. Locate the cooling centers in places that are easily accessible for vulnerable populations.
- **Prioritizing future tree plantings** in urban heat islands.
- Using the City’s new **climate impacts mapping tool** to assess potential vulnerabilities for City projects and explore ways to build equitable climate resilience.
- Developing **guidance for public health professionals to support mental health needs** of communities and help them build psychological resilience to extreme weather and natural disasters.