Dear Tampa Bay, How will we address a changing climate?

Climate change: What are the causes?

Earth’s climate is always changing due to natural processes, but recent changes cannot be explained by natural causes alone and evidence points to human activities as the main cause of recent warming. Human activities, such as burning of fossil fuels, have increased the concentration of greenhouse gases in the atmosphere. These greenhouse gases - carbon dioxide, methane, nitrous oxide - act like a blanket, creating a “greenhouse effect” much like that of a greenhouse that is warmer than its surroundings. The result of this heat retention is the warming planet, leading to an increase in land and sea surface temperatures.

Climate change in Tampa Bay

Surrounded by the Gulf of Mexico, Tampa Bay is already experiencing the global effects of climate change through its local water systems. The Gulf of Mexico has already warmed by 0.6°F (0.31°C) between 1982 to 2006. Sea levels have increased 0.97 feet over the last century and future projections show an increase of 1-2 feet by 2060 and 2-7 feet by 2100 depending on the greenhouse gas emissions.

- **Storm surge in coastal areas.** An increasing number of coastal areas will be at risk in the future.
- **Saltwater intrusion in the Bay system.** Increasing sea levels combined with declining freshwater inflows will result in increased salinities in Tampa Bay and surrounding estuaries.
- **High-tide flooding of coastal infrastructure.** The number of flood days is projected to increase to 70-110 per year by mid-century from only one day in 2000, causing damage to public infrastructure.
- **Inundation of coastal areas.** The land area that runs adjacent to the shore is highly susceptible to inundation, where parts of coastal land and infrastructure will become uninhabitable.

These impacts will have significant effects on the people of Tampa Bay, its unique natural assets (seagrasses, bays, and estuaries), its wildlife, and the region’s tourism-driven economy, which currently generates over 100,000 jobs in St. Pete and Clearwater alone.
How a hurricane strike could affect Tampa Bay

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<thead>
<tr>
<th>Category 1</th>
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<th>Category 5</th>
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<td>Less than 3 feet above ground</td>
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**How can Tampa Bay prepare?**

**Understand present and future climate risks.** The first step in tackling climate risks is understanding different ways climate change already impacts the life of Tampa Bay residents and how these risks will magnify in the future.

**Support proactive hazard mitigation and resilience planning.** Local governments in the city of St Pete, Tampa and Pinellas County are championing climate resilience planning efforts in the area. Regionwide organizations such as the Tampa Bay Regional Planning Council are also providing a platform for interested citizens and stakeholders to come together and plan for the region’s future. Community-based programs like Tampa Bay Estuary Program, Tampa Bay Watch, and Keep Pinellas Beautiful offer ways for citizens to engage in resilience efforts.

**Advocate for nature-based solutions.** Tampa Bay leaders should apply innovative and adaptive nature-based strategies to shore up coastal resources and defend from extreme storm events, particularly in low to moderate-income communities, physically vulnerable areas, and areas with critical facilities. Residents can take action and make a difference in their own back yard.

**What are Nature-based solutions?**

Nature-based solutions offer win-win solutions for mitigating flooding, attenuating storm waves, and additional co-benefits such as recreation, water quality improvements, and coastal habitats for wildlife. Although the term nature-based solutions is in increasingly broad use, the approaches this concept embodies are referred to in a number of other ways.

**Nature-based Solutions** are actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits.7

**Natural infrastructure** refers to systems such as dunes, marshes, and floodplains that provide essential services and benefits to society, such as flood protection, water purification, and carbon storage.8

**Green infrastructure** is a subset of nature-based solutions focusing on approaches such as rain gardens, permeable pavements, green roofs, etc. for stormwater management in urban areas.9

**Living shorelines** describe a broad range of techniques and approaches for providing shoreline stabilization through the use of ecological, or “soft” approaches (e.g., oyster reefs, native vegetation) or retrofitting existing hard infrastructure (e.g., breakwaters) with soft approaches through hybrid solutions.10

**Examples of Nature-based solutions**

[Image of a map showing different ecosystems and their benefits, such as coastal wetlands, forests, and coral reefs. Source: National Oceanic and Atmospheric Administration (NOAA)]

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**Project info**

This National Wildlife Federation project relays climate risk and solutions for Tampa Bay through personal storytelling from community leaders across the Gulf and experiential learning. Communication impact will be measured to inform future methods of climate communication. This work is funded by the National Academies of Sciences, Engineering, and Medicine.

**Contact Amanda Moore at moorea@nwf.org with any feedback.**