



Florida Conservation Voters Education Fund

SEA LEVEL RISE

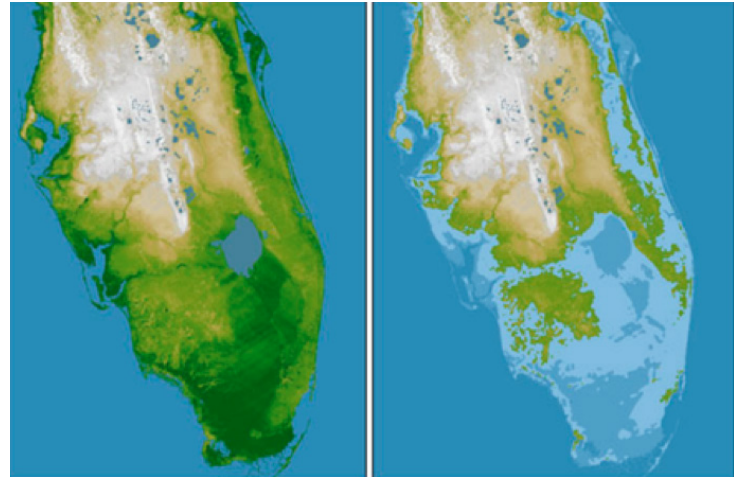
As the world's glaciers continue to melt from global climate change, sea level rise is no longer a distant danger. South Florida's low elevation, our porous limestone beneath our feet, and increased use of fossil fuels by humans makes our region remarkably vulnerable to sea level rise. This threat is no longer a question of "when" but how quickly.

WHAT IS SEA LEVEL RISE?

Sea level rise is the increase in the average elevation of the surface of the world's oceans.¹ **In 2017, the global sea level was measured 3 inches above the average in 1993.**² The rate at which sea levels are rising is accelerating and scientists believe sea levels will rise between 8 inches and 6.6 feet by 2100.³

WHAT'S CAUSING SEA LEVEL RISE?

Sea level rise is tied to climate change. The earth's temperature is increasing because humans have dramatically increased their use of fossil fuels. When we burn fossil fuels, such as oil, coal, and natural gas, we release greenhouse gases into earth's atmosphere. These gases act as a blanket, trapping the sun's rays in our atmosphere and in turn, increasing global temperatures.⁴ This increase in earth's temperature is causing glaciers and ice sheets to melt, and thermal expansion to occur which causes sea levels to rise.⁵



Graphic taken from Miamiherald.com
IMAGE COURTESY SRTM TEAM NASA/JPL/NIMA

Melting Glaciers and Ice Sheets. As global temperatures rise glaciers and ice sheets will melt into the ocean. **"Melting ice has caused about two-thirds of the rise in sea level to date."**⁶

Water Expansion or Thermal Expansion. When water is warmed it expands. So, as the sea heats up from global warming seawater will expand and take up more space.⁷ **Thermal Expansion is responsible for one-third of sea level rise to date.**⁸

WHY DOES THIS MATTER?

It is estimated that Florida's coastal population is 14,468,197,⁹ and this population is expected to grow by 8 percent between 2010 and 2020.¹⁰ That is an additional 10 million coastal residents and this number is only expected to increase.¹¹ As South Florida continues to grow in population size, the state will continue to experience sea level rise regardless. More coastal residents will experience coastal flooding and erosion and increased storm surges.

But sea level rise does not look the same across the the globe or even the United States. The surface of the earth is filled with hills, valleys, and mountains, and just like the diversity on land, our sea surface is also not just flat.¹² Thus, sea levels will rise at different rates in varying parts of the world. Local factors such as beach erosion, local hydrogeology, and storm surge compound the situation.

¹ "Sea Level Rise." Environmental Science: In Context. Retrieved November 04, 2018 from Encyclopedia.com: <https://www.encyclopedia.com/environment/energy-government-and-defense-magazines/sea-level-rise>.

² "Climate Change: Global Sea Level." National Oceanic and Atmospheric Administration. Retrieved November 04, 2018 from Climate.gov: <https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level>.

³ "Climate Change: Global Sea Level." National Oceanic and Atmospheric Administration. Retrieved November 04, 2018 from Climate.gov: <https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level>.

⁴ "Global Warming FAQ." Union of Concerned Scientists. Retrieved November 04, 2018 from UCSUSA.org: <https://www.ucsusa.org/global-warming/science-and-impacts/science/global-warming-faq.html#bf-toc-0>.

HOW ARE SOUTH FLORIDA COMMUNITIES IMPACTED?

Sea level rise has many immediate and direct impacts to residents of South Florida, such as tides, storm surges, and saltwater intrusion.

Impacts to Local Businesses and Tourism. Florida has a tourism-driven economy. Everyday that a coastal hotel, restaurant, or business cannot open due to flooding or other climate change-related problems is a day of lost wages for employees and business owners.

King Tide and Sunny Day Flooding. A tide is caused by the moon's gravitational pull toward the ocean.¹³ With sea level rise, **more water is being pulled on-shore and making king tides worse.**¹⁴ A study in 2016, found that high tide flooding in Miami Beach increased by more than 400 percent since 2006.¹⁵

Salt Water Intrusion. Salt water and groundwater (freshwater) are naturally kept separate.¹⁶ But as sea levels rise more salt water infiltrates freshwater areas, including underground aquifers. This intrusion contaminates water resources for coastal communities.¹⁷ Saltwater intrusion also affects plant communities and wildlife.¹⁸

A CONSERVATIONIST PLAN

It is critical that South Florida communities have strategies in place to protect against sea level rise. A proactive resilience plan will ensure long-term sustainability for our neighborhoods and the larger South Florida community. Below are some ways to address and plan for sea level rise:

Local governments should update land-use plans and zoning policies to ensure fewer residents and structures are in harm's way when sea levels rise;

Making investments in green and sustainable infrastructure, and for review of existing infrastructure standards;

Implementation of clean energy policies that help reduce greenhouse gas emissions;

Review local drainage system readiness, and update policies and standards for repair; and

Invest in coastal restoration projects to preserve sea life.

WHAT YOU CAN DO

Join us in spreading the word about sea level rise. You can call or write to your local government officials to learn more about what they are doing to combat sea level rise in your community. Future generations are counting on us to push our leaders to confront this problem.

For more information, contact:
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⁵ "Get the Facts: Why are Sea Levels Rising?" The Climate Reality Project. Retrieved November 04, 2018 from [climate-realityproject.org: https://www.climate-realityproject.org/blog/get-facts-why-are-sea-levels-rising](https://www.climate-realityproject.org/blog/get-facts-why-are-sea-levels-rising).

⁶ "Sea Level Rise." National Museum of Natural History. Retrieved November 14, 2018 from [ocean.si.edu: https://ocean.si.edu/through-time/ancient-seas/sea-level-rise](https://ocean.si.edu/through-time/ancient-seas/sea-level-rise).

⁷ "Sea Level Rise." National Museum of Natural History. Retrieved November 14, 2018 from [ocean.si.edu: https://ocean.si.edu/through-time/ancient-seas/sea-level-rise](https://ocean.si.edu/through-time/ancient-seas/sea-level-rise).

⁸ "Sea Level Rise." National Museum of Natural History. Retrieved November 14, 2018 from [ocean.si.edu: https://ocean.si.edu/through-time/ancient-seas/sea-level-rise](https://ocean.si.edu/through-time/ancient-seas/sea-level-rise).

⁹ "Florida." National Oceanic and Atmospheric Administration, Office of Coastal Management. Retrieved January 27, 2019 from <https://coast.noaa.gov/states/florida.html>.

¹⁰ "What percentage of the American population lives near the coast?" National Oceanic and Atmospheric Administration. Retrieved November 04, 2018 from [oceanservice.noaa.gov: https://oceanservice.noaa.gov/facts/population.html](https://oceanservice.noaa.gov/facts/population.html).

¹¹ "What percentage of the American population lives near the coast?" National Oceanic and Atmospheric Administration. Retrieved November 04, 2018 from [oceanservice.noaa.gov: https://oceanservice.noaa.gov/facts/population.html](https://oceanservice.noaa.gov/facts/population.html).

¹² "Is Sea Level Rising?" National Oceanic and Atmospheric Administration. Retrieved November 04, 2018 from [oceanservice.noaa.gov: https://oceanservice.noaa.gov/facts/sealevel.html](https://oceanservice.noaa.gov/facts/sealevel.html).

¹³ "King tides cause flooding in Florida in fall 2017." National Oceanic and Atmospheric Administration. Retrieved November 04, 2018 from [www.climate.gov: https://www.climate.gov/news-features/event-tracker/king-tides-cause-flooding-florida-fall-2017](https://www.climate.gov/news-features/event-tracker/king-tides-cause-flooding-florida-fall-2017).

¹⁴ "King tides cause flooding in Florida in fall 2017." National Oceanic and Atmospheric Administration. Retrieved November 04, 2018 from [www.climate.gov: https://www.climate.gov/news-features/event-tracker/king-tides-cause-flooding-florida-fall-2017](https://www.climate.gov/news-features/event-tracker/king-tides-cause-flooding-florida-fall-2017).

¹⁵ "Increasing flooding hazard in coastal communities due to rising sea level: Case study of Miami Beach, Florida" Shimon Wdowinski, Ronald Bray, Ben P. Kirtman, and Zhaohua. Retrieved November 04, 2018 from [sciencedirect.com: https://www.sciencedirect.com/science/article/pii/S0964569116300278](https://www.sciencedirect.com/science/article/pii/S0964569116300278).

¹⁶ "Groundwater and the Rising Seas." National Environmental Education Foundation. Retrieved November 04, 2018 from [neefusa.org: https://www.neefusa.org/nature/water/groundwater-and-rising-seas](https://www.neefusa.org/nature/water/groundwater-and-rising-seas).

¹⁷ "Groundwater and the Rising Seas." National Environmental Education Foundation. Retrieved November 04, 2018 from [neefusa.org: https://www.neefusa.org/nature/water/groundwater-and-rising-seas](https://www.neefusa.org/nature/water/groundwater-and-rising-seas).

¹⁸ "Assessing sea-level rise impact on saltwater intrusion into the root zone of a geo-typical area in coastal east-central Florida." Han Xiao, Dingbao Wang, Stephen C. Medeiros, Scott C. Hagen, and Carlton R. Hall. Retrieved November 04, 2018 from [sciencedirect.com: https://www.sciencedirect.com/science/article/pii/S0048969718305837](https://www.sciencedirect.com/science/article/pii/S0048969718305837).