



## Sea Level Solutions Day

Florida International University's Sea Level Solutions Center and Office of University Sustainability are joining with the Eyes on the Rise team to collect data on King tides and flooding in the community, with your help!

**What causes tides?** Tides are the periodic rise and fall of the water within oceans, seas, bays and other major water bodies, caused by the combined gravitational influences of the sun and moon and their positions relative to the Earth. Complex gravitational and centrifugal forces are applied to the earth's oceans by the sun, moon and the earth's rotation. Peaks in tidal movement depend on the rotation of the earth and the moon's orbital location, which has a greater effect on the tides than the sun. The moon moves around the earth in an elliptical orbit, taking about 29 days to complete one cycle (a lunar month). The overall gravitational force is greatest when the moon is closest to the earth (perigee), and least when it is furthest from the earth (apogee).

**Predicting tides.** The National Oceanic and Atmospheric Association (NOAA) has been measuring tides around the country since the early 1880s. Modern tidal recording instruments include advanced acoustics and electronics. Tidal predictions are based on these tidal measurements in many areas over an extended period of time. Predictions then go into tide tables that show times and heights of the highest and lowest tides.

**What are spring tides?** The term "spring tide" is the term used to define the highest tide in each lunar month. A spring tide occurs every 14.5 days, when the earth, moon and sun all align in what is termed syzygy. The spring tidal range varies from month to month.

**What is a King tide?** The term "King tide" is a term used to describe the highest seasonal perigean tides that occur each year. King tides are marked by a spring tide that takes place while the moon is closest to the Earth. King tides are a natural occurrence, and in some places they are barely noticeable. In low-lying areas, however, they can cause a significant amount of flooding. Tidal flooding can lead to coastal erosion and disrupt daily routines. With sea level rise, the frequency and amplitude of King tides are expected to increase.

**Why study King tides?** King tides illustrate the local impacts of sea level rise, and provide a glimpse of future everyday water levels. Because Miami's beaches already experience "sunny day flooding" during high tides and severe storms, identifying flood-prone locations and highlighting King tides can help raise awareness of sea level rise impacts to the community. FIU's research across a wide range of disciplines provides an increased understanding of how sea level rise will impact local resources is valuable information for community decision-makers.



Eyes on the Rise

**FIU** | Sea Level  
Solutions Center  
FLORIDA INTERNATIONAL UNIVERSITY

**FIU** | FLORIDA  
INTERNATIONAL  
UNIVERSITY  
Office of University Sustainability

### How to Document a Flood:

1. Use your cell phone to take a photo of a flooded area. If there is no flooding, take a photo of a dry area near a water source.
2. On your phone's internet browser, go to <http://eyesontherise.org/flood>. The form may ask to use your phone's GPS to determine your location. Agreeing will allow the device to automatically pinpoint your location on the map. If you don't see this notification, or if you decline, simply enter your location in the Description box.
3. Enter your name and e-mail address.
4. Select the date and the time that you are observing the flood.
5. Provide a description (location, appearance, etc.). The more detail, the better!
6. If you do see a map below your entry, please make sure it references your current location. If necessary, you can manually enter your location at the top of the map.
7. If you have access to a ruler and/or salinity measurement tool (such as a refractometer), use it to measure the depth flooding and/or salt content, then enter it into the form. This information is especially important.
8. Upload photos or videos of the scene by pressing the CHOOSE FILE button. You may upload up to 3 files. If you shoot video, it should be short (under 10 seconds).
9. When you are done, press SUBMIT.

### Tips for Effective King Tides Photos:

- Take pictures at or near peak high tide. You can track high tides and water levels in your area using NOAA's [Tides and Currents page](#).
- Take pictures where the impact of tides can be gauged against familiar landmarks, such as buildings, roads, sidewalks, parking lots, jetties, bridges, sea walls, & shorelines.
- Take contrasting shots of peak high and low tides, to help show the tidal range/variation.
- Most importantly- be safe! Use good judgment when you are taking photos; stay away from dangerous situations – such as stormy conditions – and avoid taking risks.

### Photos of flooding are used in several ways to help people:

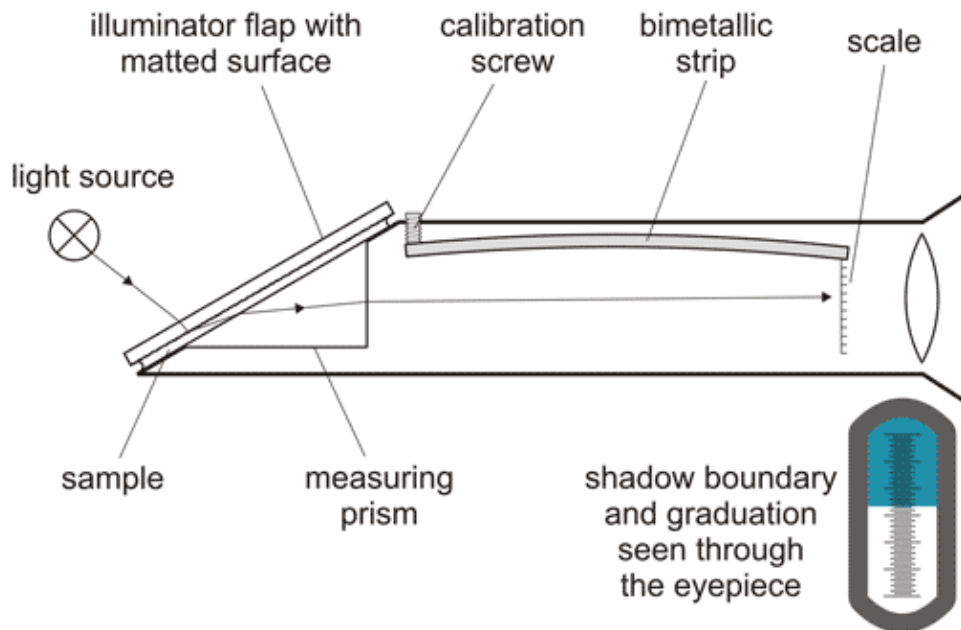
- Document current flood risk in coastal areas
- Visualize the impacts of future sea level rise in their community
- Verify climate change models by comparing model predictions with the high-tide reality
- Serve as a living record of change for future generations

*Photos may be used in presentations, exhibitions, websites and publications on sea level rise impacts, coastal initiatives and climate action. Photos may also be used by government agencies for research and planning to assess where coastline is most vulnerable, and by scientists to better predict future sea level rise.*



## Using a refractometer to measure salinity in flood waters:

1. Open the daylight plate and apply one or two drops of the sample solution using a pipette (or eyedropper) to the surface of the prism. Hold the refractometer at an angle, so the sample will not run off.
2. Gently close the daylight plate to avoid splashing. The sample solution should make a thin film over the entire surface of the prism. If the sample does not cover the entire prism, reapply the sample solution. If the prism is not completely covered or has bubbles it could result in inaccurate readings.
3. Look through the eyepiece. Focus the scale until it is sharp to your eyes by gently turning the eyepiece either clockwise or counterclockwise.
4. The upper field of view appears blue and the lower field will be white. The reading is taken at the line where the blue and white fields meet.
5. After taking a salinity reading, gently wipe the prism with a provided cloth.
6. You will need to calibrate your refractometer periodically. To calibrate it, take a reading using distilled water. Turn the calibration screw with the included screwdriver while looking through the eyepiece until the boundary line falls on "0".



- Tips:
  - Be gentle with the instrument: do not drop it or handle it roughly.
  - Do not use a rough or abrasive material to clean the prism.
  - Do not hold the refractometer under water or splash it with water.