Hawaiʻi and Pacific Islands King Tides Project

Low tide (July 30, 2015) and high tide (June 4, 2016) along the Ala Wai Canal (HI Sea Grant King Tides Project).

King Tides are coming! And we need your help!

We know that sea level is rising in Hawai'i and across the Pacific. In addition, the existing problem of chronic erosion, which causes beach loss, damages homes and infrastructure, and endangers critical habitat, will likely worsen with sea level rise. We are particularly interested in documenting those higher tidal and sea level events as representation of what our coasts may look like on a more regular basis in the future.

The challenges of sea level rise are real and daunting. Environmental experience and photographic documentation of high water level events is intended to raise awareness of the present, near-term, and ultimate impacts to our coastal environments and infrastructure. The hard evidence is the necessary support for future research and policy development, and decisions related to sea level rise risk and vulnerability and climate change adaptation.

This Citizen Science initiative is one of many existing and developing efforts focused on coastal community resilience, e.g.: Honolulu's selection to join the Rockefeller Foundation's 100 Resilient Cities Network; the Hawaiʻi Interagency Climate Adaptation Committee (ICAC) and the Hawaiʻi Climate Adaptation Portal; the newly-formed Hawaiʻi Sea Grant College Program Center for Coastal & Climate Science & Resilience; and others.

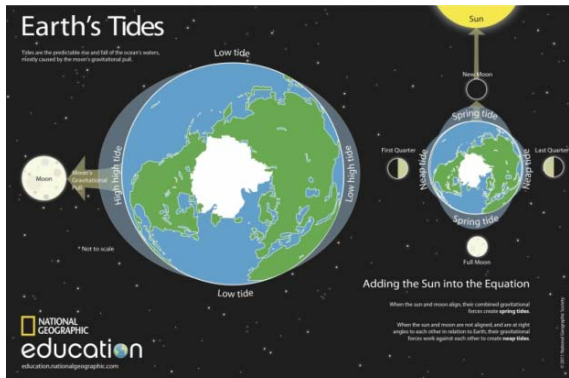**There are four main aims of the HI King Tides Project:**
1. Educate and train citizen scientists on coastal processes and coastal hazards.
2. Observe and document water levels during King Tides.
3. Discuss how to prevent, withstand, adapt to, and recover from coastal hazards.
4. Apply citizen scientist-generated data towards research, policy, and climate change adaptation.

Citizen scientist-generated data and images are significant contributions to the state's and our island communities' efforts to remain resilient in the face of rising seas.

Our highest high tides generally occur in the summer and winter months of, approximately, June-August and November-January, respectively. We utilize NOAA's Tide Predications to forecast our predicted highest high tides – *King Tides* – and rely on, *you*, interested citizens to

collect data and photographs during these events. All entered data is publicly accessible via the HI King Tides dataset, hosted by Liquid.

"Tides are the predictable rise and fall of the ocean's waters, mostly caused by the moon's gravitational pull. When the sun and moon align, their combined gravitational forces create spring tides."
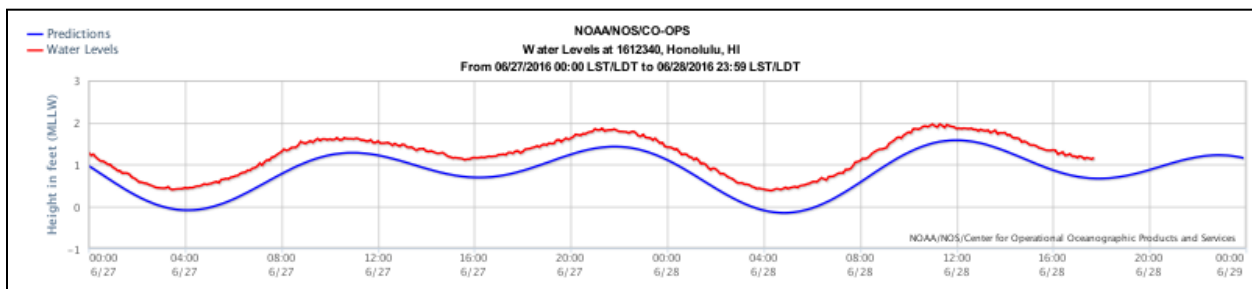
-National Geographic Education Blog, January 31, 2014

There are several factors that contribute to water levels; these can be astronomical, climatic, and meteorological, e.g., *Daily Tides, King Tides, El Nino, and Storm Surge*.

NOAA National Ocean Service: "Coastal Flooding in California."

Other sea surface anomalies or bulges can track across the ocean affecting water levels (e.g., recorded tides have been consistently 4 inches or greater than predicted tides for several months now.)

Screen capture of the Honolulu Tide Station's predicted and record water level from June 27-June 29, 2016.

APA Hawai'i Newsletter Article
June 28, 2016
Matthew Gonser, AICP
University of Hawai'i Sea Grant College Program

These ranges in sea surface can translate into water lapping at your feet at the beach; nuisance flooding that affects businesses, homes, and coastal infrastructure such as roads or storm drains; large erosion events and loss of property; and ultimately, due to sea level rise and groundwater penetration, permanent inundation.

L-R: Hawai'i Kai Boat Ramp, O'ahu, June 4, 2016; Nawiliwili Harbor, Kaua'i , July 30, 2015; Kalia Road at Saratoga Road, O'ahu, June 30, 2016 (HI Sea Grant King Tides Project).

During the King Tide events, we ask that you help us in documenting our dynamic shore. As the international King Tides Network says, "Snap the Shore, See the Future."

Images and data from any stretch of shore are important contributions to the project. However, to intentionally investigate the potential for nuisance flooding or coastal inundation, we recommend using the NOAA Sea Level Rise and Coastal Flooding viewer, adjusting the water level between +1 foot and +3 feet, and documenting a location that is projected to experience flooding as a result of future higher sea level (i.e., today's higher high tides).

For full details and instructions, as well as more information on this program and **how to participate and contribute as a Citizen Scientist**, please visit the project webpage. We look forward to seeing you out along the shore and mahalo for your participation and contribution!

-**Matthew Gonser, AICP**, is an Extension Agent with the University of Hawai'i Sea Grant College Program (Hawai'i Sea Grant). He holds one of two Director-At-Large positions with APA-HI. Hawai'i Sea Grant supports an innovative program of research, education and extension services, directed to the improved understanding and stewardship of coastal and marine resources of the state, region, and nation - http://seagrant.soest.hawaii.edu/.

Hawaiʻi and Pacific Islands King Tides Project

Education, Observation, and Application
A Citizen Science and Extension Program

For full program details, please visit the project website:

http://ccsr.seagrant.soest.hawaii.edu/hawaiʻi-and-pacific-islands-king-tides-project

How to Participate

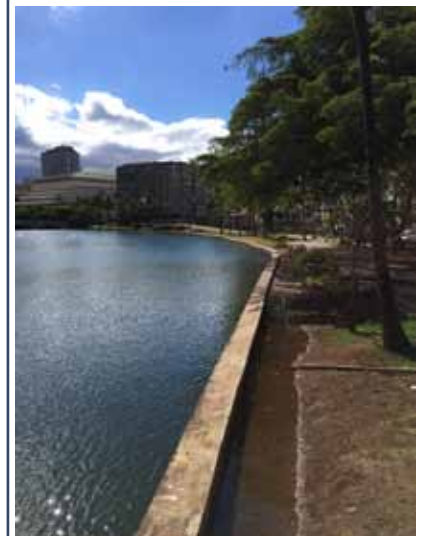Participation in the *Citizen Science photo survey* takes just a few steps:

1. Visit **https://getliquid.io/home** to join the King Tides dataset, which is hosted by Liquid. To set up your account, establish a username and passowrd, then sign into the new account. Search "HI Sea Grant" and join the dataset (i.e., select "Join Dataset").

2. Using an iPhone: go to the App store to download and install the "*liquid mobile data collection*" application. Open and login to the app. Since you already joined the dataset on-line, the King Tides dataset will open when you login.

3. Enter data! Select "new record," take a photo* using the camera icon on the data entry form, fill in all required data, then press "submit." Pau! Now go record more observations!

4. Using a computer^: Enter data at the Liquid website. Select "add record," and use the camera icon to upload each photo* from your desktop, fill in all required data, then press "submit." Pau! Now enter your next observation!

 *Liquid officially supports Chrome. We suggest that you **use Chrome**.*

* Please see the next page for more guidance on taking pictures and filling out the form to provide the best possible data.

^ Important: If you are uploading your photo from a computer, use your phone's compass to take a GPS location in latitude and longitude before you change locations.

Staying safe along the shore: The shoreline is a dynamic environment with benefits and risks. Always reduce risk to yourself and others when capturing King Tides imagery. Be aware of your surroundings (e.g., wind, waves, edges, steps, etc.) and observe your location and routes before heading out. Avoid locations that require climbing on rocks, walls, or other structures, and ensure you access sites via public access points. Dress appropriately (you may get wet!), but most of all, have fun! MAHALO for your contributions!

Guidance for Taking a Picture

1. At your selected location, take time to observe the water - find, and stand at, the highest wet water line in the sand, lawn, and/or road. Take a step mauka from that line. Take the photo facing parallel to the shoreline. If available, include some sort of feature in your picture (e.g., wall, lifeguard station, dock, etc.).

2. Ideally, you'll want your image to capture the highest water line (i.e., highest wash of the wave) - this requires patience. However, all images and associated data are helpful for the objectives of the Citizen Science documentation and future application of the data.

3. If using the iPhone app, you must take the photo using the camera icon in the data entry phone. The app does not access your photo library, nor does it save the image to your library.

Guidance for Entering Information in the Data Form

1. Location*: In the iPhone app, select ⌖ icon.^

2. Location Description*: Be as decsriptive as you can about your location, e.g.: "Fort DeRussy at handball courts," "McCully Street bridge at bus stop at Ala Wai Canal."

3. Orientation*: Use your phone's compass; select from menu.

4. Date*: This will autopopulate in the iPhone app.^

5. Time*: This will autopopulate in the iPhone app.^:

6. General Comments (optional): This allows you to provide additional interesting and/or important information about your photo.

7. Photographer's Name (optional): If you would like your name associated with your image, please enter here.

* = required field

^ Important: If you are uploading your photo from a computer, use your phone's compass to take a GPS location in latitude and longitude before you change locations. Similarly, record the date, time, orientation and other information for required fields.