Recording Water Levels Through Citizen Science Reporting

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Citizen Science and Crowdsourcing

- Voluntary public participation in the scientific process

- Participants help address real-world problems by
  - Collecting & analyzing data
  - Making new discoveries,
  - Solving complex problems

- US Gov’t recognized benefits of citizen science and crowdsourcing in 2015 memorandum
Elevated water levels – hurricanes and storm surge
Elevated water levels - Globally

It's not just Harvey: August marked by deadly floods around world

By Madison Park, CNN

Updated 5:50 AM ET, Fri September 1, 2017
Elevated water levels – High Tide Floods, Nuisance Flooding, and King Tides

High Tide Flood Events Are Significantly Increasing Around the U.S.

What is high tide flooding?
Flooding which causes public inconvenience.

What are the impacts of high tide flooding?
Frequent road closures, overwhelmed storm drains, and deterioration of infrastructure such as roads and rail.

Where is this happening?
High tide flooding is increasing around the coastal U.S., with more rapid acceleration along the East and Gulf Coasts.

Why is this happening?
High tide flooding is increasing due to climate-related sea level rise and land subsidence (sinking) combined with loss of natural coastal barriers.

In 1950, it would take a considerable amount of water caused by a large storm such as a hurricane to cause high tide flooding. High tide flooding was infrequent.

In 2010, with higher relative sea level, it no longer takes a strong storm or hurricane to cause flooding. Now, high tide flooding is frequent and can be caused merely by high tide.

How is local elevation important to high tide flooding?
The relationship between local elevation and the high tide line determines the rate of nuisance flooding. If they are close to the same in elevation, flooding is frequent. If they are not close, flooding is infrequent.
Collecting high water levels – King Tides

The King Tides Project: Snap the Shore, See the Future

More than half of the world’s population lives in coastal areas. Over one trillion dollars’ worth of private property, public infrastructure, and businesses are at risk from rising seas caused by climate change. Coastal communities from Baja California to Bristol and Bangladesh are beginning to plan for a future with higher seas, and the King Tides Project is a part of many of these efforts. This project is an easy way for everyday citizens to get a glimpse of this future, while at the same time helping researchers and planners protect lives, homes, and businesses.

Explore this interactive story map to learn more about how the King Tides Project is weaving together some of the most exciting trends in citizen science, digital storytelling, and community mapping.

What is Sea Level Rise?

Just as the surface of the Earth is not flat, the surface of the ocean is not flat. For instance, the absolute water wave height is higher along the West Coast of the United States than the East Coast. The surface of the sea changes at different rates around the globe.

The term “global sea level rise” refers to the average height of all of the Earth’s ocean basins. “Global sea level rise” refers to the increase in the average global sea level trend. “Local sea level” refers to the height of the water measured along the coast relative to a specific point on land. Tide stations measure local sea level. “Relative sea level trends” reflect changes in local sea level over time. This relative change is the one most critical for many coastal applications, including coastal mapping, marine boundary determination, coastal zone management, coastal engineering, sustainable habitat restoration, and the general public warning.
Demonstration of “What’s your water level?”

Interactive Map – summary data and other websites to learn more: https://noaa.maps.arcgis.com/apps/MapSeries/index.html?appid=8e4a278576964f47b4fc050e51f344ca

Report – make a report on mobile device or computer: https://noaa.maps.arcgis.com/apps/GeoForm/index.html?appid=3b55f51105d64d5895f252374e7c902a
Data users and application – University of North Carolina

Gaps:
11) Cape Fear River
12) New River
13) Bogue Inlet/Sound
14) Cedar Is./So Pamlico S.
15) Western Pamlico S.
16) Albemarle S.

1. King Tides
   (education & outreach)

2. Cit. Sci. Water-Level Monitoring
   (NC Sea Grant & CISA)

http://nckingtides.web.unc.edu/
Data users and application – NOAA’s Center for Operational Oceanographic Products and Services (COOPS)

Inundation Landmarks & Impact Graphics

Front Street, Beaufort, NC

https://tidesandcurrents.noaa.gov/inundationdb/
Data users and application

- National Weather Service
- Local Government
- Town Planners
- Model Validation
- Schools
Other available apps

Sea Level Rise

Liquid Field Notes

MyCoast (SC, ME, MA)

Hawai’i and Pacific Islands
King Tides Citizen Science In...

Latest Records
Feb 10, 2017 8:51:38 AM HST
Nov 19, 2016 8:51:14 AM HST
Nov 19, 2016 8:49:41 AM HST

View Form New Record
Feedback - Discussion

• Using the application,

• Diversifying Use,
  o Expanding geographically
  o Other applications of the data

• Suggestions for getting the word out

• Other Suggestions - Recommendations