Nuisance Tidal Flooding

* What is it?
* How often does it happen?
* Sea level anomaly.
* Who noticed?
Nuisance Flooding defined by NOAA’s National Ocean Service

* Image from NOAA
* Typically 1.0 feet above Mean Higher High Water

Sea level rise is increasing nuisance flooding around the United States.

- Storm Surge
  - 1950 sea level
    - In 1950, it would have taken a considerable amount of water from a large storm, such as a hurricane, to cause nuisance flooding. **Nuisance flooding was infrequent.**
  - 2010 sea level
    - In 2010, with higher relative sea level, it no longer takes a strong storm or hurricane to cause flooding. **Today, nuisance flooding is frequent,** and it can be caused merely by high tide.

Sea level rise at a given location depends on the combination of subsidence (sinking or settling of the soil) and global sea level rise from melting glaciers and ice sheets and water expanding in volume as it warms. **Nuisance flood thresholds** vary by location, but are generally 1-2 feet above the high tide level.
Water Level Variability at Different Time Scales

Interannual variability: ~ 1 ft

Seasonal variability: ~ 1 ft

Note: Mean Tide Range: ~ 1 ft
Rockport Tide Gauge 1966 and 1986

- Tides computed based on 2002-2006 MSL
- Green: measured, Blue: predicted
- 1966 – 0 Nuisance floods
- 1986 – 0 Nuisance floods
Rockport Tide Gauge
1996 and 2006

* 1996 – 2 Nuisance floods
* 2006 – 1 Nuisance flood
Rockport Tide Gauge 2015 and 2016

- 2015 – 32 Nuisance floods
- 2016 – 91 Nuisance floods

* Incomplete tide data
Rockport Tide Gauge
2006 and 2016

- 2006 – “Normal” Year 1 Nuisance flood
- 2016 – 91 Nuisance floods
Rockport Tide Gauge
2016

* 2016 – 91 Nuisance tides
* The reason for the nuisance floods, in this case, is the mean tide level is high for weeks
* It’s not 91 storm events
* 91 days with an unusually high tide indicates a longer term trend
Mean Sea Level Anomaly Definition

* “…occurs when the 5-month running average of the interannual variation is at least 0.1 meters (4 inches) greater than or less than the long-term trend. The interannual variation is the monthly mean sea level after the trend and the average seasonal cycle are removed....”

(Weather Service's National Ocean Service)
Rockport Tide Gauge
2006 and 2016

* 2006 – “normal” year
* 2016 – 8 months of “high” sea level
Gulf of Mexico

https://tidesandcurrents.noaa.gov/sltrends/anomalymapmonth.htm
Local fishermen noticed unusual “high water levels”

* Boat traffic in new areas…resulting in some damage to habitat
* Fish are spread out and/or in the grass…on private land for months
* Water didn’t “fall out” in the fall, flats remained submerged
* Wade fishing areas moved shoreward
Who noticed - Contractors

* Construction projects on beaches and in shallow bays affected
  * Water levels reaching into dune projects
  * Mobilizing equipment for 1 foot of water, then working in 3 feet
  * Under keel clearance is “easier” to maintain
Who noticed – Real Estate

* Connecting hype in the media with water over bulkheads
  * Should I sell my house and move? Panic could cause values to plummet.
  * Local streets and driveways flooded
  * Storm drainage not working well, leaks into sanitary sewer systems
  * Unprotected shorelines eroding at an accelerated rate
Coastal Flood Exposure

https://coast.noaa.gov/floodexposure/#/map
Nuisance floods made worse by a leak in the water line running under the parking lot…

* Things are not always as they appear.
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