



**RISING  
WATERS**

**WORLD OCEANS  
DAY 2020**



[www.ClimateCreatives.com](http://www.ClimateCreatives.com)



**FUTURE FROGMEN**

[www.futurefrogmen.org](http://www.futurefrogmen.org)





**RISING  
WATERS**

Susan Israel, *President & Founder*

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Creative Engagement Exercises  
Engaging people to think about sustainability...  
...using art and design.



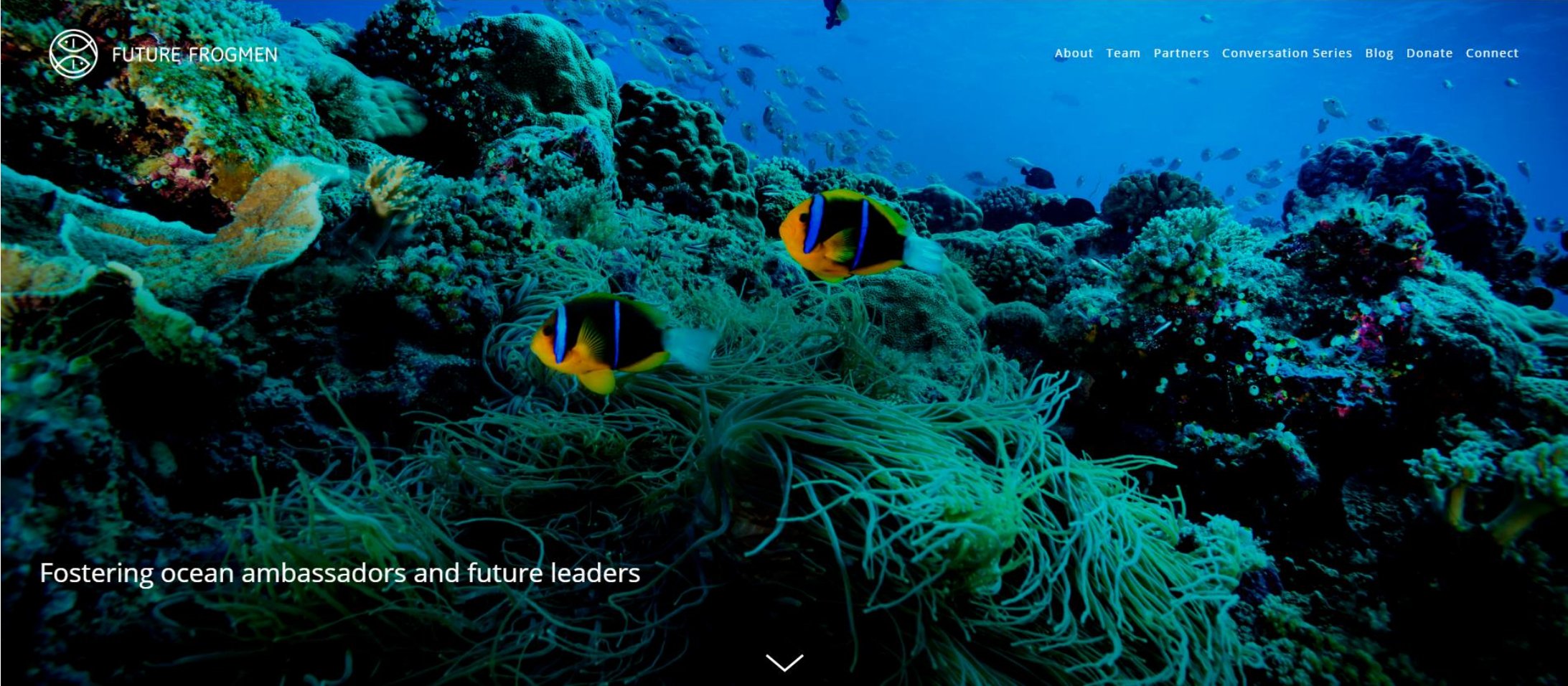
Climate  
Creatives

[www.ClimateCreatives.com](http://www.ClimateCreatives.com)



Thanks to Future Frogmen!!

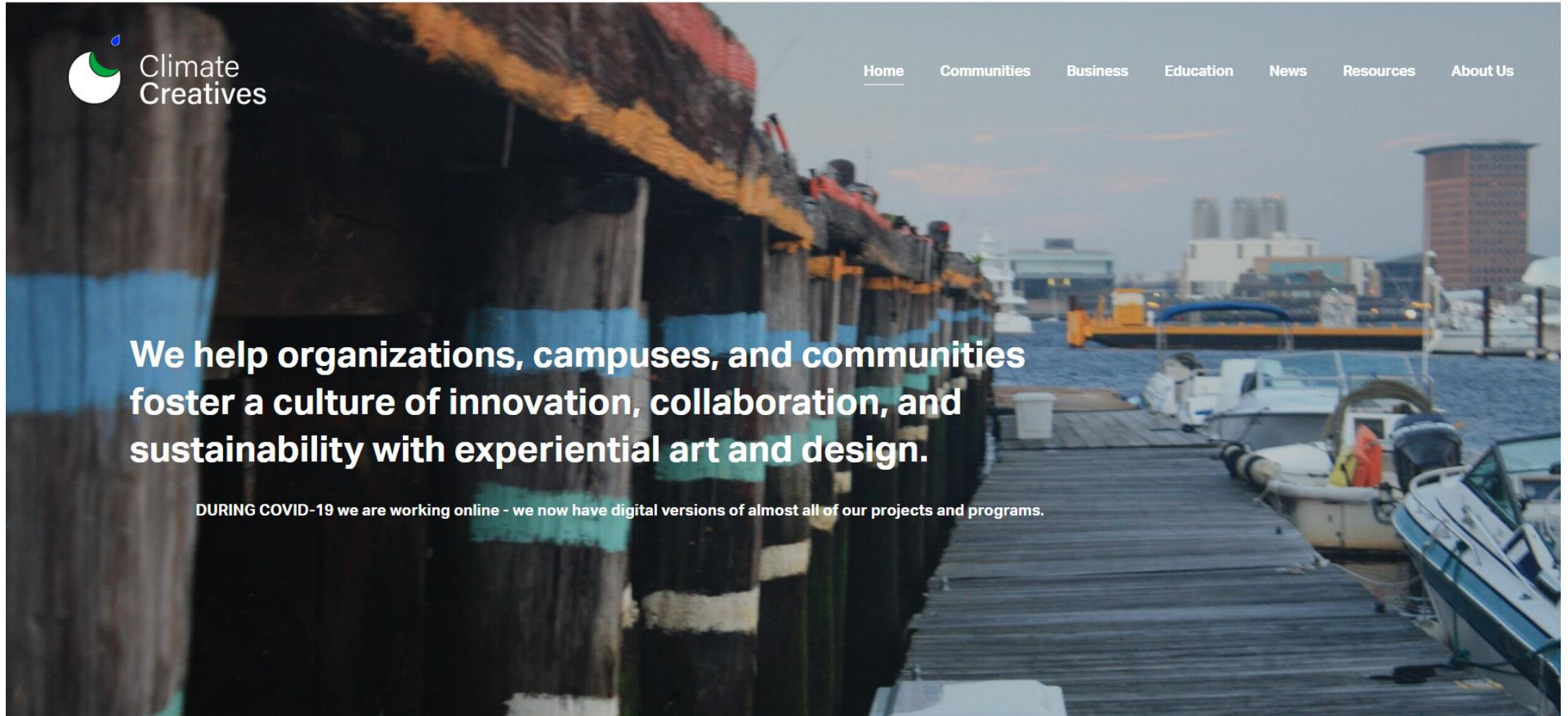
<https://www.futurefrogmen.org/>





# Climate Creatives

<https://climatecreatives.com/>



[Home](#) [Communities](#) [Business](#) [Education](#) [News](#) [Resources](#) [About Us](#)

**We help organizations, campuses, and communities foster a culture of innovation, collaboration, and sustainability with experiential art and design.**

DURING COVID-19 we are working online - we now have digital versions of almost all of our projects and programs.



# Agenda

- Introduction – Future Frogmen and Climate Creatives
- Rising Waters overview- website - <https://www.risingwaters.org/>
- How to do an installation
- Selfies/digital installations
- Installation methods
- Do1Thing Pledge – action-based
- Documentation
- Sharing – upload to RisingWaters.org, social media, networks
- Q & A
- Closing remarks



# Rising Waters/Rising Tides

Boston HarborArts, 2013  
First installation



# Rising Waters

- Broward County Schools MODS Jan 2020
- 30 installations in April 2020
- Hong Kong Chapter and installations 2019
- San Blas Islands, Panama installation 2017
- Photo Exhibition at United Nations and EarthdayTX (120k, Texas)
- Installed 120+ locations
- Educational materials
- Do1Thing Pledge – action-based
- Kendall, UMASS, Courthouse, World Trade Center
- Maverick Square MBTA & Health Center
- Ferry Dock, MacMillan Pier, Provincetown
- Students in public schools helped produce artwork
- Sustainable Brands, San Diego





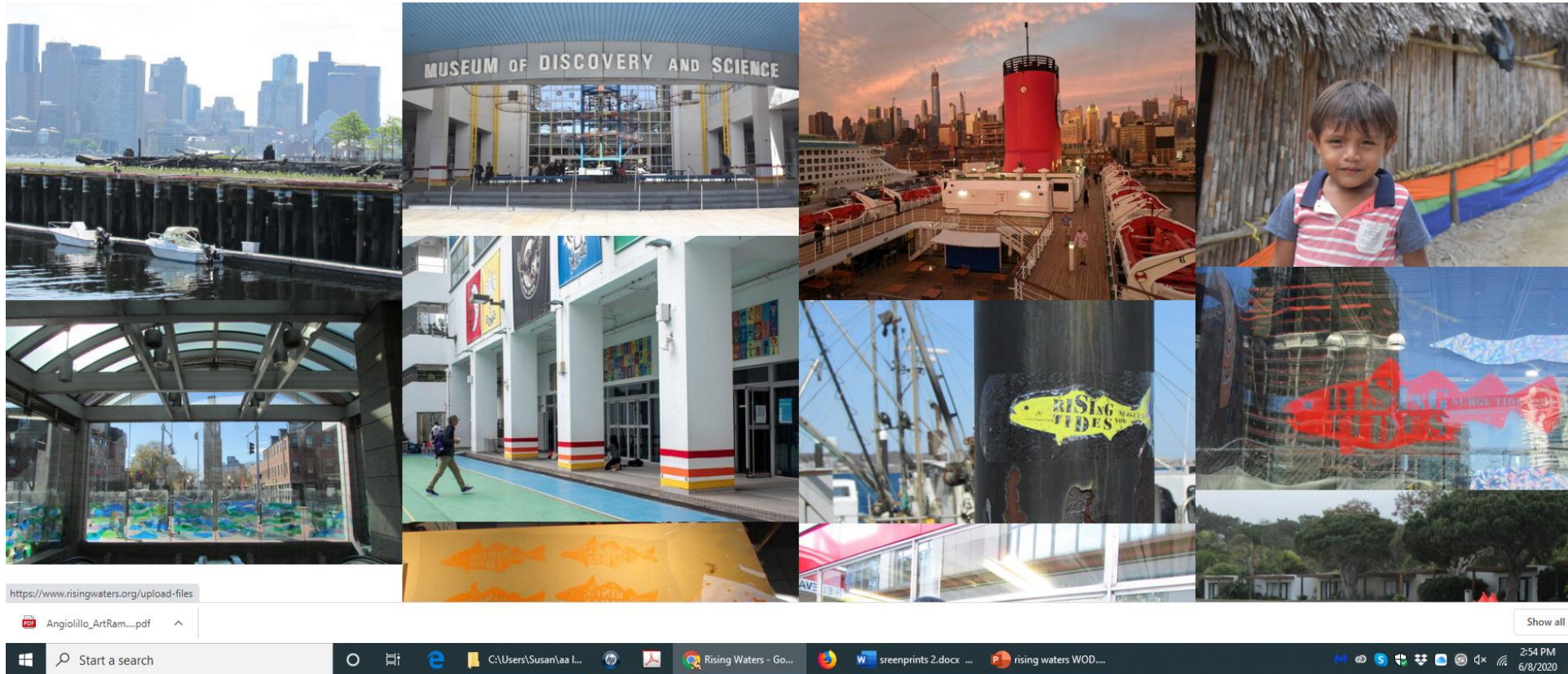
# Rising Waters Installations

[www.RisingWaters.org](http://www.RisingWaters.org)

[INSTALLATIONS](#) [ABOUT](#) [KITS](#) [RESOURCES](#) [JOIN](#) [RW DIGITAL](#) [UPLOAD](#)



Art for climate education and adaptation





# Rising Waters Process

- Identify your site
- Find the data
- Render the water on the building/landscape/monument
- Show the dates
- Signage- What's your message? **Credit others**
- Action items: Create an action campaign
- #Do1Thing
- Education- <https://climatecreatives.com/resources>
- SHARE!! Social media, blogs, write articles
- Talk about Climate Change, Oceans and human impacts
- *"Your Choices Matter"*
- **VOTE**

# Calculating Sea Level Rise & Flood Levels

## *Find the Data - Overview*

Find the exact elevation of your site.

**Find flooding from all sources. Add them up.**

SUBTRACT your site elevation from the water flood elevation (If you have 10' of flooding above Mean High High Waters, but your site is 5' above MHHW, you have 5' of flooding)

*Adding them all up:* use whichever ones apply

**For coastal areas**

Sea level rise + storm surge + king tide + rainfall = **total flood amount**

**For riverine flooding**

river flooding + rainfall = total flood amount



# Calculating Sea Level Rise & Flood Levels

## *Find the Data – Elevation of your site*

Pick your site on land – Find its elevation

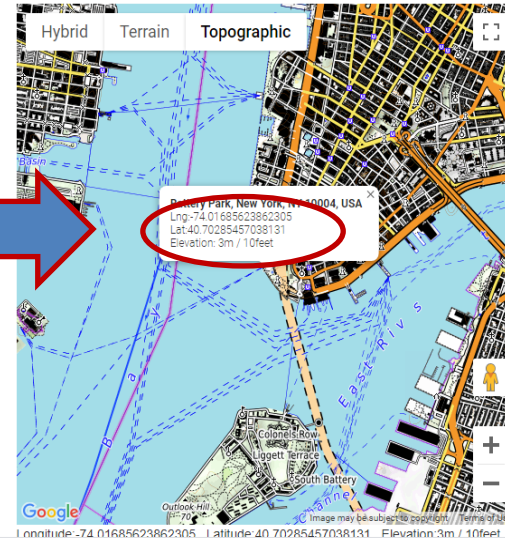
Example: Battery Park Elevation = 10' above MSL (uses *Mean Sea Level* as the datum) <https://elevation.maplogs.com/>

### Worldwide Elevation Finder / Topographic map / Altitude map

#### 1. Search by Address

#### 2. Search by Map



#### Recent Places:

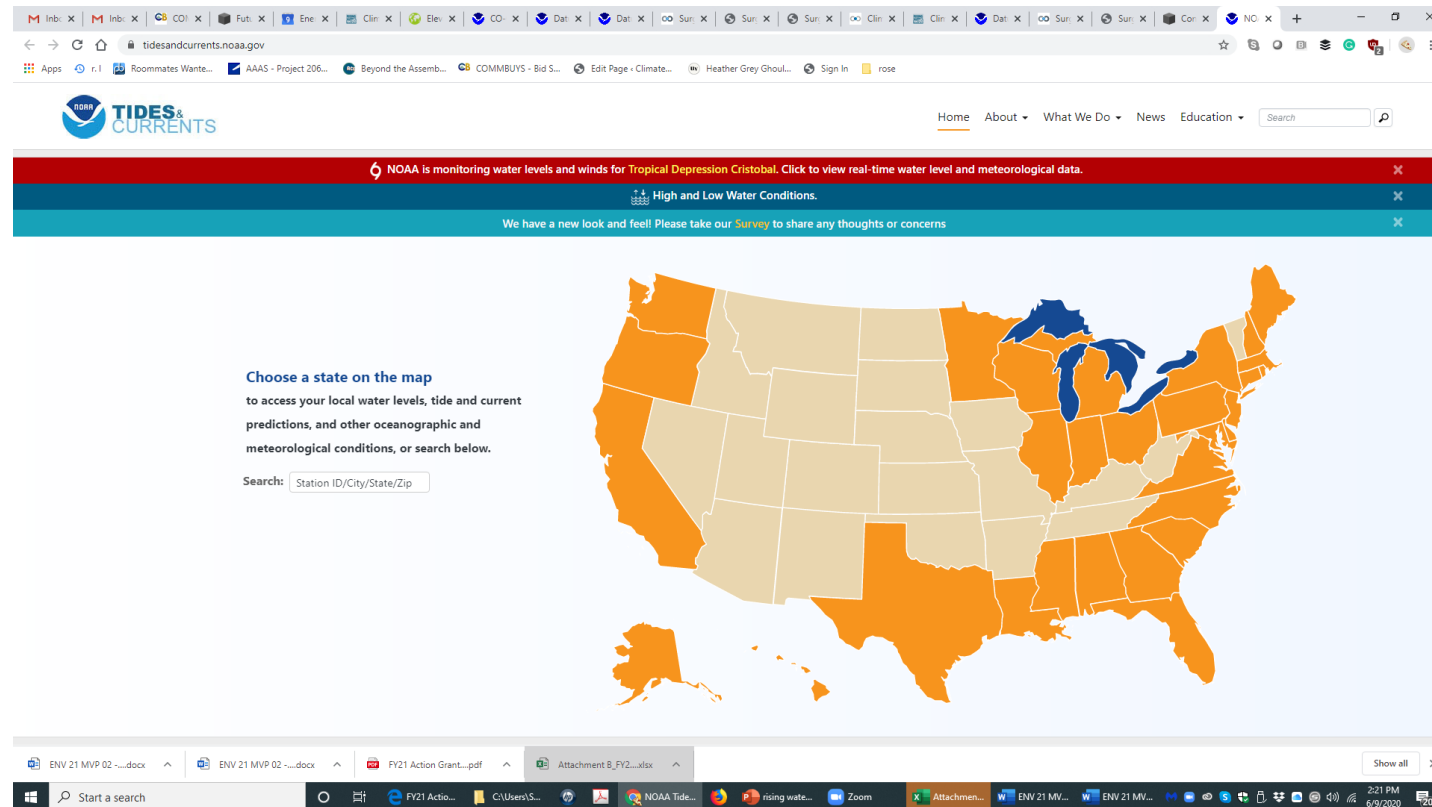
- Elevation of Papaveri St, Richmond, TX, USA
- Elevation of Rampart St, Houston, TX, USA
- Elevation of Bankside Dr, Houston, TX, USA
- Elevation of Forest Rd, West Haven, CT, USA
- Elevation of 3 Cll San Martin, Santa Fe, NM, USA
- Elevation of DYWIDAG-Systems International GmbH, Germanenstraße 8, Königsbrunn, Germany
- Elevation of 84 Chestnut St, Andrews, NC, USA
- Elevation of Lakefield Ct, Union, MO, USA
- Elevation of Dancing Moon Way, Sparks, NV, USA
- Elevation of 18th St, Des Moines, IA, USA
- Elevation of Hull Ave, Des Moines, IA, USA
- Elevation of Harehills, Leeds, UK
- Elevation of Idu Industrial Layout, Abuja, Nigeria
- Elevation of Alpine Ln, Sky Valley, GA, USA
- Elevation of Stanford Hills, Redding, CA, USA
- Elevation of Pinon Ln, Peeples Valley, AZ, USA
- Elevation of 7 N Sherwood Glen, Monument, CO, USA
- Elevation of Mayo Dr, Dyke, VA, USA
- Elevation of SW 86th Way, Gainesville, FL, USA
- Elevation of Grottoes, VA, USA
- Elevation of Izatnagar, Bareilly, Uttar Pradesh, India
- Elevation of Clive Lodge, Southport PR8 4QY, UK
- Elevation of St James Dr SE, Southport, NC, USA
- Elevation of Gopher Valley Rd, Sheridan, OR, USA
- Elevation of Indian Ridge Dr, Tellico Plains, TN, USA
- Elevation of Mont Tremblant, Mont-Tremblant, QC J8E 0A8, Canada
- Elevation of Golf Le Maitre De Mont Tremblant, Allée Grande, Mont-Tremblant, QC J8E 2L8, Canada
- Elevation of Peachtree Rd NE, Atlanta, GA, USA
- Elevation of Sea Pines Dr, St Helena Island, SC, USA
- Elevation of Mazara del Vallo, Province of Trapani, Italy
- Elevation of Kaalplaats Plots Vanderbijlpark, Windsor, Vanderbijlpark, South Africa
- Elevation of Fernbrook NSW, Australia

# Calculating Sea Level Rise & Flood Levels

## *Find the Data – Water datums at your site*

Find datums: MSL and Mean Higher High Water

<https://tidesandcurrents.noaa.gov/>



The screenshot shows the NOAA Tides and Currents website interface. At the top, there is a navigation bar with the NOAA logo and the text "TIDES & CURRENTS". Below this, there are several notification banners: "NOAA is monitoring water levels and winds for Tropical Depression Cristobal. Click to view real-time water level and meteorological data.", "High and Low Water Conditions.", and "We have a new look and feel! Please take our Survey to share any thoughts or concerns". The main content area features a map of the United States with states colored in orange and blue. To the left of the map, there is a text prompt: "Choose a state on the map to access your local water levels, tide and current predictions, and other oceanographic and meteorological conditions, or search below." Below this prompt is a search input field labeled "Search:" with the placeholder text "Station ID/City/State/Zip". The browser's address bar shows the URL "tidesandcurrents.noaa.gov". The Windows taskbar at the bottom displays various open applications, including "ENV 21 MVP 02", "NOAA Tide...", and "rising wate...", along with the system clock showing 2:21 PM on 6/9/2020.



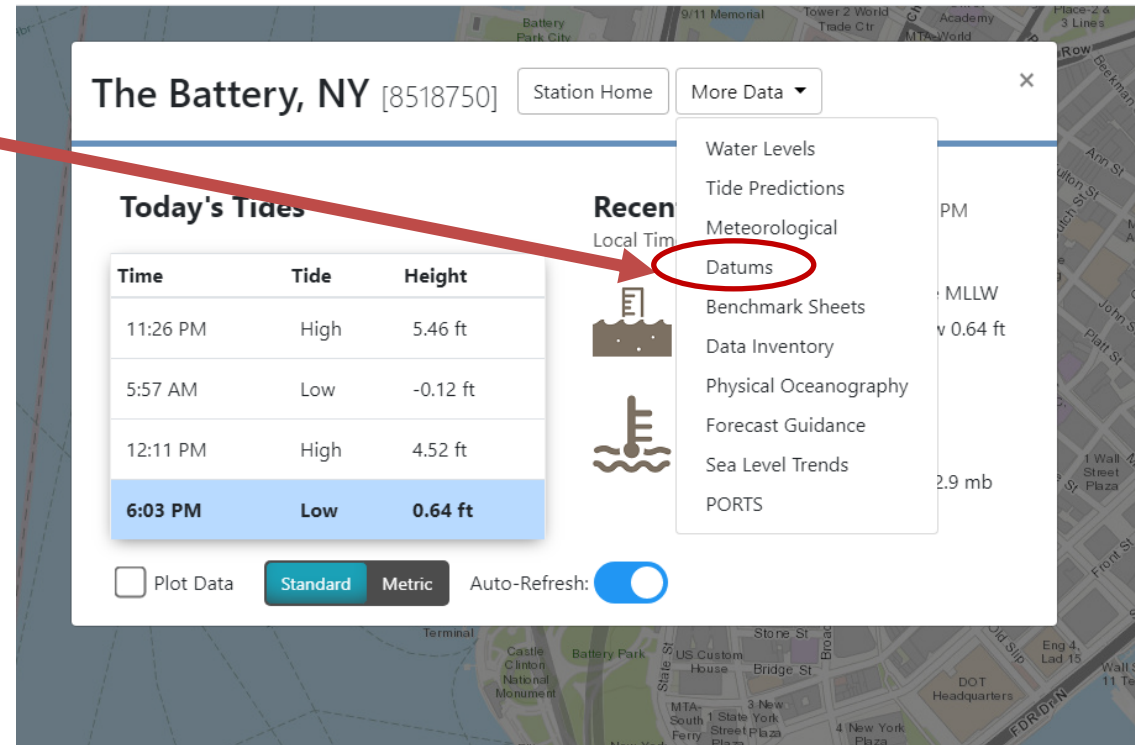
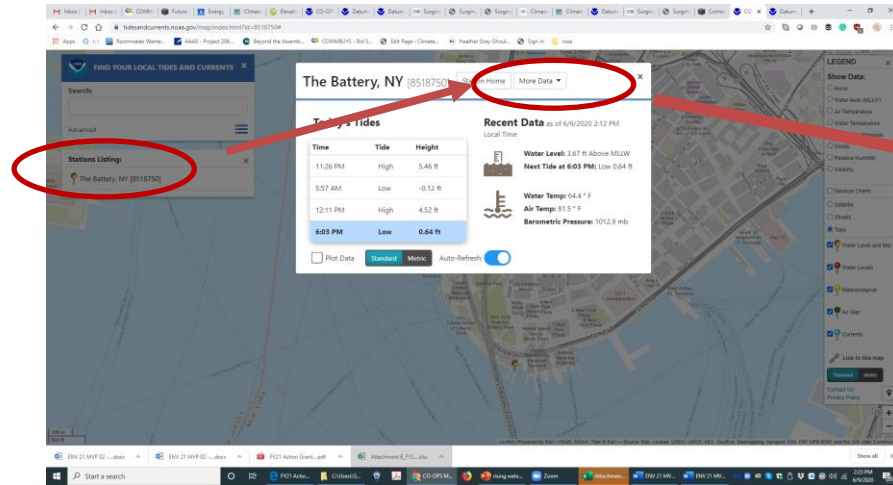
# Calculating Sea Level Rise & Flood Levels

## *Find the Data - Water datums at your site, cont.*

Find datums at your site: MSL and Mean Higher High Water

Type in your location, e.g; Battery, NYC, go to “More Data” box, select “Datums”

<https://tidesandcurrents.noaa.gov/datums.html?id=8518750>



# Calculating Sea Level Rise & Flood Levels

## Find the Data – MHHW and MSL at your site

Mean Higher High Water =  
5.05' (datum used by  
Surging Seas)

Mean Sea Level =  
2.57' (datum for land  
elevation)

Site Elevation =  
7.5' above MSL  
5' above MHHW

### Datums for 8518750, The Battery NY

NOTICE: All data values are relative to the MLLW.

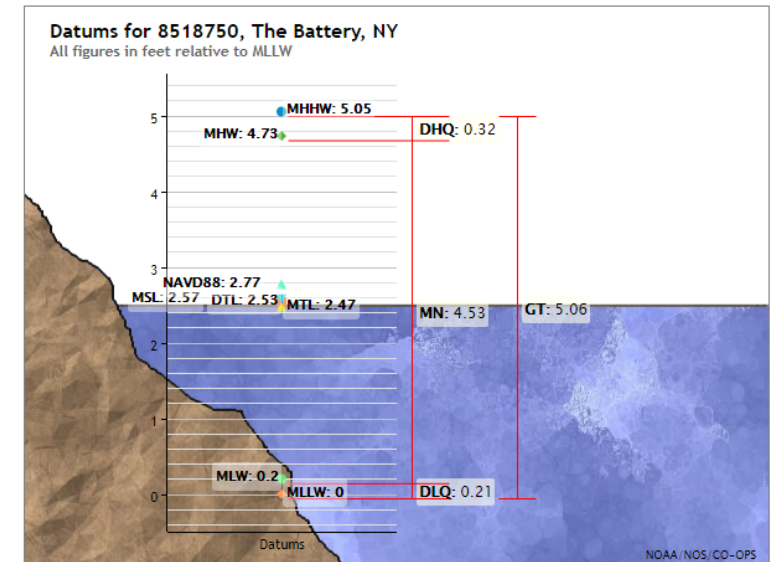
#### Elevations on Mean Lower Low Water

Station: 8518750, The Battery, NY  
Status: Accepted (Nov 19 2012)  
Units: Feet

T.M.: 0  
Epoch: 1983-2001  
Datum: MLLW

Control Station:

Datum	Value	Description
MHHW	5.05	Mean Higher-High Water
MHW	4.73	Mean High Water
MTL	2.47	Mean Tide Level
MSL	2.57	Mean Sea Level
DTL	2.53	Mean Diurnal Tide Level
MLW	0.20	Mean Low Water
MLLW	0.00	Mean Lower-Low Water
NAVD88	2.77	North American Vertical Datum of 1988
STND	-3.29	Station Datum
GT	5.06	Great Diurnal Range
MN	4.53	Mean Range of Tide
DHQ	0.32	Mean Diurnal High Water Inequality
DLQ	0.21	Mean Diurnal Low Water Inequality
HWI	0.84	Greenwich High Water Interval (in hours)
LWI	7.21	Greenwich Low Water Interval (in hours)
Max Tide	14.04	Highest Observed Tide
Max Tide Date & Time	10/30/2012 01:12	Highest Observed Tide Date & Time



Showing datums for

8518750 The Battery, NY

Datum

MLLW



# Calculating Sea Level Rise & Flood Levels

## *Find the Data – Find flood levels by decade*

4: Find flood levels: Climate Central Surging Seas:  
<https://www.climatecentral.org/> select “Program on Sea Level Rise”

The screenshot shows the Climate Central website interface. At the top, the navigation bar includes links for Home, Research, Partnerships Journalism, Gallery, Videos, Media Library, News Archive, and What We Do. Below this, there are three main content sections: '2020 SUMMER PACKAGE', 'RALEIGH-DURHAM SUMMER WARMING AVERAGE SUMMER TEMPERATURE' (which includes a line graph showing a temperature increase of +4 degrees from 1970 to 2019), and 'OUR PROGRAMS'. The 'OUR PROGRAMS' section features three cards: 'Program on Sea Level Rise' (circled in red), 'Climate Matters', and 'Partnerships Journalism'. The 'Program on Sea Level Rise' card includes a map of the United States and text describing the program's focus on flooding risk.

# Calculating Sea Level Rise & Flood Levels

## *Find the Data – Find flood levels by decade*

Find flood levels: Climate Central Surging Seas:

<https://sealevel.climatecentral.org/> select “Risk Finder and Map”

Search for your location

The screenshot shows the homepage of the 'Surging Seas' tool. The main header includes navigation links: About, Maps & Tools, Research, Basics, Responses, News. A large banner image features a woman holding a child, with the text: 'CLIMATE CENTRAL STUDY TRIPLES ESTIMATES OF WORLD POPULATION THREATENED BY SEA LEVEL RISE'. Below the banner are links for 'Interactive Map', 'Report', 'Coastal DEM Data', 'Exposure Data', and 'Coastal DEM in the News'. A vertical navigation menu on the right contains buttons for 'POPULATION IMPACTS', 'RISK FINDER & MAP', 'ZILLOW REPORT', and 'MAPPING CHOICES'. The 'RISK FINDER & MAP' button is circled in red. Below the menu is a 'LATEST NEWS & UPDATES' section with a featured article titled 'THE 2020 SUPER BOWL STADIUM COULD EXPERIENCE OCCASIONAL FLOODING FROM SEA LEVEL RISE BY 2070...'.

The screenshot shows the 'Surging Seas RISK FINDER' interface for 'St. Petersburg, FL, USA'. The page includes a 'Summary' section with a vertical slider set to '5'. A map of the region is displayed with a red circle highlighting a specific area. Below the map is a 'RISK FINDER & MAP' section with a 'Choose a completed state' dropdown and a 'GO' button. The 'RISK FINDER & MAP' text is circled in red. The right-hand navigation menu is visible, with 'RISK FINDER & MAP' selected. The 'LATEST NEWS & UPDATES' section at the bottom is identical to the first screenshot.

# Calculating Sea Level Rise & Flood Levels

## Find the Data – Find flood levels by decade

Find the bar graph (scroll down) -select your assumptions – I use “extreme” because that’s the path we are on

[https://riskfinder.climatecentral.org/state/new-york.us?comparisonType=county&forecastName=With+extreme+flood&forecastType=NOAA2017\\_extreme\\_p50&level=6&unit=ft](https://riskfinder.climatecentral.org/state/new-york.us?comparisonType=county&forecastName=With+extreme+flood&forecastType=NOAA2017_extreme_p50&level=6&unit=ft)

The screenshot displays the 'Surging Seas RISK FINDER' interface for New York, USA. The main content area features a bar graph titled 'When Are the Risks?' showing 'Projected sea level rise + major flood level' from 2020 to 2200. The y-axis is 'Water Level (ft)' ranging from 0 to 40. The x-axis is 'Year' ranging from 2020 to 2200. A legend indicates the 'Sea level scenario' with options: Extreme (selected), Fast rise, Medium, and Slow rise. A settings overlay is open, showing 'Forecast settings' with options for 'Select a chart type' (Multi-year flood risk, Single-year flood risk, Sea level rise only) and 'Select a sea level rise model' (Kopp et al. (2017)-With Antarctic dynamics, NOAA (2017), National Climate Assessment (2012/2014), Kopp et al. (2014): Probabilistic, IPCC (2013), Army Corps of Engineers (2011), Global warming). The 'Select a water level station (tide gauge)' section is also visible, with 'The Battery - New York Harbor (168 miles from central New York)' selected. Red circles and arrows highlight the settings overlay and the 'Extreme' scenario selection.

Year	Water Level (ft)
2020	~8
2040	~10
2060	~12
2080	~15
2100	~18
2120	~22
2140	~26
2160	~30
2180	~34
2200	~38

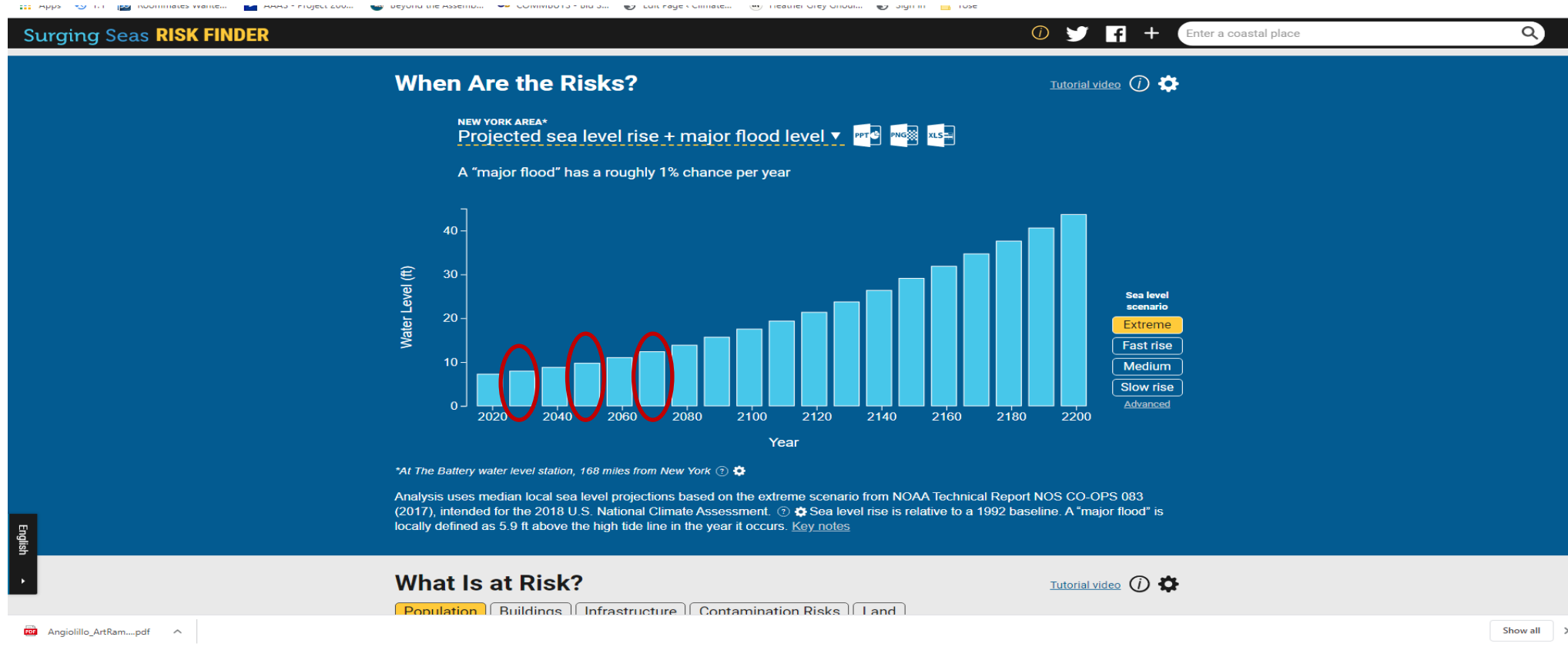


# Calculating Sea Level Rise & Flood Levels

## *Find the Data – Find flood levels by decade*

2030 = 7.9'  
2050 = 9.7'  
2070 = 12.4'

“Water level” means feet or meters above the local high tide line  
 (“Mean Higher High Water”)



# Calculating Sea Level Rise & Flood Levels

## *Find the Data – Find the elevation above ground*

Levels by decade, above MHHW

I use 2030, 2050 and 2070. 2030 is close enough for people to relate to it, and 2070 is a typical furthest out date for municipal planning.

2030 = 7.9'

2050 = 9.7'

2070 = 12.4'

Site is 5' above MHHW

2030:  $7.9' - 5.05' = +/- 3 - 0'$  above grade"

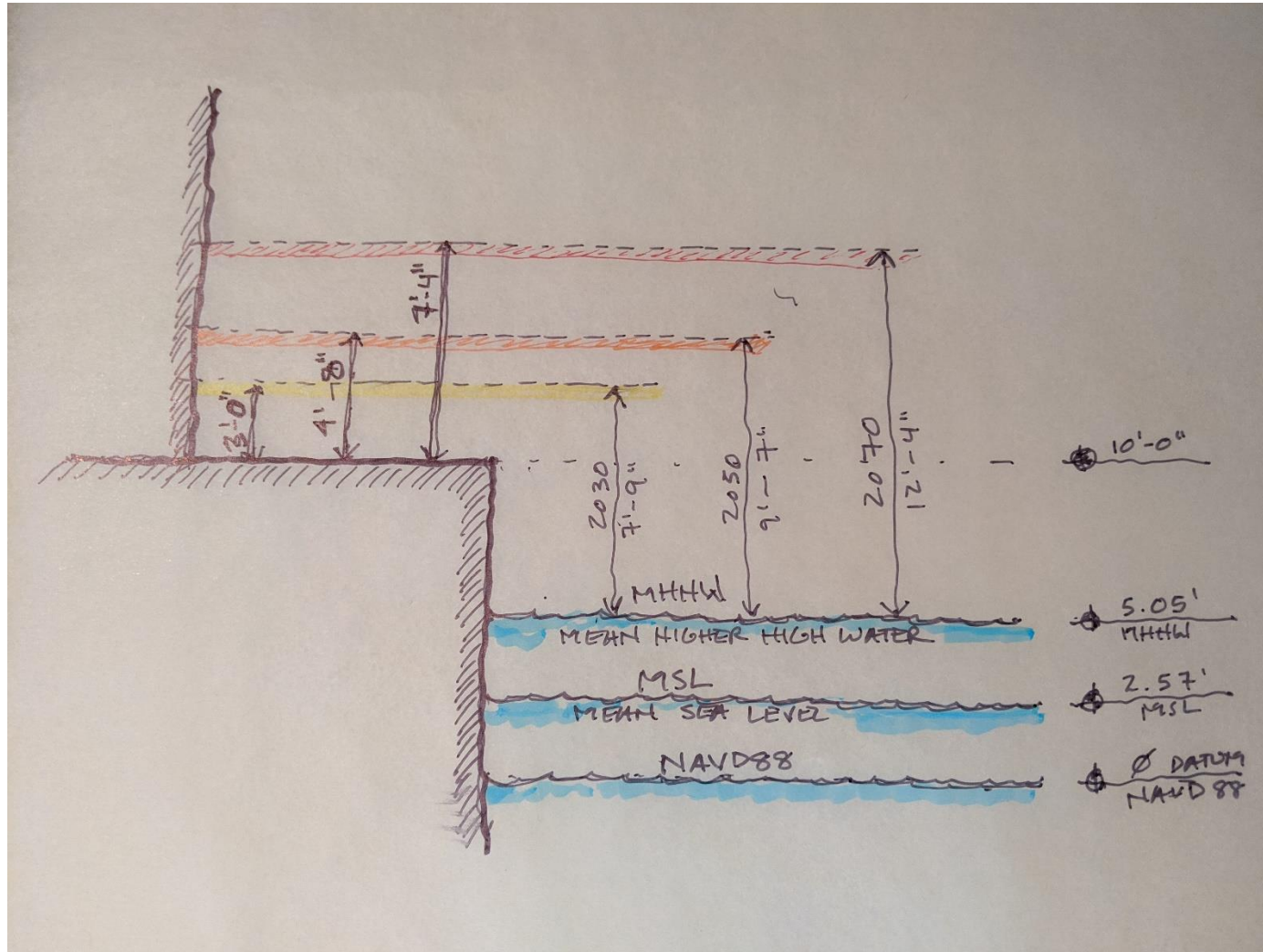
2050:  $9.7' - 5.05' = 4.65' = 4' - 8''$  above grade

2070:  $12.4' - 5.05' = 7.35' = 7' - 4''$  above grade

Can I reach this height to install it? Yes- Yay!!

# Calculating Sea Level Rise & Flood Levels

## Diagramming the levels



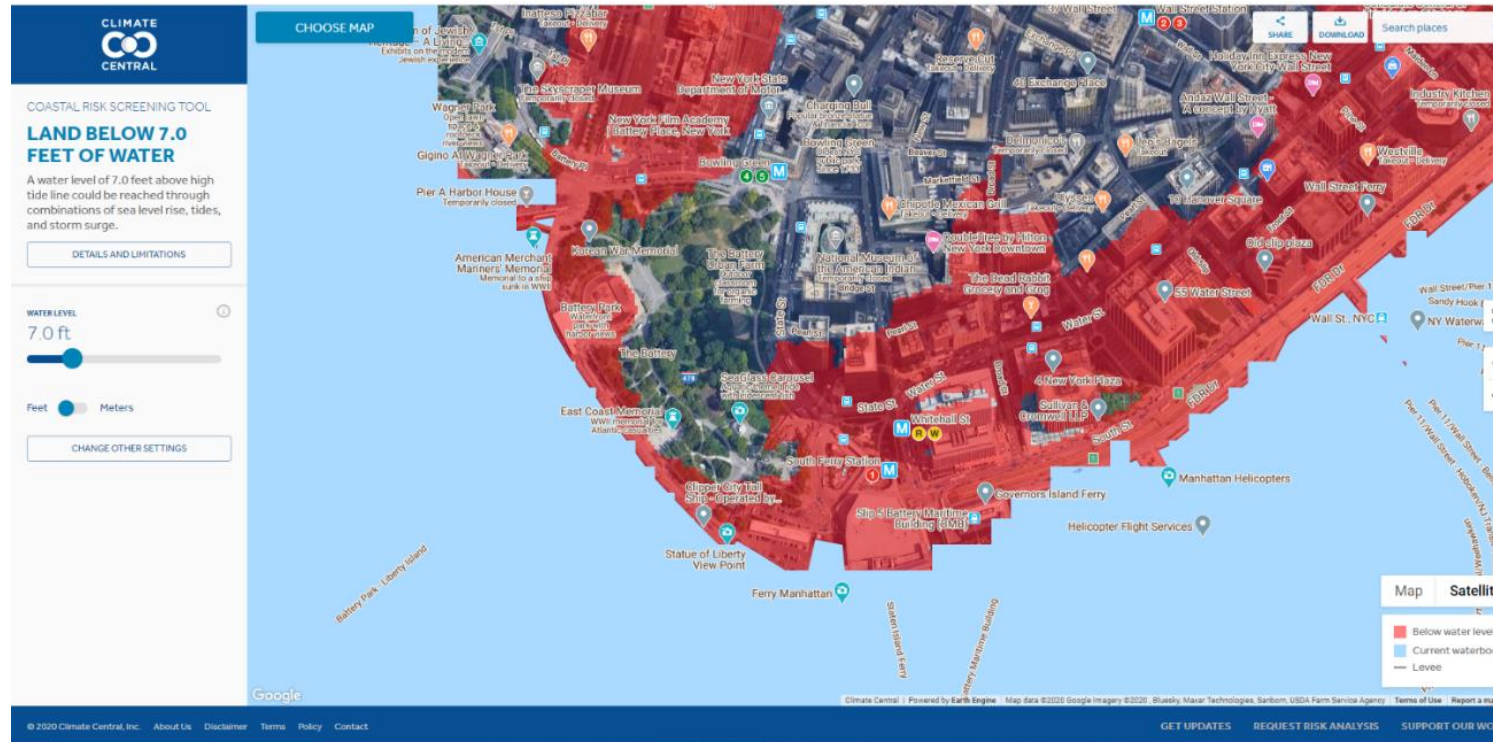


# Calculating Sea Level Rise & Flood Levels

## *Confirm and/or select other sites with latest data*

[https://coastal.climatecentral.org/map/17/-74.013/40.7029/?theme=water\\_level&map\\_type=water\\_level\\_above\\_mhwh&contiguous=true&elevation\\_model=best\\_available&water\\_level=7.0&water\\_unit=ft](https://coastal.climatecentral.org/map/17/-74.013/40.7029/?theme=water_level&map_type=water_level_above_mhwh&contiguous=true&elevation_model=best_available&water_level=7.0&water_unit=ft)

“Areas lower than the selected water level and with an unobstructed path to the ocean are shaded red. By default, areas below the water level but that appear to be protected by ridges (and in the U.S., levees) are not shaded.”



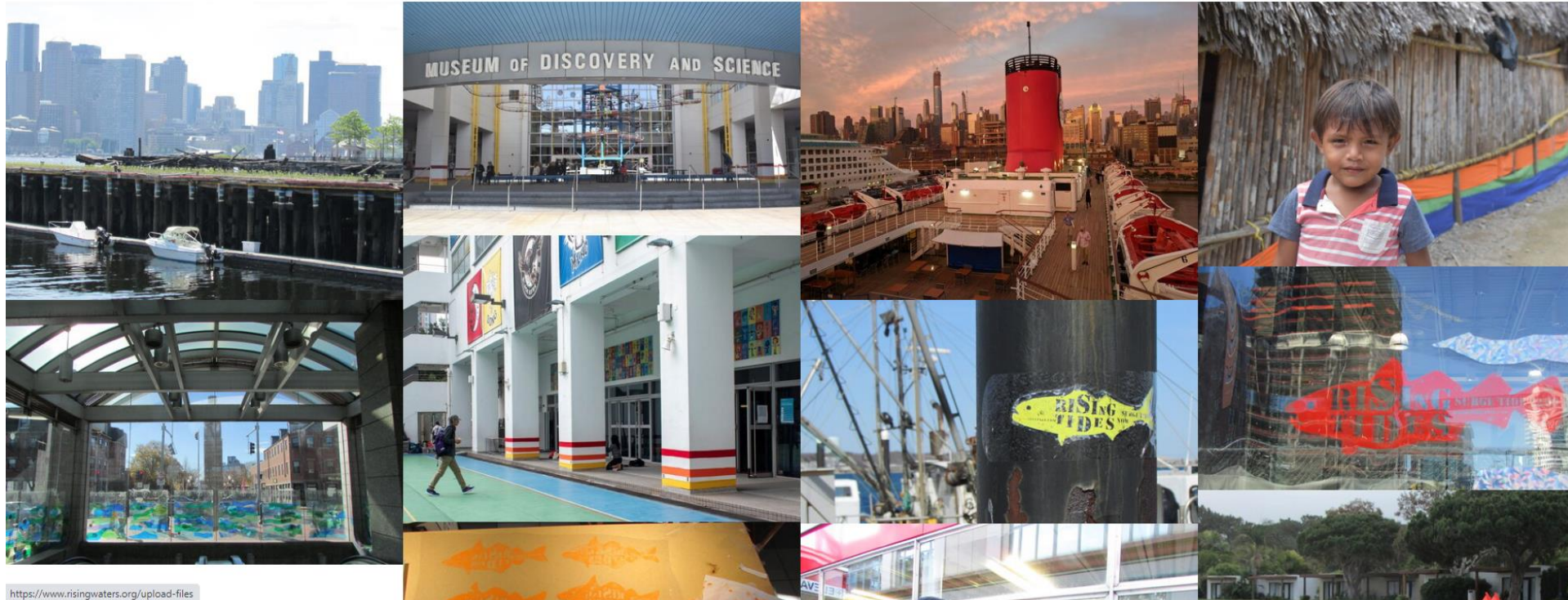
# Render Installation & Upload

<https://www.risingwaters.org/upload-files>

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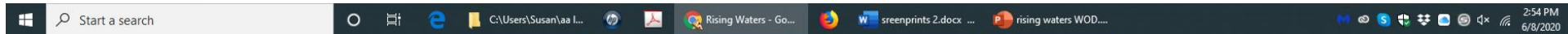


Art for climate education and adaptation



<https://www.risingwaters.org/upload-files>

Angiolillo\_ArtRam...pdf





# On-Site Installations

## Case Study: Broward County



- Engagement
- Data Communication
- Culture Change
- Climate Adaptations: Mitigation, Resiliency, Preparedness



# Rising Waters: Broward County 2020 Installation, Training Workshops

Museum of Discovery & Science (MODS) Jan 2020

training workshops

30 school installations in April 2020



## Optional 2020 “NOW” Baseline Blue Tape

for installations that are showing *relative sea level rise*,  
not the *actual SLR at that site*

- **“NOW” Option:** Place a strip of 4” wide blue painters masking tape on the ground, and stencil NOW using black sharpies. The tape may not withstand rain as well as the rest of the materials. See photos of Peace Boat at right.
- This version shows tape on the floor as “1992” – the original NAVD88 datum. You can use either version, but use the correct reference datum for your location. “1992” is just an outline to indicate that it is past.



## Installing on-site Using Fabric

Confirm Heights using local data and reviewing with Rising Waters

Choose site(s)

Measure length of stripes or rows of fish flags -**Fabric:** Measure installation area – column circumference or wall surface to order correct amount of fabric, allow for at least 10% extra. Plan location(s) of dates.

Order materials

Plan signage





# Order Materials



# Stencil Dates on Fabric

Paint at least 1 day ahead so paint can dry.

- Place a protective sheet of parchment paper under the fabric to protect the surface below and keep it from sticking
- Tape your stencils to each other, covering the seams between them, and add strips of cardboard top and bottom to create a template with the entire date.
- Line up the stencil, tape it lightly to the fabric to hold it in place
- Using a sponge or stencil brush, dab acrylic paint onto the number until none of the fabric color shows through.
- Let dry overnight and remove gently from the parchment paper.





## Stencil Dates on Fabric

2030 on yellow, 2050 on orange, 2070 on red

These dates are printed approximately 2 feet apart, but you can decide how many dates you want to show on each strip. Just one in a visible place is ok. More dates mean more people can help.





## Measure and Mark Heights

- Tape measuring sticks to your columns or wall
- Find the height for the top of each stripe
- Tape a string to mark the correct heights for the tops of the lines
- Stretch it taught to the next mark
- Continue until the lines mark all of the stripe tops



0029

# Lay out the stripes, Tack into place

Plan where the stripes will begin, staggering the numbers vertically



Lightly tape stripes into place without taping over the string



## Anchor end of fabric

Tape the ends of the fabric to the wall using gaffer tape



Leaving the end taped into place, carefully remove the fabric (video)





## Place gaffer tape and double-stick tape

Place lines of gaffer tape just under the string all along the stripes (video).

Place double-stick tape onto the gaffer tape.



# Lay out the stripes, Tack into place

Peel one side of the double-stick tape, place it onto the gaffer tape

Burnish the tape so it stays well  
– wall surfaces vary



## Tape end of stripes

Place 2 strips of the gaffer tape and double stick along the starting edge of the stripes.





## Keep fabric taught, burnish the tape

Keeping the fabric taught,  
tape the stripes into place.



0100

Rub hard where there is tape.



0073

## Finish the end with tapes

Overlap the final end, cut a clean edge, and tape it with 2 layers of the duck-tape that matches that color



0122

# Signage



These red, orange, and yellow lines show predicted flood levels here from sea level rise, storm surge, and rain due to climate change. We can reduce dangerous changes to our climate and oceans by reducing greenhouse gasses and waste.

## Your choices matter!

Our data comes from NOAA and the Southeast Florida Regional Climate Compact's Unified Sea Level Rise projection (2019)

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This installation was made in collaboration with the School Board of Broward County  
The Broward County Environmental Planning & Community Resilience Division  
Susan Israel of Climate Creatives & [www.RisingWaters.org](http://www.RisingWaters.org)





# Document, Share & Enjoy!

Document your process in photographs and video & share!

Send to [RisingWaters.org](http://RisingWaters.org)



2070

Susan Israel, *President &  
Founder*

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[www.RisingWaters.org](http://www.RisingWaters.org)

[www.ClimateCreatives.com](http://www.ClimateCreatives.com)



2030

2050

2050

0502

2050

20

030

2030

20

0

2030

20





CONABIO

**RISING  
WATERS**

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Luis Gerardo Hernández Moreno / CONABIO





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