



Coastal Flooding

Monmouth County NJ CRS Meeting

July 16, 2020

New NOAA Report – July 2020

- Released this week
- Google it

NOAA Technical Report NOS CO-OPS 092

2019 State of U.S. High Tide Flooding with a 2020 Outlook

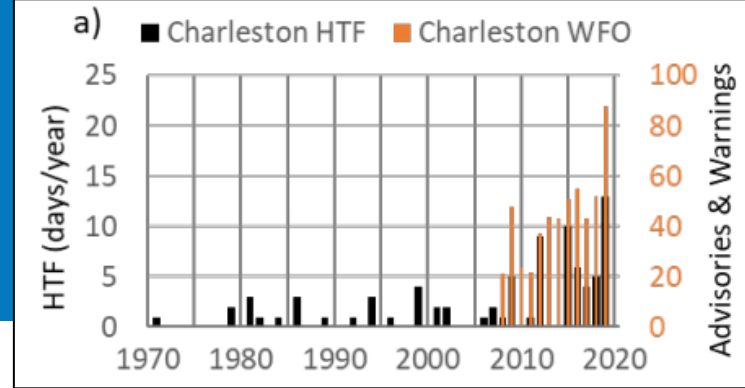


Photo Credit: New York Sea Grant

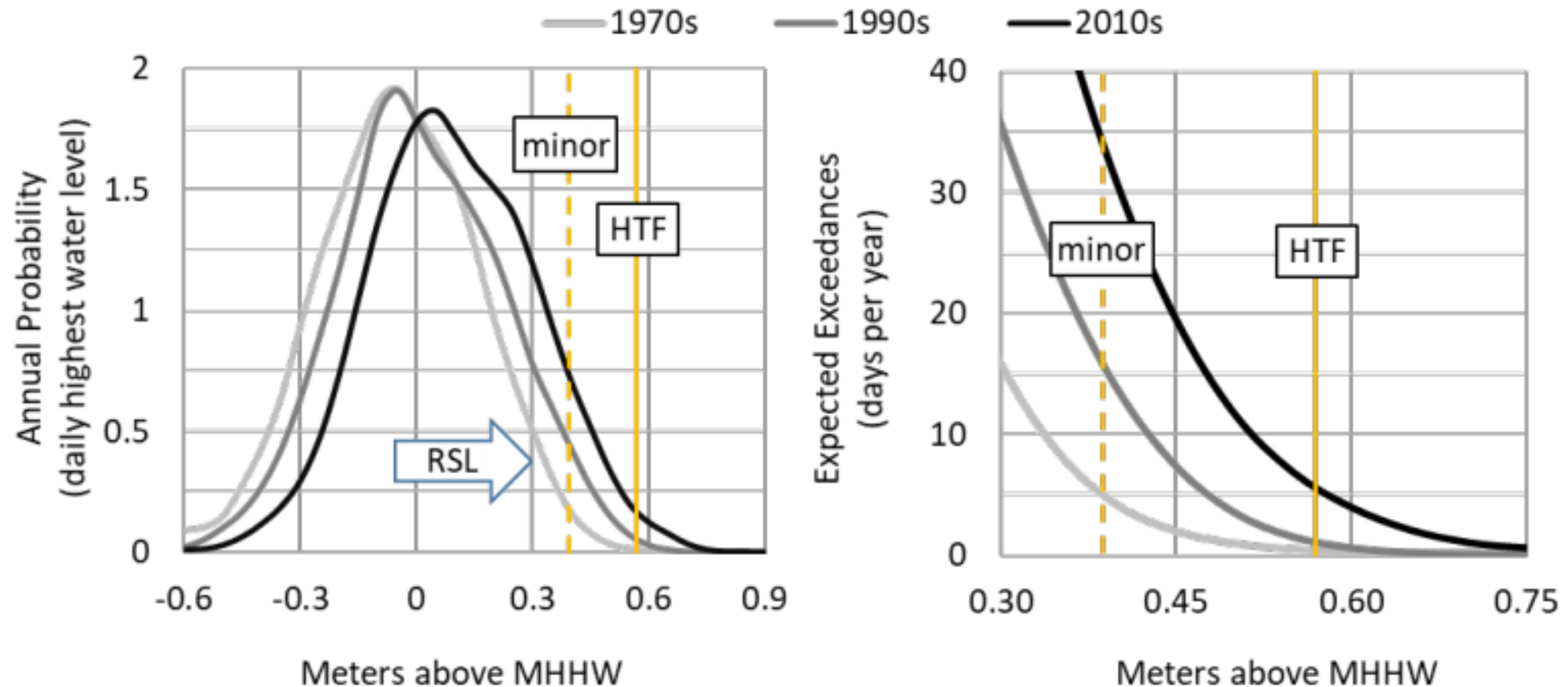
Silver Spring, Maryland
July 2020



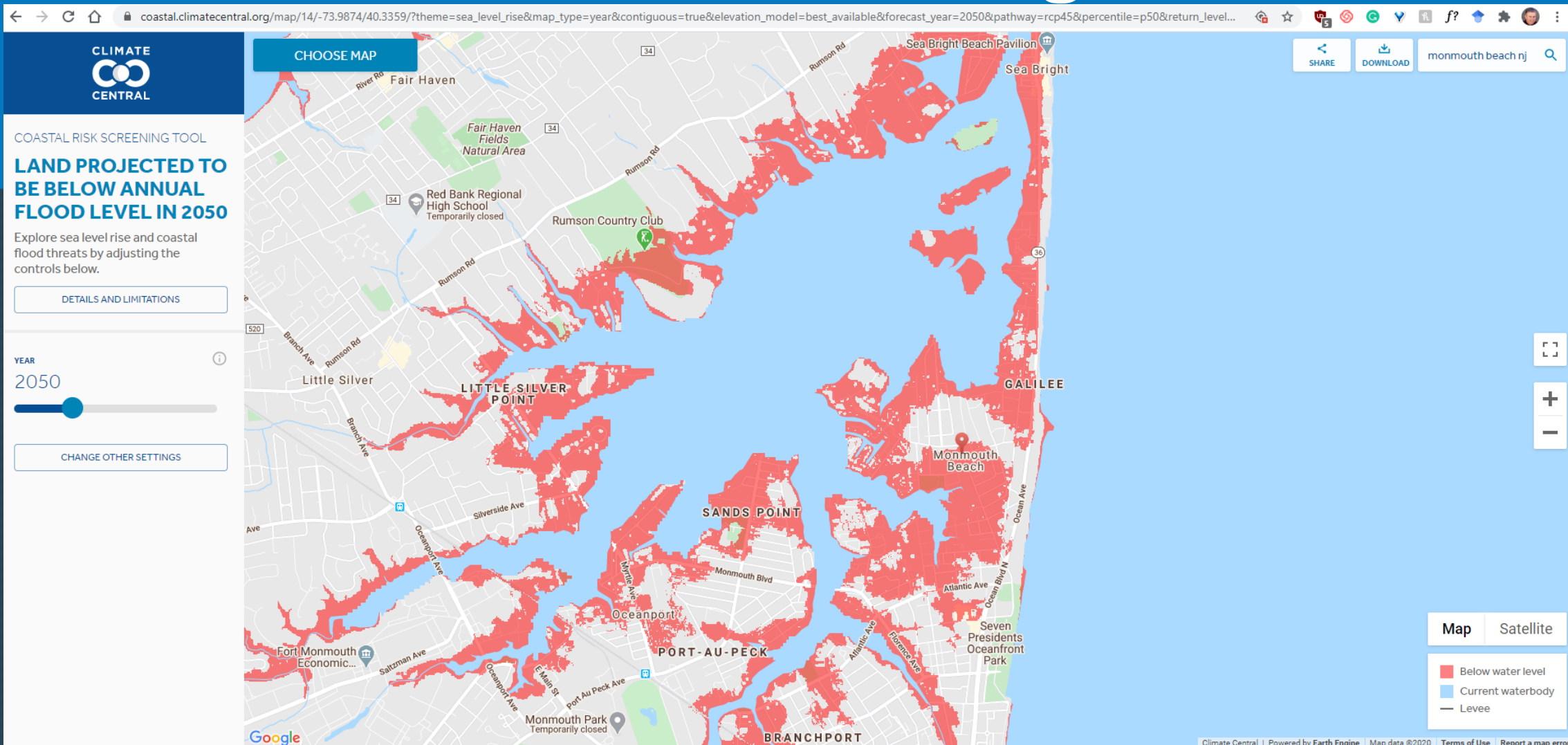
Rapid Onset



NOAA Tide Gauge Charleston, South Carolina



Coastal.ClimateCentral.org





Portfolio Analysis Tool

What is the future flood risk for any* coastal location?

Portfolio Analysis Tool (PAT)

Future flood risk
in coastal areas

Expected annual
flood events

Cumulative annual
flood events

Portfolio Analysis

Job Status

Job ID

b57070f2948b-4c90-9586-01c4257ec21c

Started

3 hours ago

Status

COMPLETE

Job time

6m 44s

Results

b57070f2948b-4c90-9586-01c4257ec21c.csv



Problems? [Contact us.](#)

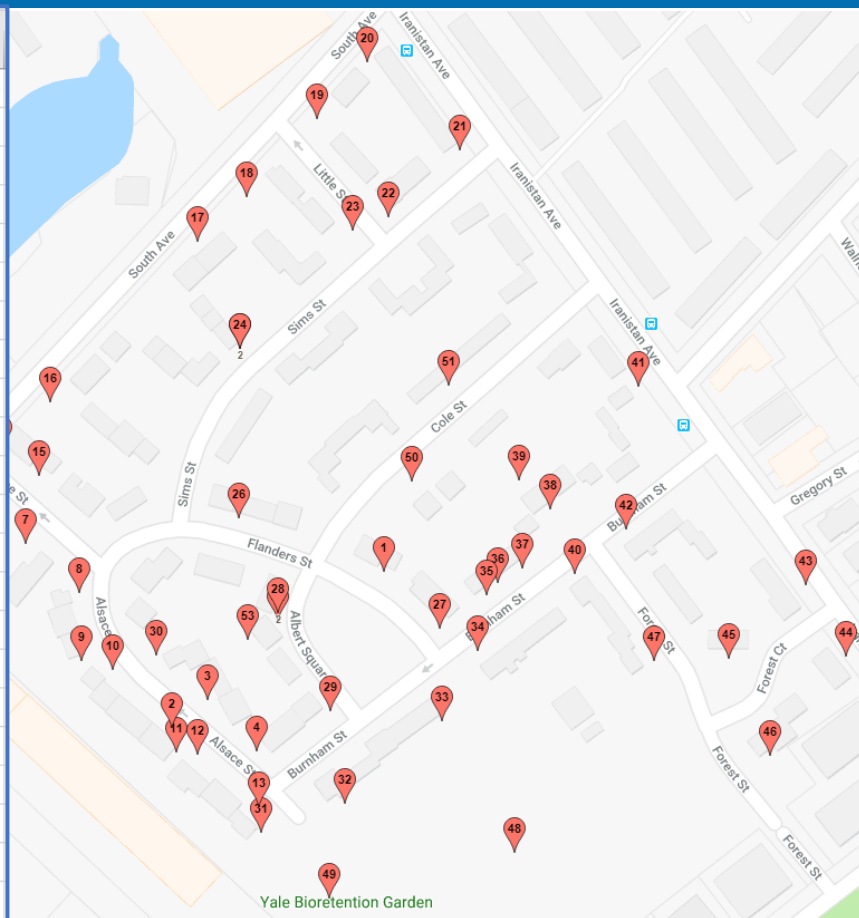
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PAT: Homeowners Association



	A	B	C
1	ID	Latitude	Longitude
2	132 Flanders St front yard	41.16504	-73.1995
3	139 Alsace St front yard	41.16447	-73.2005
4	138 Alsace St front yard	41.16457	-73.2003
5	100 Alsace St front yard	41.16439	-73.2001
6	221 Alsace St side yard	41.16532	-73.2014
7	219 Alsace St front yard	41.16523	-73.2014
8	201 Alsace St front yard	41.16514	-73.2012
9	181 Alsace St front yard	41.16496	-73.2009
10	169 Alsace St side yard	41.16471	-73.2009
11	159 Alsace St front yard	41.16468	-73.2008
12	129 Alsace St side yard	41.16438	-73.2005
13	129 Alsace St front yard	41.16437	-73.2003
14	107 Alsace St front yard	41.16419	-73.2001
15	228 Alsace St front yard	41.16547	-73.2013
16	216 Alsace St front yard	41.16538	-73.2011
17	103 Sims Ave side yard back	41.16565	-73.2011
18	72 Sims Ave back yard	41.16623	-73.2004
19	72 Sims Ave side yard	41.16639	-73.2001
20	915 South Ave corner side ya	41.16668	-73.1998
21	439 Iranistan back yard	41.16688	-73.1995
22	2 Sims St side yard	41.16656	-73.1991



PAT Input File

- CSV file, e.g. Excel
- Description
- Latitude
- Longitude
- 1 to 1000s

	A	B	C
1	ID	Latitude	Longitude
2	132 Flanders St front yard	41.165	-73.1995
3	139 Alsace St front yard	41.1645	-73.2005
4	138 Alsace St front yard	41.1646	-73.2003
5	100 Alsace St front yard	41.1644	-73.2001
6	221 Alsace St side yard	41.1653	-73.2014
7	219 Alsace St front yard	41.1652	-73.2014
8	201 Alsace St front yard	41.1651	-73.2012
9	181 Alsace St front yard	41.165	-73.2009
10	169 Alsace St side yard	41.1647	-73.2009
11	159 Alsace St front yard	41.1647	-73.2008
12	129 Alsace St side yard	41.1644	-73.2005
13	129 Alsace St front yard	41.1644	-73.2003
14	107 Alsace St front yard	41.1642	-73.2001
15	228 Alsace St front yard	41.1655	-73.2013
16	216 Alsace St front yard	41.1654	-73.2011
17	103 Sims Ave side yard back	41.1657	-73.2011
18	72 Sims Ave back yard	41.1662	-73.2004

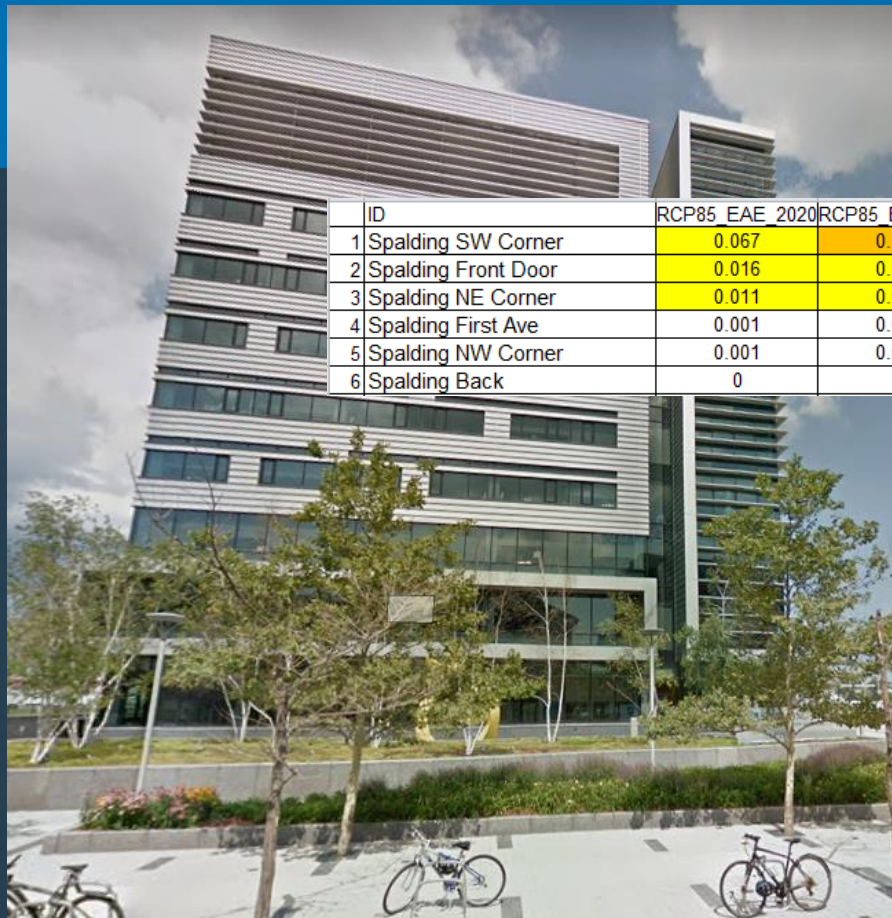
PAT: Homeowners Association

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30	152 Alsace St front yard	0.109	0.159	0.235	0.409	0.886	1.981	3.817	5.908	7.424
41	329 Iranistan Ave front yard	0.107	0.156	0.231	0.401	0.867	1.944	3.765	5.859	7.381
10	159 Alsace St front yard	0.103	0.15	0.221	0.382	0.824	1.858	3.648	5.745	7.283
1	132 Flanders St front yard	0.102	0.148	0.218	0.377	0.812	1.834	3.615	5.713	7.255
8	181 Alsace St front yard	0.093	0.134	0.196	0.336	0.719	1.644	3.34	5.431	7.006
3	138 Alsace St front yard	0.091	0.131	0.191	0.327	0.698	1.598	3.262	5.338	6.919
33	93 Burnham St backyard	0.073	0.104	0.151	0.253	0.53	1.221	2.614	4.563	6.201
38	42 Burnham St front yard	0.066	0.093	0.134	0.222	0.46	1.064	2.344	4.24	5.902
13	107 Alsace St front yard	0.062	0.087	0.125	0.206	0.425	0.985	2.209	4.078	5.751
23	3 Little St front corner yard	0.058	0.082	0.117	0.192	0.394	0.913	2.062	3.87	5.53
31	107 Alsace St side yard	0.058	0.081	0.115	0.189	0.387	0.897	2.027	3.821	5.477
39	42 Burnham St back yard	0.056	0.079	0.112	0.184	0.376	0.869	1.969	3.739	5.389
9	169 Alsace St side yard	0.054	0.076	0.108	0.176	0.358	0.827	1.883	3.615	5.257
32	100 Burnham St backyard	0.049	0.069	0.097	0.158	0.319	0.734	1.69	3.341	4.964
26	170 Flanders St front yard	0.047	0.066	0.093	0.15	0.303	0.696	1.61	3.228	4.843
46	37 Forest Ct back yard	0.044	0.062	0.087	0.139	0.277	0.635	1.485	3.049	4.652
47	75 Forest St front yard	0.043	0.059	0.083	0.132	0.263	0.601	1.414	2.948	4.545
49	Rain garden	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
27	118 Flanders St corner yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
34	73 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
43	271 Iranistan Ave front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
48	Field - middle	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
35	66 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
40	45 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
37	54 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
42	25 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
12	129 Alsace St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
2	139 Alsace St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
22	26 Sims St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
36	64 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
11	129 Alsace St side yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459

PAT: Homeowners Association

ID	RCP85_EAE_202	RCP85_EAE_203	RCP85_EAE_204	RCP85_EAE_205	RCP85_EAE_206	RCP85_EAE_207	RCP85_EAE_208	RCP85_EAE_209	RCP85_EAE_210	
30	152 Alsace St front yard	0.109	0.159	0.235	0.409	0.886	1.981	3.817	5.908	7.424
41	329 Iranistan Ave front yard	0.107	0.156	0.231	0.401	0.867	1.944	3.765	5.859	7.381
10	159 Alsace St front yard	0.103	0.15	0.221	0.382	0.824	1.858	3.648	5.745	7.283
1	132 Flanders St front yard	0.102	0.148	0.218	0.377	0.812	1.834	3.615	5.713	7.255
8	181 Alsace St front yard	0.093	0.134	0.196	0.336	0.719	1.644	3.34	5.431	7.006
3	138 Alsace St front yard	0.091	0.131	0.191	0.327	0.698	1.598	3.262	5.338	6.919
33	93 Burnham St backyard	0.073	0.104	0.151	0.253	0.53	1.221	2.614	4.563	6.201
38	42 Burnham St front yard	0.066	0.093	0.134	0.222	0.46	1.064	2.344	4.24	5.902
13	107 Alsace St front yard	0.062	0.087	0.125	0.206	0.425	0.985	2.209	4.078	5.751
23	3 Little St front corner yard	0.058	0.082	0.117	0.192	0.394	0.913	2.062	3.87	5.53
31	107 Alsace St side yard	0.058	0.081	0.115	0.189	0.387	0.897	2.027	3.821	5.477
39	42 Burnham St back yard	0.056	0.079	0.112	0.184	0.376	0.869	1.969	3.739	5.389
9	169 Alsace St side yard	0.054	0.076	0.108	0.176	0.358	0.827	1.883	3.615	5.257
32	100 Burnham St backyard	0.049	0.069	0.097	0.158	0.319	0.734	1.69	3.341	4.984
26	170 Flanders St front yard	0.047	0.066	0.093	0.15	0.303	0.696	1.61	3.228	4.843
46	37 Forest Ct back yard	0.044	0.062	0.087	0.139	0.277	0.635	1.485	3.049	4.652
47	75 Forest St front yard	0.043	0.059	0.083	0.132	0.263	0.601	1.414	2.948	4.545
49	Rain garden	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
27	118 Flanders St corner yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
34	73 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
43	271 Iranistan Ave front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
48	Field - middle	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
35	66 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
40	45 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
37	54 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
42	25 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
12	129 Alsace St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
2	139 Alsace St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
22	26 Sims St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
36	64 Burnham St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
11	129 Alsace St side yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
29	122 Burnham St front corner yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
4	100 Alsace St front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
44	239 Iranistan Ave front yard	0.041	0.057	0.08	0.127	0.251	0.574	1.358	2.869	4.459
21	2 Sims St side yard	0.039	0.054	0.075	0.119	0.235	0.535	1.27	2.713	4.27
28	29 Albert Sq front yard	0.038	0.053	0.074	0.117	0.23	0.523	1.242	2.663	4.209
52	25 Albert Sq front yard	0.038	0.053	0.074	0.117	0.23	0.523	1.242	2.663	4.209
53	25 Albert Sq back yard	0.036	0.05	0.069	0.109	0.215	0.485	1.157	2.514	4.026
7	201 Alsace St front yard	0.035	0.048	0.066	0.104	0.203	0.457	1.093	2.399	3.887
24	80 Sims St side yard	0.031	0.043	0.059	0.092	0.179	0.398	0.96	2.164	3.6
25	194 Flanders St side yard	0.031	0.043	0.059	0.092	0.179	0.398	0.96	2.164	3.6
50	71 Cole St front yard	0.03	0.041	0.056	0.088	0.169	0.376	0.909	2.073	3.489
20	439 Iranistan back yard	0.029	0.04	0.055	0.085	0.164	0.363	0.88	2.022	3.427
51	40 Cole St front yard	0.026	0.035	0.047	0.072	0.137	0.301	0.733	1.729	3.037
45	24 Forest Ct front yard	0.024	0.033	0.045	0.069	0.13	0.284	0.693	1.645	2.921
19	915 South Ave corner side yard	0.018	0.024	0.032	0.049	0.089	0.19	0.462	1.146	2.207
6	219 Alsace St front yard	0.014	0.018	0.024	0.036	0.063	0.132	0.318	0.81	1.667
5	221 Alsace St side yard	0.014	0.018	0.024	0.035	0.061	0.128	0.308	0.786	1.622
15	216 Alsace St front yard	0.013	0.018	0.024	0.034	0.06	0.128	0.306	0.782	1.615
14	228 Alsace St front yard	0.012	0.015	0.02	0.029	0.05	0.105	0.248	0.641	1.352
17	72 Sims Ave back yard	0.01	0.014	0.018	0.026	0.044	0.093	0.216	0.565	1.208
18	72 Sims Ave side yard	0.01	0.013	0.017	0.025	0.042	0.089	0.206	0.54	1.162
16	103 Sims Ave side yard back	0.009	0.011	0.015	0.021	0.034	0.073	0.166	0.439	0.958

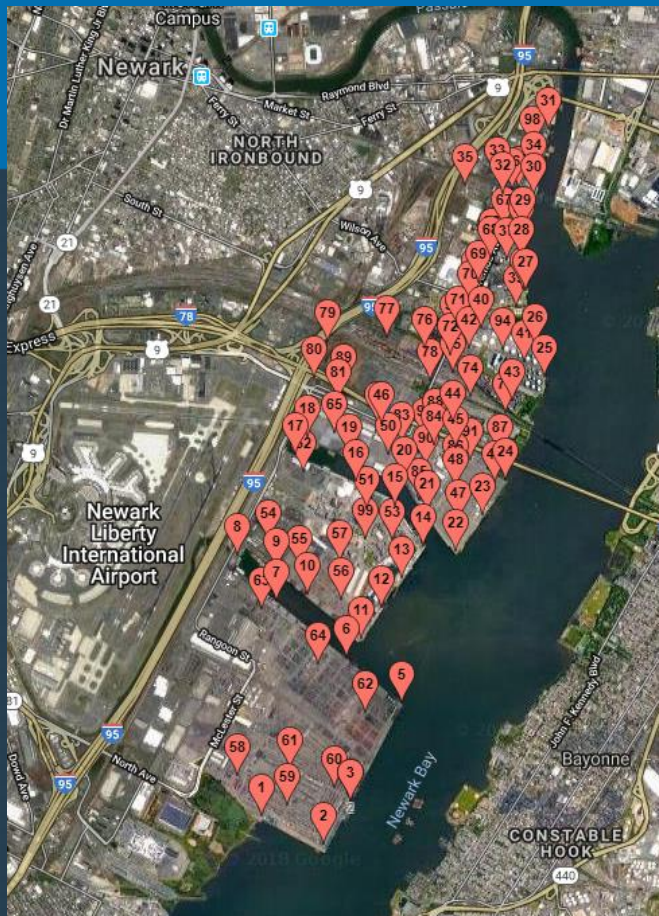
PAT: Hospital



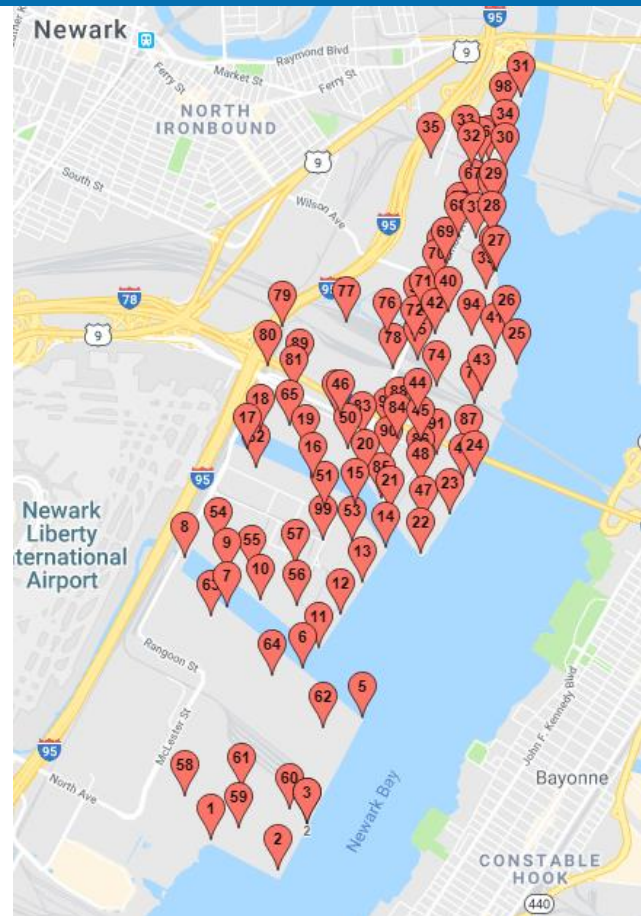
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1 Spalding SW Corner	0.067	0.118	0.235	0.583	1.542	3.362	5.636	7.585	8.789
2 Spalding Front Door	0.016	0.026	0.048	0.11	0.316	0.922	2.229	4.112	5.834
3 Spalding NE Corner	0.011	0.019	0.033	0.075	0.216	0.66	1.73	3.479	5.225
4 Spalding First Ave	0.001	0.002	0.004	0.007	0.02	0.067	0.22	0.663	1.531
5 Spalding NW Corner	0.001	0.001	0.001	0.002	0.006	0.025	0.077	0.254	0.673
6 Spalding Back	0	0	0	0.001	0.001	0.006	0.025	0.075	0.221

ID	Latitude	Longitude	State	NAVD88_ELEV_CC	MHHW_ELEV_CC
Spalding SW Corner	42.378118	-71.049352	MA	2.7	1.23
Spalding Front Door	42.378328	-71.0488	MA	2.9	1.45
Spalding NE Corner	42.379142	-71.048405	MA	3.0	1.50
Spalding First Ave	42.378225	-71.049154	MA	3.3	1.87
Spalding NW Corner	42.378437	-71.049795	MA	3.5	2.06
Spalding Back	42.378823	-71.049255	MA	3.8	2.32

PAT: Port of Newark, NJ



Docks
Cargo areas
Rail segments
Road segments



Ports: Supply Chain Consequences

ProLogix v7.0 - Viewing \Climate_Central_Ports_Analysis_12122018_h

Home Project Edit Data View Reports Tools Solve Help

Model Settings

- Manage My Data
- Optimize Supply Chain
- Supply Chain Modeler

Model Results

6 Optimization Results

\$13,226,218

Service Lvl 100%

0 Simulation Results

Service Lvl

Model Parameters

6 Number of Sites

Svc Radius

Region Filter

Product Filter

Model Options

- Quantit
- Zip_3
- Dist
- Inbound
- Rt\$/Dst
- Brief
- Invtly\$
- All Sites
- LTL ON

Site Name	Capacity	Slabs	Quantity
Ventura CA	A	111	110,790
Inglewood CA	A	111	110,598
Centennial CO	A	110	110,250
Everett WA	A	110	110,079
Richmond CA	A	110	110,040
Clovis CA	A	110	109,691
Billings MT	A	110	109,642
West Covina CA	A	108	107,598
Boulder CO	A	107	107,125
Daly City CA	A	107	107,074
Santa Maria CA	A	107	107,014
Hillsboro OR	A	107	106,894
Norwalk CA	A	106	106,084
Jurupa Valley CA	A	106	106,028
Burbank CA	A	105	104,834
San Mateo CA	A	105	104,748
El Cajon CA	A	104	103,894
Rialto CA	A	104	103,561
Vista CA	A	102	101,561
Renton WA	A	101	101,378
Sparks NV	A	101	100,888
Vacaville CA	A	100	100,032
TOTAL (Outbound)	300,000	32,379	32,379,407
SITE LOCATION ~ Macon GA			
Port of Savannah [*]	A	12,164	12,164,468
TOTAL (Inbound)		12,164	12,164,468
Outer Atlanta Area			
Jacksonville FL	A	892	892,062
Charlotte NC	A	859	859,039
Nashville TN	A	668	667,560
Memphis TN	A	652	652,236
Atlanta GA	A	486	486,290
Raleigh NC	A	465	464,758
Miami FL	A	463	463,347
Tampa FL	A	385	385,430
Greensboro NC	A	290	290,222
Orlando FL	A	280	280,257
Durham NC	A	268	267,743
St. Petersburg FL	A	263	263,255
Winston-Salem NC	A	245	244,605
Hialeah FL	A	240	239,673
Birmingham AL	A	211	210,710
Fayetteville NC	A	210	209,888
Montgomery AL	A	200	199,513
Augusta GA	A	197	197,164
Huntsville AL	A	195	194,589
Columbus GA	A	194	194,059
Tallahassee FL	A	191	191,049
Mobile AL	A	190	190,265
Port St. Lucie FL	A	189	189,344
Knoxville TN	A	187	187,347
Summary Totals: (Quantity)			
	1,800,000	94,332	94,333,102

Map Satellite

Map Satellite

Outer Atlanta Area

Macon, GA

Port of Savannah [*]

Savannah, GA

See travel times, traffic and nearby places

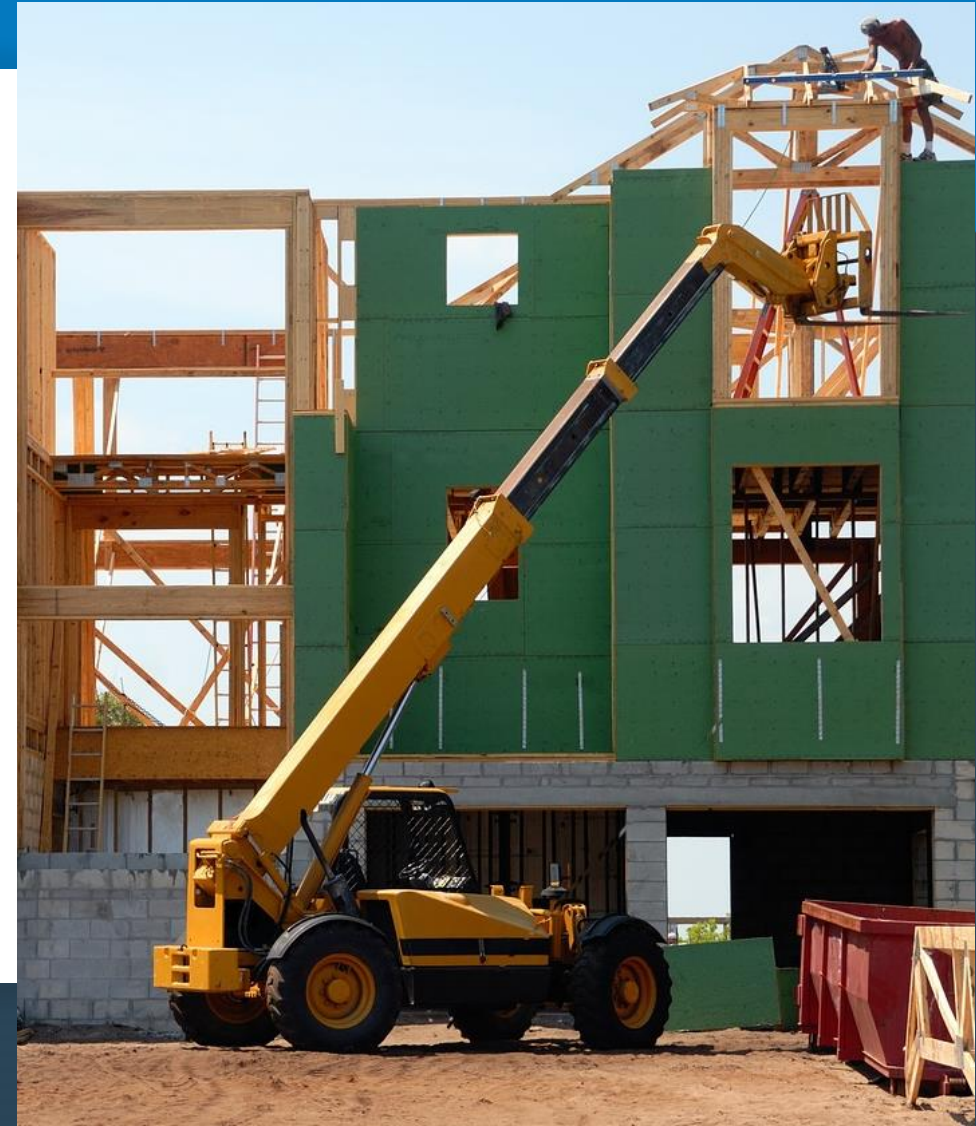
Task Monitor 1.1 sec Memory (9.8 Gb)

New Optimize Add Maps Analytics

PAT (scale): New homes in Delaware

- 22,445 houses built 2010 or later
- 1,476 houses in 2020 with 1% chance or more expected annual flood events (6.6%)
- 1,848 houses in 2050 with 1% chance or more (8.2%); increase of 372

6:44 run time



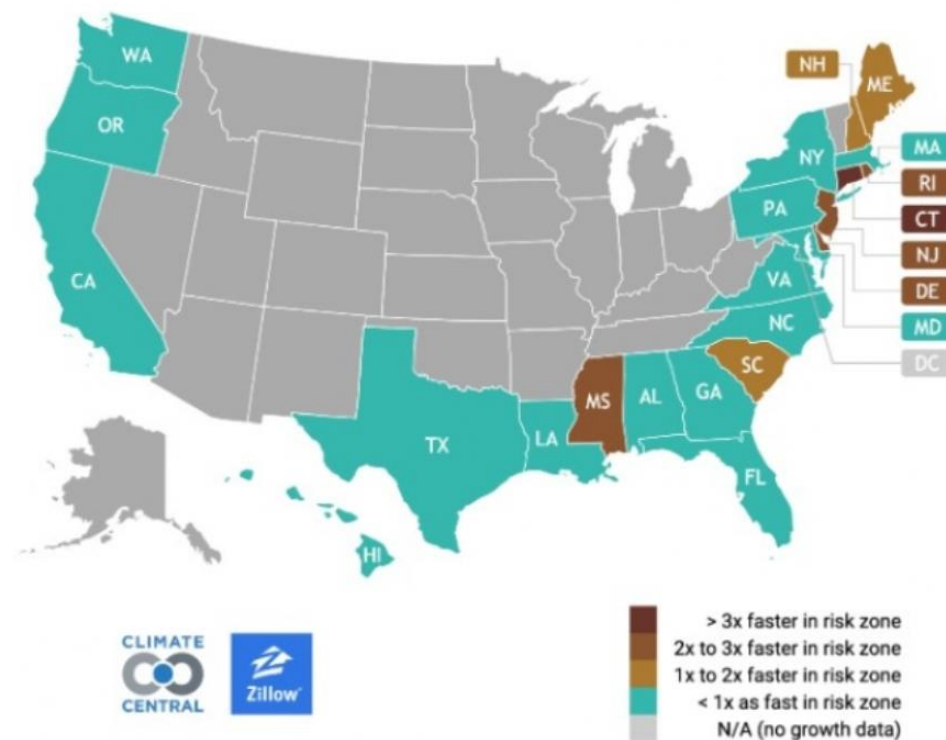
Updated Zillow Research July 2019

[Ocean at the Door](#)

Climate Central and Zillow
Updated in July

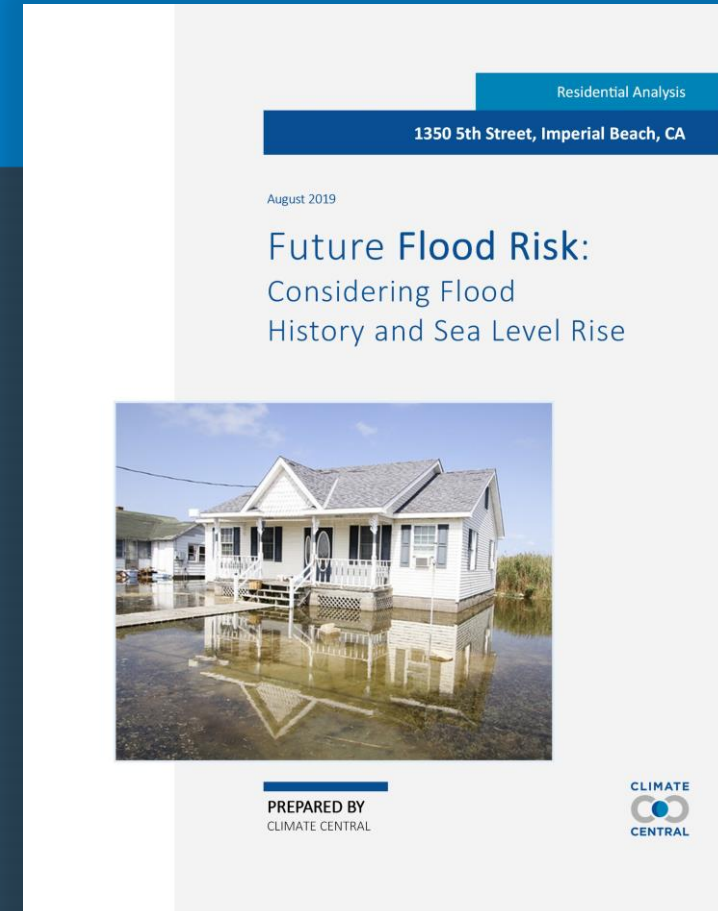
- [The New York Times](#)
- [San Jose Mercury News](#)
- [The State](#) (South Carolina).

Housing Growth Rate Ratio for 10 Year Flood Risk Zone vs. Safer Areas



Prototype – Coastal Flood Risk Reports

- Residences
- Commercial properties
- Industrial facilities



Commercial Properties

Non-obvious risk to operations, not property

- Staff and customer access
- Transportation
- Municipal service obligations and investments



Industrial Facilities – PES Refinery

Many industrial facilities built at the water's edge

- High exposure to sea level rise and flooding
- Environmental cleanup not adequately costed-out.



Hidden Environmental Liabilities

Philadelphia Energy Solutions declares bankruptcy

- Who will pay for clean-up?
- Site will become part of the marine environment, increasing environmental liability.



Image: AP Matt Rourke

Shifting Boundary – Private Property v. Public Waters

Private - risks

- Loss
- Environmental hazards

Public - risks

- Services
- Tax base
- Legal – takings claims
- Environmental



SLR discount in property values

Signal now appearing in real estate values

See Keenan, [Climate gentrification: from theory to empiricism in Miami-Dade County, Florida, 2018](#)



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