

A vibrant, stylized illustration of a tropical beach scene. The background is a bright blue sky with several yellow and white clouds. In the foreground, there's a blue ocean with dark blue waves. The bottom of the image shows a sandy beach in shades of orange and brown. Various tropical elements are scattered around: palm fronds in blue and green, and pink hibiscus flowers with yellow centers. The title text is centered in the upper half of the image.

Legal Aspects of SEA LEVEL RISE

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There Are **A LOT** of Legal Issues!

01.

PROPERTY USE

Can you build a sea wall?
What happens when you have to retreat?

02.

TAKINGS

If you **CAN'T** build that seawall or are ordered to retreat.

03.

INSURANCE

Private insurance
departures, bankrupt
government alternatives.

04.

WATER SUPPLIES

Salt water can intrude into both coastal aquifers and coastal rivers.

05.

BUILDING CODES

How do you design for incoming saltwater and worsening storms?

06.

PUBLIC HEALTH

Toxic hot spots and new diseases require public health law interventions.



01.

PROPERTY USE

Probably the first thing you thought of.



The California Seawall Case



Original
“temporary”
seawall.

11 Lagunita Dr.
before (above,
2012) and after
(right, 2020) the
alleged “repair and
maintenance.”



The California Court of Appeal upheld a Coastal Commission cease-and-desist order requiring demolition of a seawall and payment of a \$1 million penalty by homeowners who performed major reconstruction on their coastal home without notifying the California Coastal Commission. *11 Lagunita, LLC v. California Coastal Commission*, (4th Dist., Dec. 18, 2020). In March 2021, the California Supreme Court refused to review the case.

02. CONSTITUTIONAL TAKINGS

What makes the news and
instills fear in local
governments.



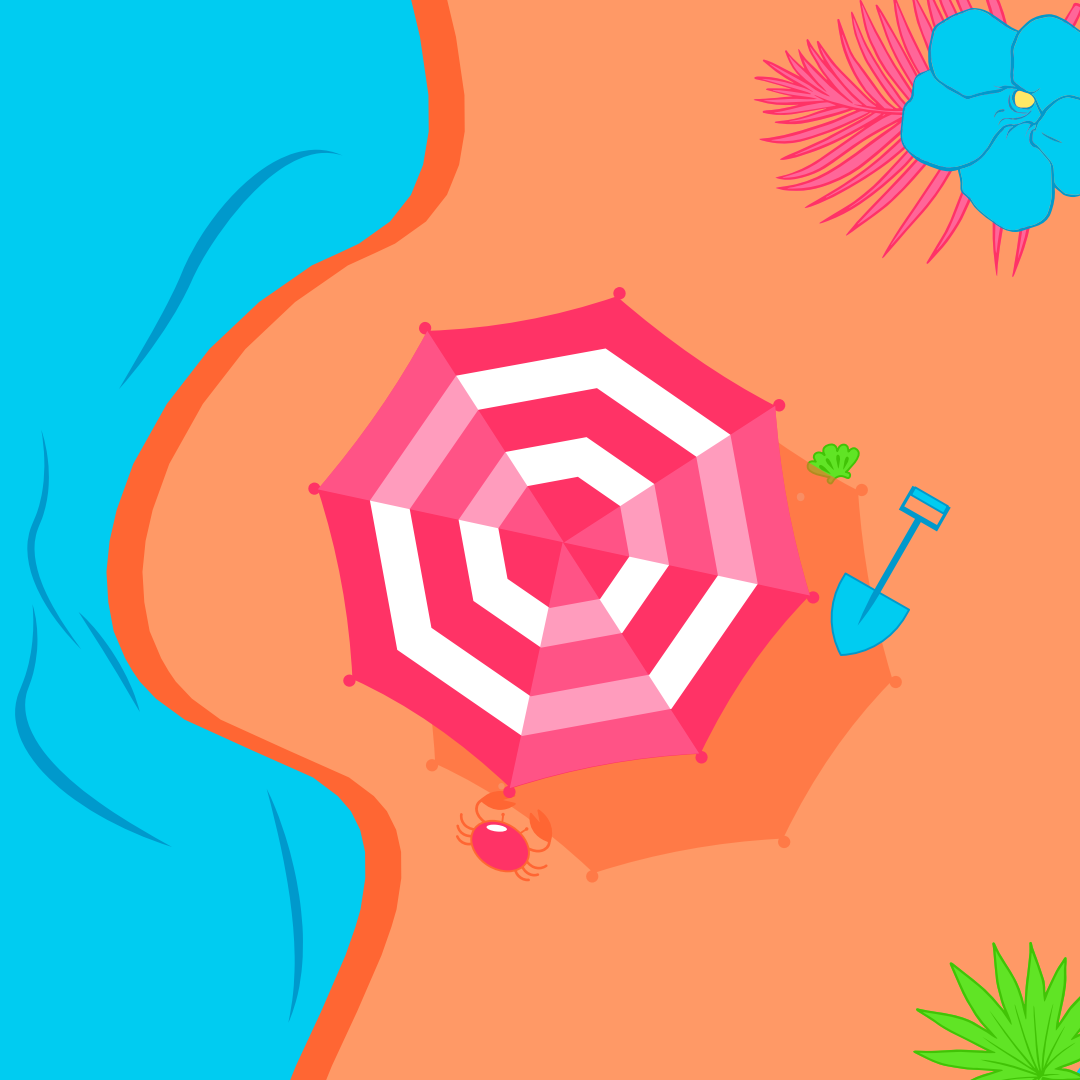
Borough of Harvey Cedars v. Karan (N.J. 2013)



**Loss of View from Beach Renourishment
= Storm Protection for Harvey & Phyllis Karan**

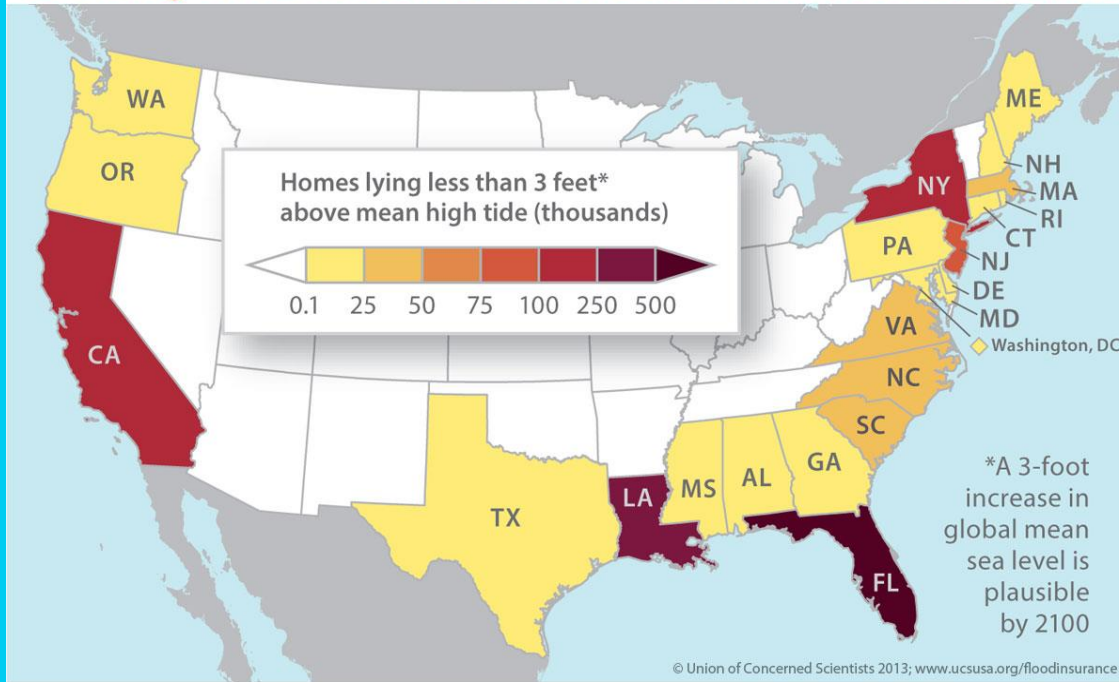
03. INSURANCE ISSUES

Insuring an increasingly inundated and storm-ridden coast makes NO fiscal sense.



The Risks

Growing Risks to Homes from Sea Level Rise and Storms

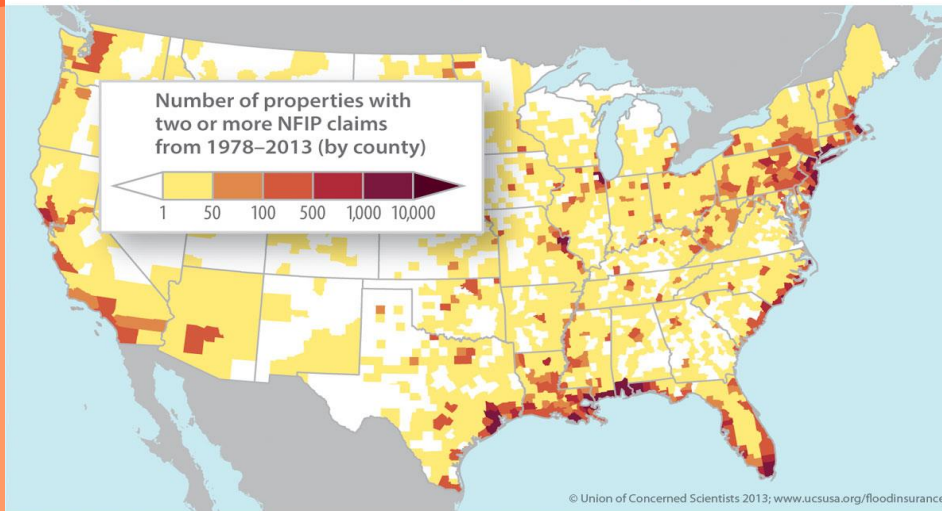


Source:
http://www.ucsusa.org/sites/default/files/legacy/assets/images/gw/overwhelming-risk-rethinking-flood-insurance/Map-homes-less-than-three-feet-above-sea-level_Full-Size.jpg

In recent years, properties in low-lying coastal states have experienced increasing damage from storms and severe flooding. Almost three million people—and their homes—reside within three feet of mean sea level. With rising seas projected to exceed

Repetitive Loss is a Coastal Problem

Repetitive-Loss Properties by U.S. County

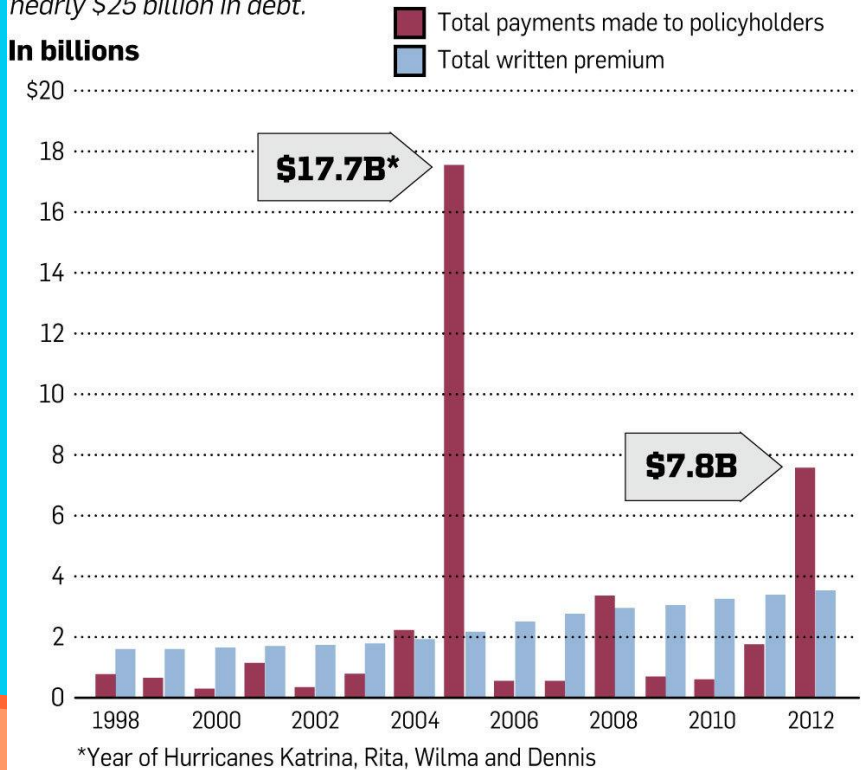


Insurance claims on properties that are repeatedly damaged by flooding, or “repetitive losses,” are of particular concern to the National Flood Insurance Program (NFIP). NFIP has paid out almost \$9 billion in claims to repetitive-loss properties, which amounts to about a quarter of all NFIP payments since 1978. Repetitive-loss properties, shown here, account for just 1.3 percent of all policies but are responsible for fully 25 percent of all NFIP claim payments since 1978. The darker colors show counties particularly prone to repetitive losses. Map based on data from FEMA as of May 2013.

Source:
http://www.ucsusa.org/sites/default/files/legacy/assets/images/gw/overwhelming-risk-rethinking-flood-insurance/Map-Repetitive-Loss-Properties-by-US-County_Full-Size.jpg

Rising tides, falling funds

The National Flood Insurance Program is officially under water. After record payouts for damages related to Hurricanes Katrina and Sandy, and accumulated smaller storms, the program is nearly \$25 billion in debt.



Source: FEMA

THE STAR-LEDGER

Hurricanes Bankrupt the NFIP

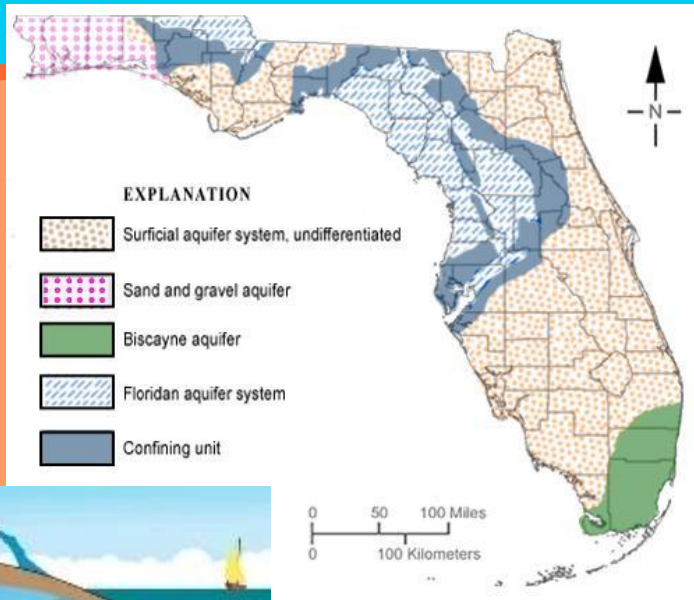
So, maybe turn flood
insurance into a
government buyout
program?

04. WATER SUPPLY

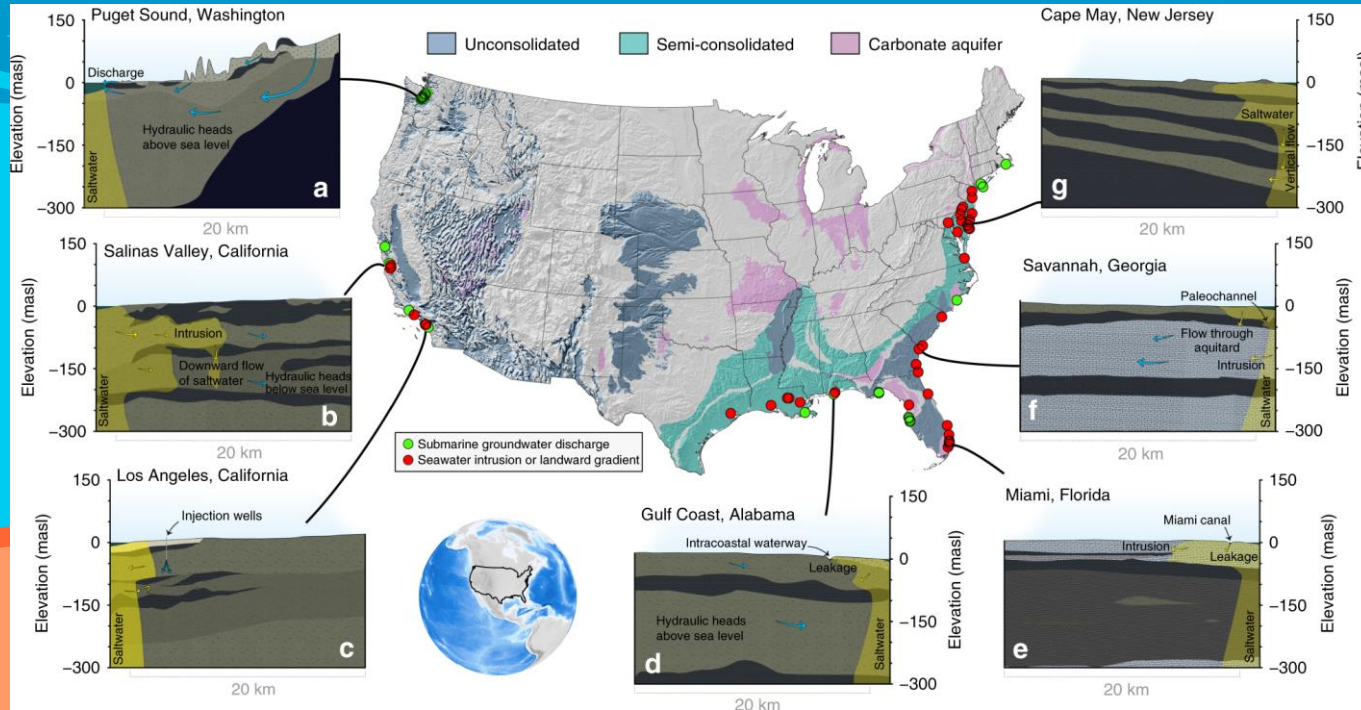
Probably NOT the first thing
you thought of.



Inundated Drinking Water

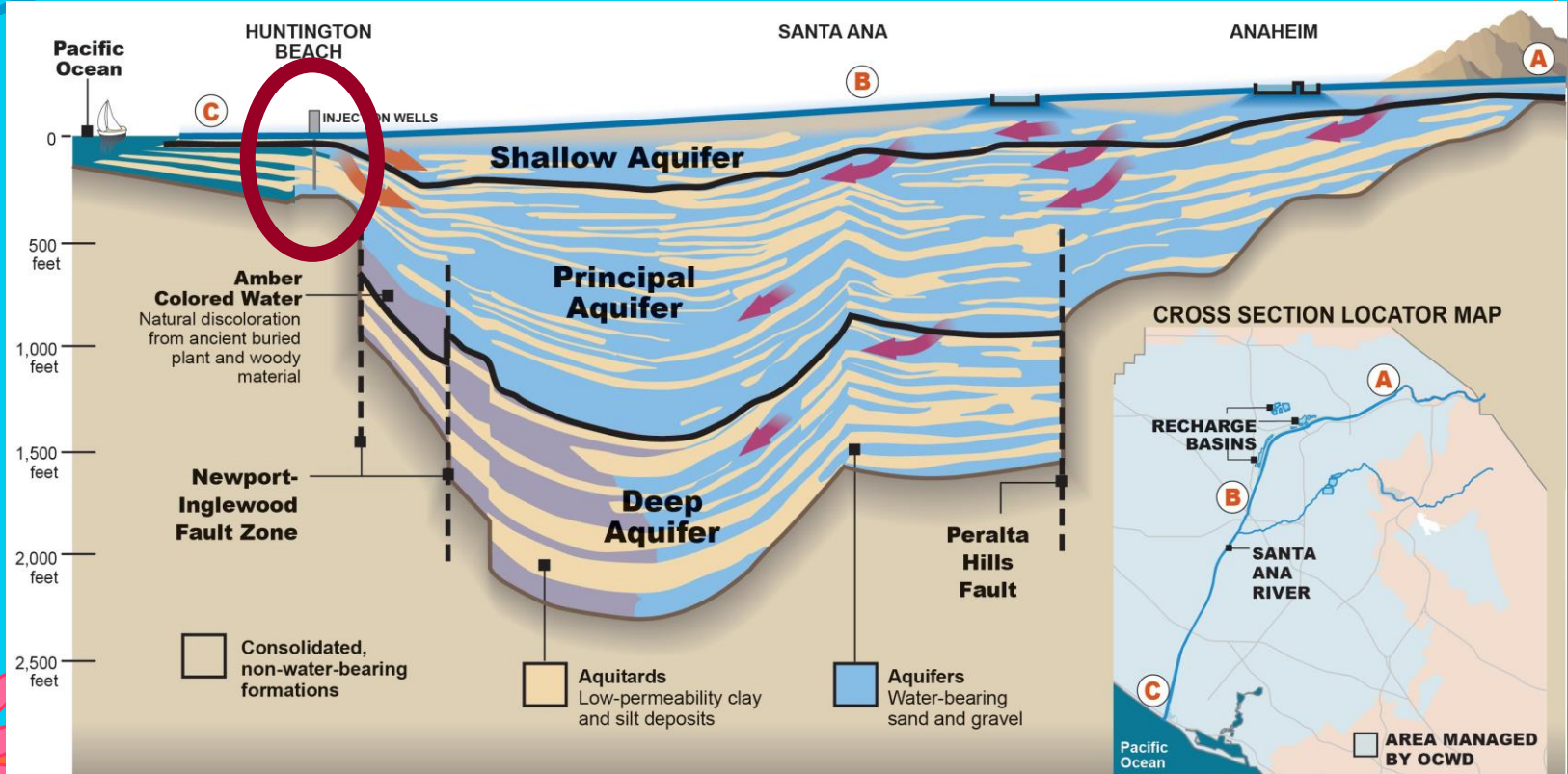


A Pervasive Problem in the U.S.



Jasechko et al.,
11 Nature Communications 3229
(2020),
<https://doi.org/10.1038/s41467-020-17038-2>

One Approach



05. BUILDING CODES

Good building codes can prevent a lot of damage and loss of life.



Legal Strategy: Enact Building Codes that Allow for Structural Survival

Anatomy of a High Wind & Hurricane Resistant Home



deltechomes.com
800.642.2508

All aspects of a Deltec home are ingeniously designed to work as a system, making it the smartest home you can build for high wind areas.

A. SHAPE

Aerodynamic circular building envelope works with nature, not against it

1. Wind can't build up enough pressure on any side to cause a structural failure
2. Reinforced clear span roof is at optimum pitch (6/12) for wind deflection and reduced lift
3. Circular structure transfers environmental loads most efficiently, with a high degree of redundancy providing extra resilience and performance during critical events



B. ENGINEERING

Creating a building envelope to resist high wind and provide safety to its occupants

4. Radial truss array in roof and floors work like spokes on a wheel
5. Potential energy from sustained winds is dispersed throughout the structure instead of building up in a single area

C. MATERIAL EXCELLENCE

Merging superior materials with a superior design results in a stronger and more durable structure

6. Machine rated 2400 psi framing lumber used in trusses and walls is twice as strong as typical framing material
7. Five Ply 5/8" plywood sheathing used instead of OSB on exterior walls, roof and floors strengthens the home and prevents flying debris from penetrating the structural envelope of the home
8. Reinforced windows with impact glass prevent wind and water from entering the home

E. SUSTAINABILITY

Utilizing products and construction techniques that enhance livability in the event of a prolonged power outage

12. Solar water heater provides uninterrupted hot water
13. Enhanced insulation maintains a more balanced temperature inside the home
14. High wind rated reflective metal roofs helps reduce radiant heat gain in the home
15. Passive solar design helps heat and cool the building through appropriate shading and window placement

D. CONNECTIONS

Emphasis on maintaining continuous load paths and strong connections between the roof, exterior walls, floor systems and foundation

9. Oversized truss hangers keep roof system anchored to walls
10. Walls have multiple construction ties to the floor system for structural stability and to transfer shear forces
11. Continuous metal strapping from roof trusses to foundation helps maintain structural stability

Engineers Are Getting Creative!



6 FLOOD PROOF
floating buildings
to survive rising tides

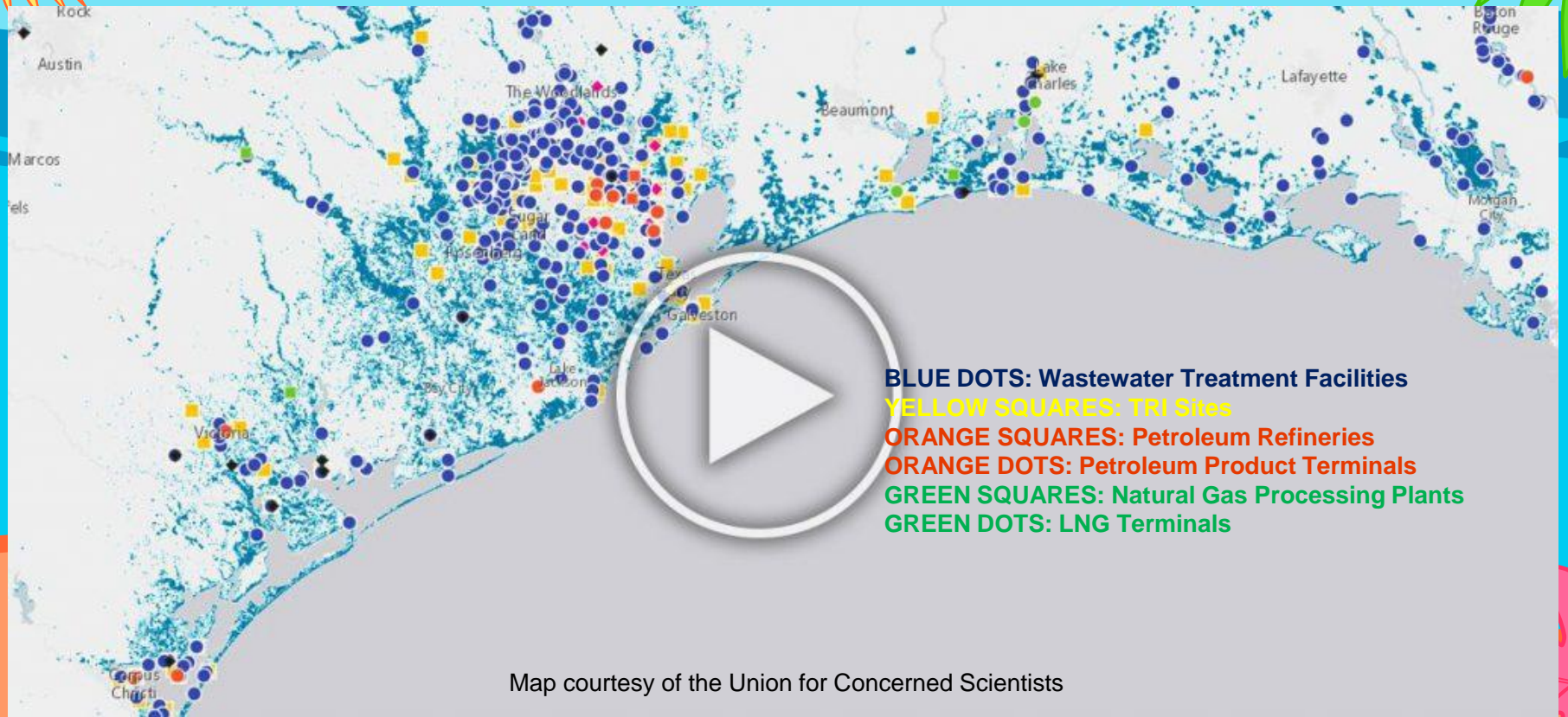


06.

PUBLIC HEALTH

New diseases, plus saltwater
and toxic contamination is a
bad mix!

August-September 2017: What Did Hurricane Harvey Encounter?



Map courtesy of the Union for Concerned Scientists

What A Hurricane Does to an Oil Refinery



The nation's largest oil refinery, owned by Motiva and located in Port Arthur, Texas, was forced to shut down due to flooding from Hurricane Harvey.

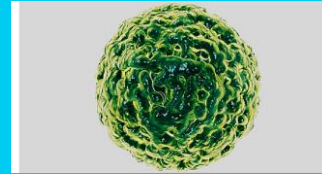
Photograph courtesy of Alex Glostrum,
Louisiana Bucket Brigade

Also, Sea Level Rise and Storm Surge Mean More Sewage Contamination of the Coast

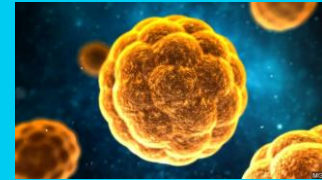


**Hurricane Michael Makes Landfall in Florida,
October 2018**

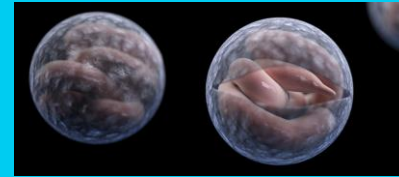
Photograph courtesy of CNN



Norovirus



Hepatitis A



Cryptosporidium



Giardia



Shigella



E. coli

And Inundated Coasts Tend to Increase Mosquito Habitat



Dengue in Florida

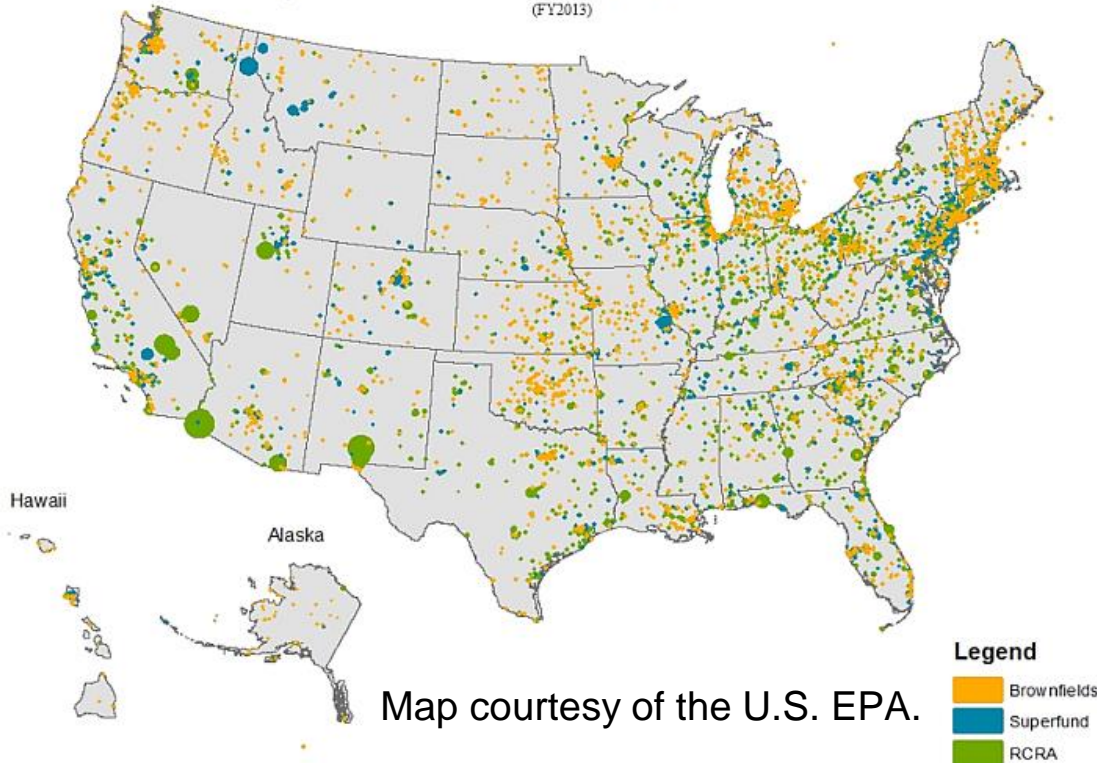


Dengue Cases in Florida, 2013

Graphic courtesy of Health News Florida

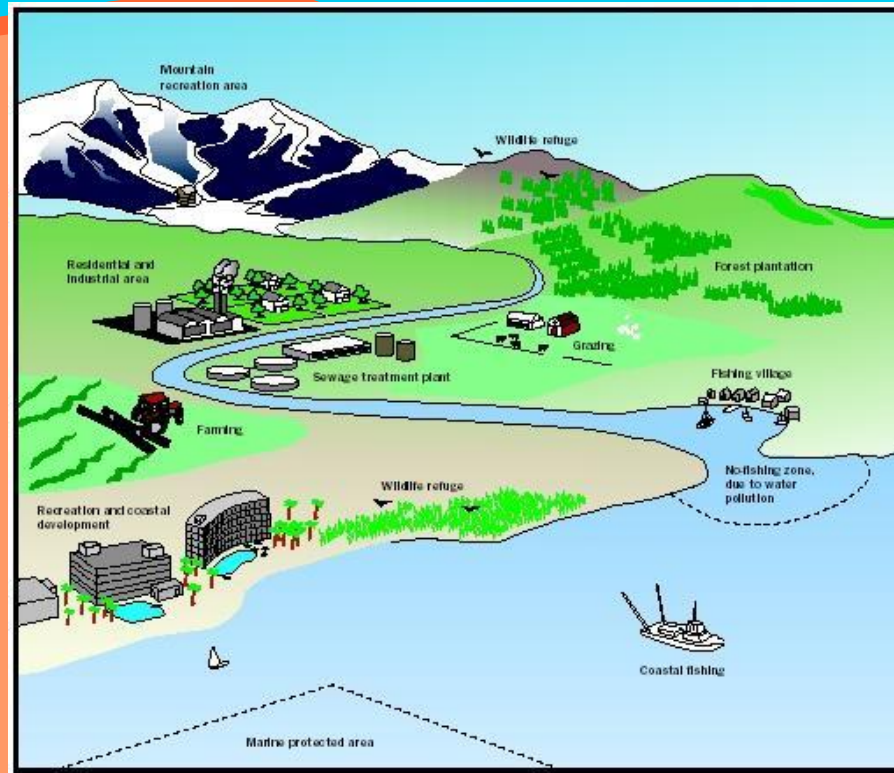
Legal Strategy #1: Clean Up Existing Problems

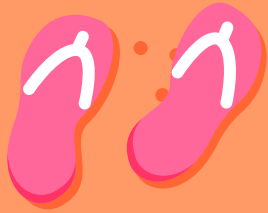
Superfund, RCRA, and Brownfields Sites
(FY2013)



Map courtesy of the U.S. EPA.

Legal Strategy #2: Toxic-Aware Land Use Planning Along the Coast





THANK YOU!