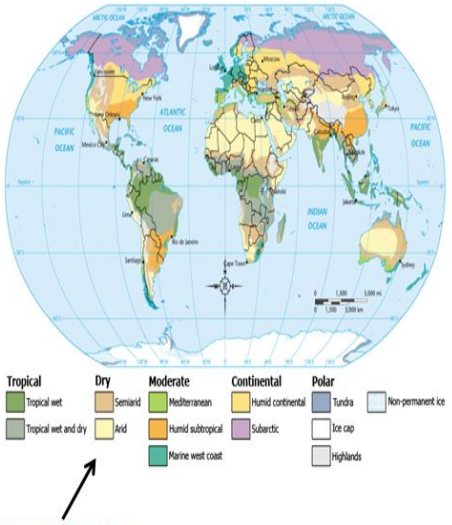
GEOTECHNICAL ENGINEERING

You can emphasize that soils are not only required for building foundations but they are intimately related to world hunger.

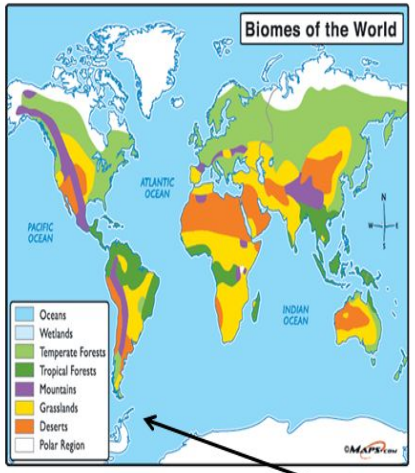
Soils are also a major player in the growth of civilizations and the arts through pottery.

Mud Hut Design and Strength

Climate Zones, Vegetation Regions, Biomes, and Ecosystems

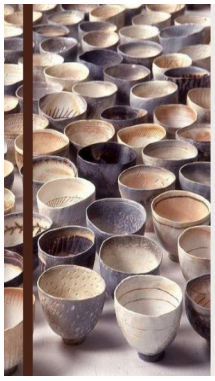


Climate Zones



Biomes

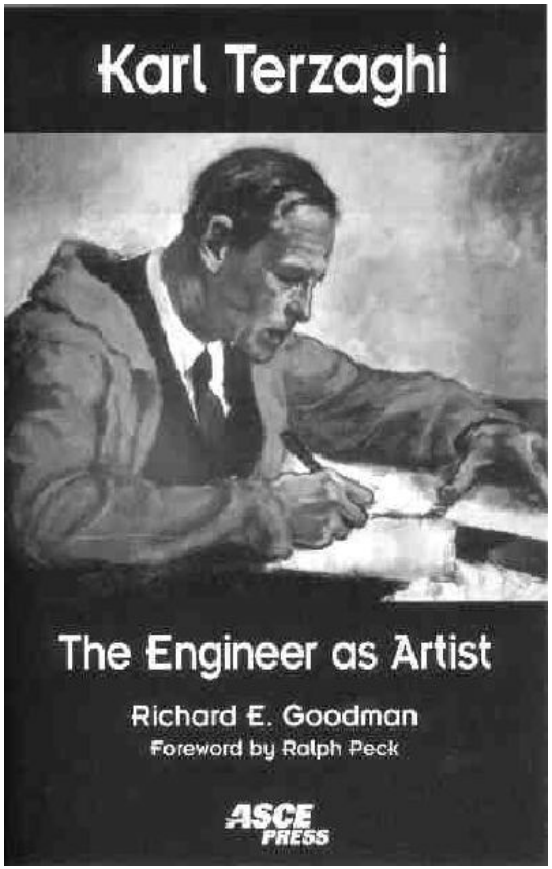
Scientists have divided our world into different biomes, such as, grasslands, deserts, rainforests, deciduous forests, and marine environments. A biome is a large geographical region with plants and animals that are able to live in that location with its particular climate because they have adapted in different ways to the amounts of water, heat, and soil in that area.



HISTORY

- Pinch pots are some of the oldest ceramic artifacts found around the world.
- Before the invention of the Potter's Wheel and Kiln, pottery was strictly hand built and mostly valued for function.

KARL TERZAGHI



Terzaghi, the father of geotechnical engineering struggled with a dark side.

Professional Jealousy

MANY WOMEN STUDIED SOIL SCIENCE AND MADE SIGNIFICATION CONTRIBUTIONS BUT ARE NEVER MENTIONED

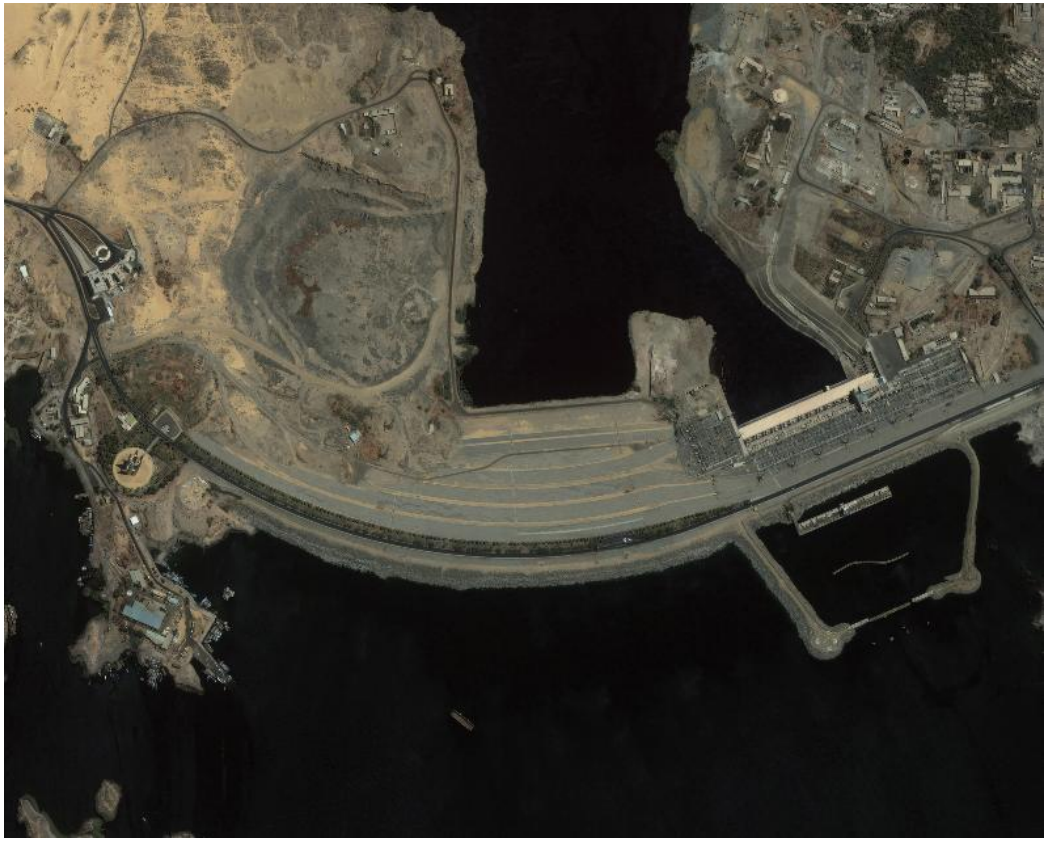
1895 Miss Janette Steuart and Miss Sorena Haygood maintained laboratory and field records in Washington, D.C. for the Soils Division of what was then the U.S. Weather Bureau of USDA

June 1901 Miss Julia Pearce was appointed to one of the first USDA Soil Survey field parties (Hanford, CA) as an assistant in the Soil Survey (Macy Lapham, Crisscross Trails). She copied maps. A short time later, she was transferred to Washington to work in the physical laboratory

Read: The History of Women in Soil Science

ASWAN DAM IN EGYPT

Historians of civil engineering have almost totally ignored the Moslem period, and in particular historians of dam building, such as there have been, either make no reference to Moslem work at all or, even worse, claim that during Umayyad and Abbasid times dam building, irrigation and other engineering activities suffered sharp decline and eventual extinction.



Satellite view of Aswan High Dam in Egypt. Completed in 1970, this gigantic dam was one of the **largest earthen embankment** dams in the world. It is 111 m tall, 3830 m long and nearly 1000 m wide. Its construction has had immeasurable impacts on the Egyptian economy by regulating the Nile river flooding, providing storage of water for agriculture and for generating electricity.

Dams and Their Construction Techniques

The majority of the earliest Muslim dams were completed in Arabia itself; and full information on their height, length, and ratios between height and length is given by Schnitter. He notes that with the exception of the Qusaybah dam near Medina, a 30 m high-205 m long structure, which was slightly curved in plan, the alignment of all others were straight.[11] About half such dams were provided with a flood overflow at one end, and often with a downstream training wall to guide the spilled water to a safe distance from the foot of the dam. Schnitter also observes that about a third of these very early dams (7^{th}-8^{th} century) are still intact.[12]

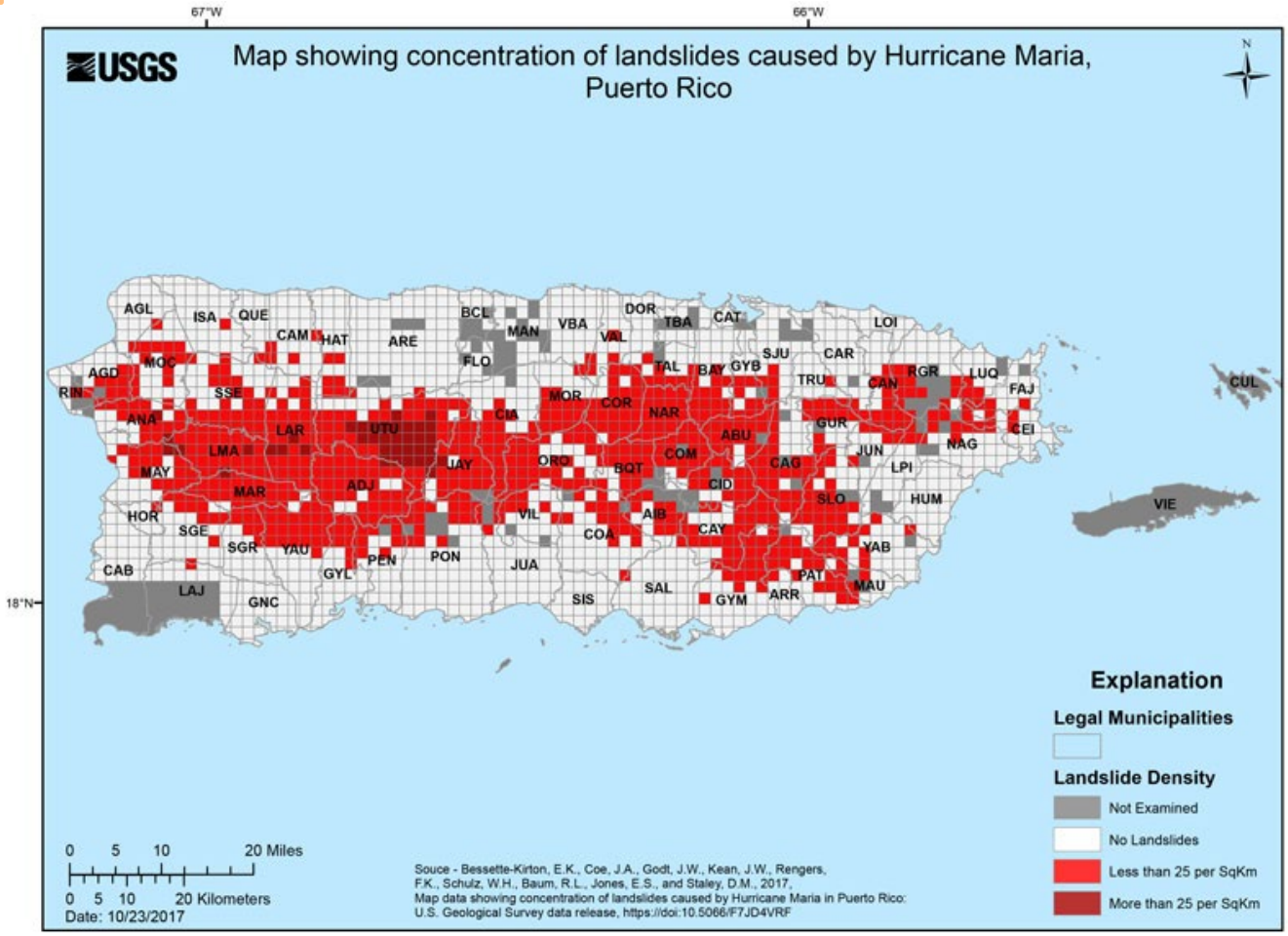
Figure 2a-b: Khaybar Dam called Sadd Qasr al-Bint in the Arabian peninsula. It is one of the largest ancient dams, probably built by the Queen of Sheeba in pre-Islamic times. It is a big stone construction on a dried out river bed. Although it had been breached for about one third of its length, it is nevertheless an impressive 20 metres high and about 135 metres long. The upstream face is plastered with yellow mortar, the

https://muslimheritage.com/review-of-muslim-contribution-to-civil-engineering-dam-construction/

Geotechnical Conditions Post Hurricanes

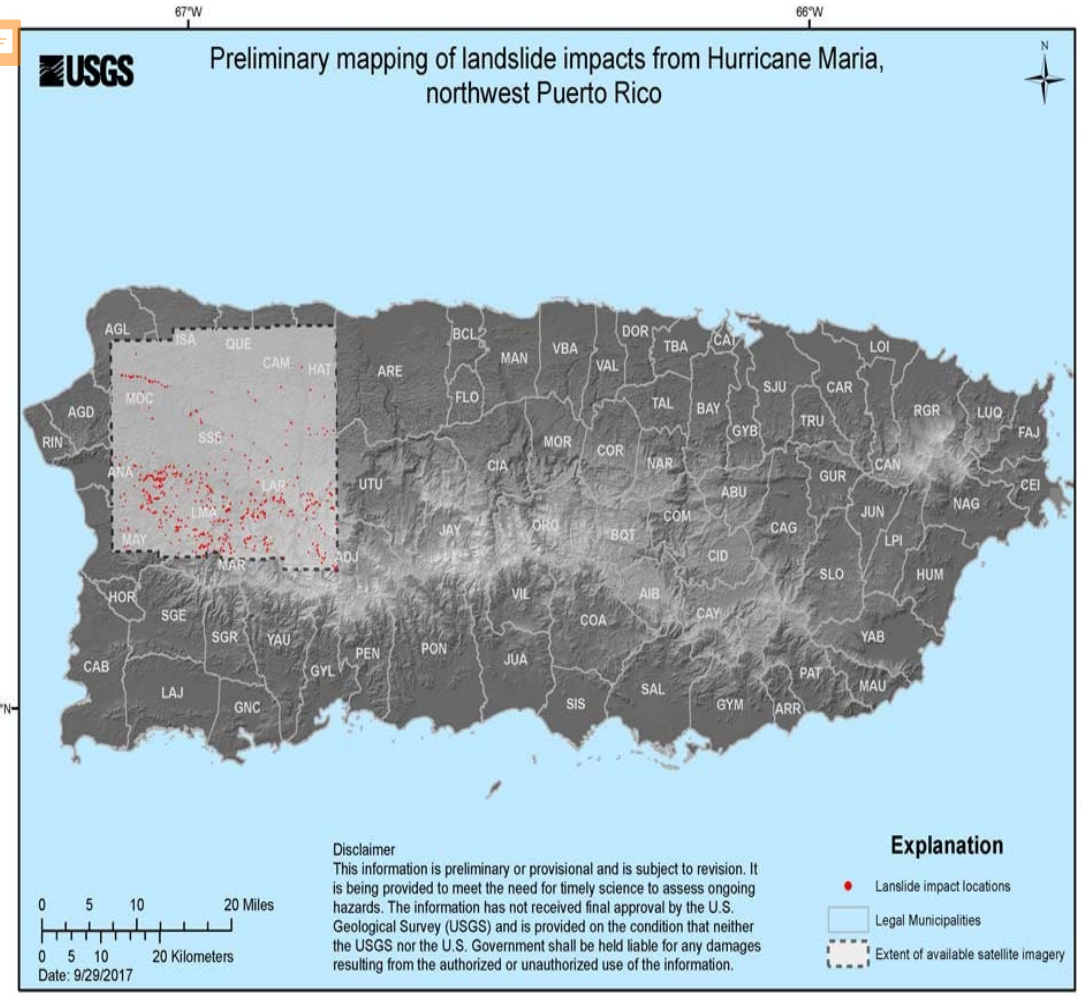
Intro to Infrastructure
Spring 2018

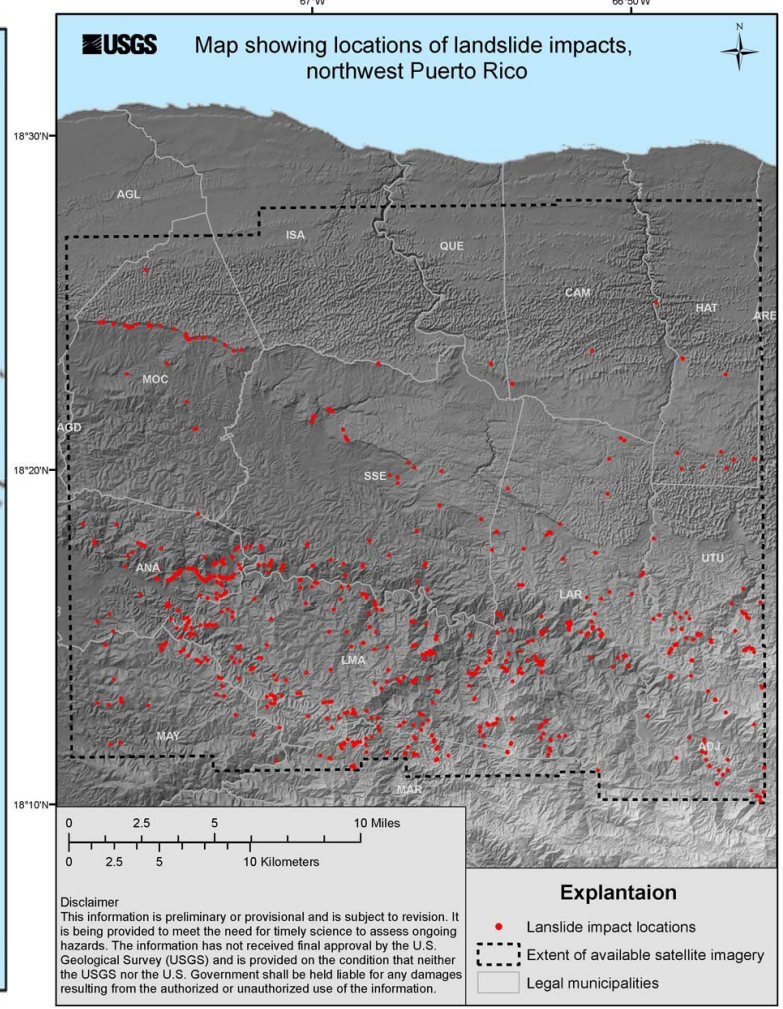
Hurricane Maria



Overall Geotechnical Impacts of Hurricane Maria to Puerto Rico. (USGS Map)

Elevation Display at the Center of the Island





Landslides Incident Distribution in North East Puerto Rico

Road damaged by
Mudslides

(Image by Digitalglobe)

Landslide near Rio Rosario, Maricao Municipality.

(Image by Digitalglobe)

The Guajataca Dam

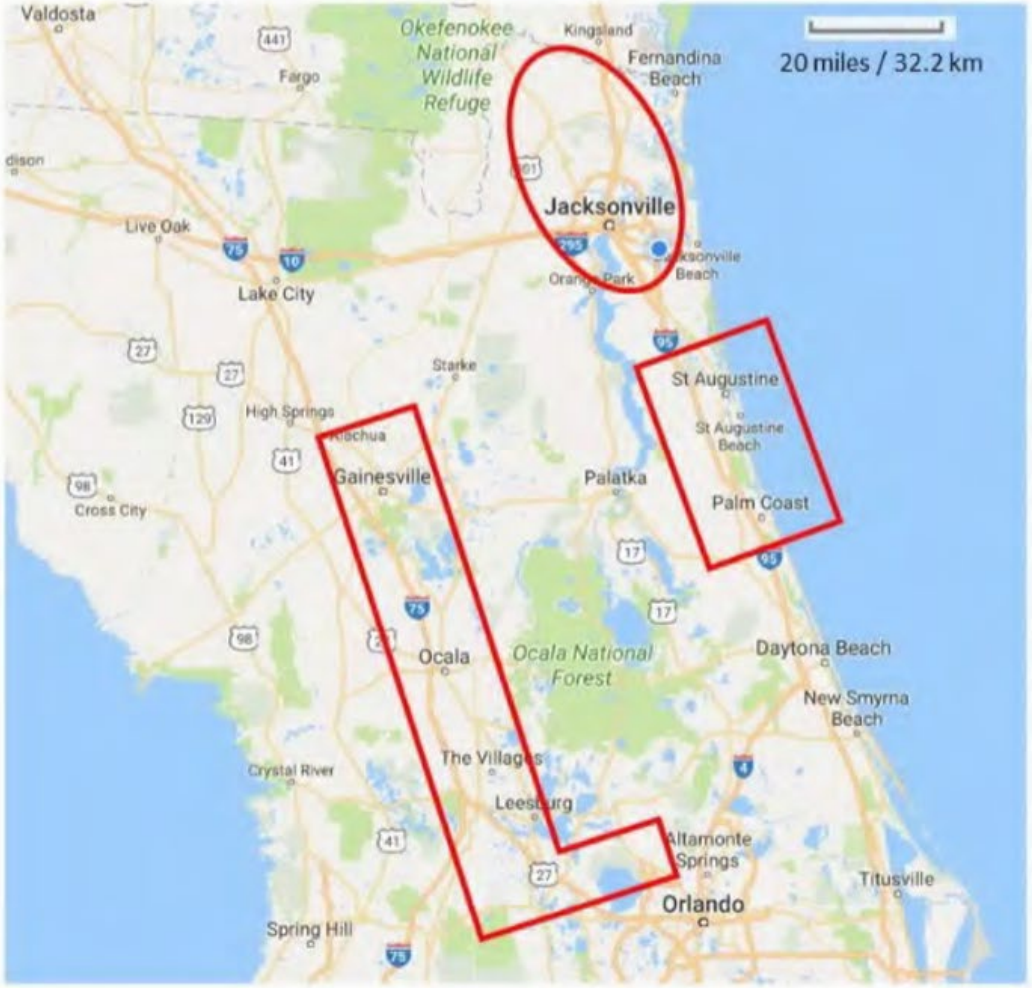
Video of Guajataca Dam

https://www.youtube.com/watch?v=81GOCPz633w


PR1442CC
MERCURY

Hurricane Irma

Rainfall Data in three days when Irma hit Florida (National Weather Service)



Locations of geotechnical incident to be analyzed (Geotechnical Extreme Events Reconnaissance Associate - GEER)

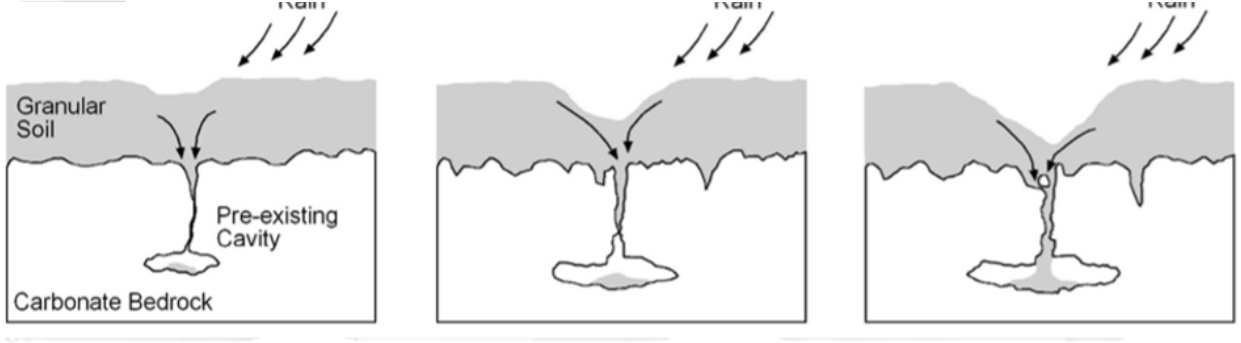
Reconnaissance Areas

Area 1: Central Florida

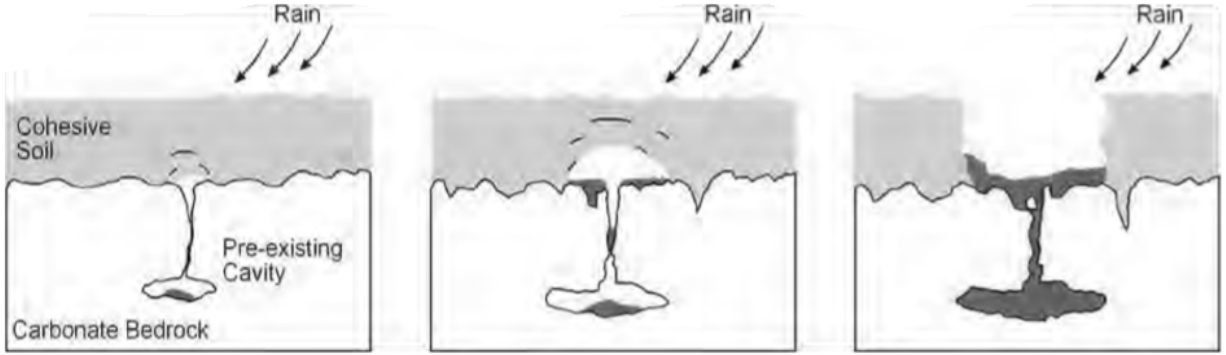
Area 2: NE Florida Beaches

Area 3: Jacksonville

Types of Sinkhole



Cover Subsidence Sinkhole



Cover Collapse Sinkhole

Base map Source: ESRI

Project Study Area
and Site Visit Locations

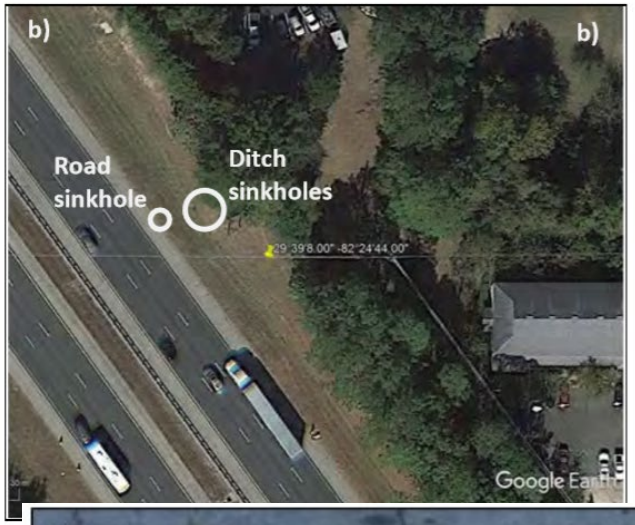
Locations that experienced sinkholes during Hurricane Irma at Central area of Florida

: Approximate locations of five sinkholes (A-E) and a depression (F) within and nearby a retention pond near 2800 NW 143 Street, Gainesville, FL (Latitude: 29°40'34.84"N / Longitude: 82°29'43.31"W) (from Google Earth, 2016).

Sinkhole A (left) and sinkhole C (right)

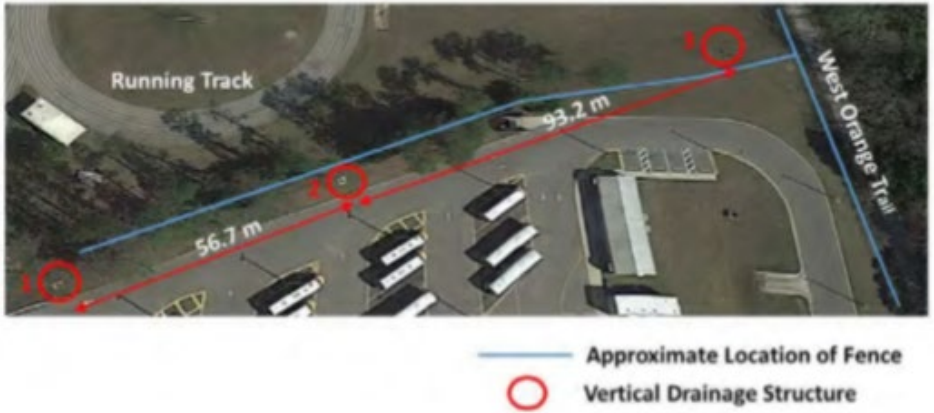
: a) Sinkhole "D" (Latitude 29°40'48.85"N / Longitude: 82°29'43.13"W and b) newly developed depression "F" (Latitude 29°40'47.99"N / Longitude 82°29'41.99"W).

The erosion in the retention pond during the hurricane and the 12.5 meter length brick wall was toppled at sinkhole E

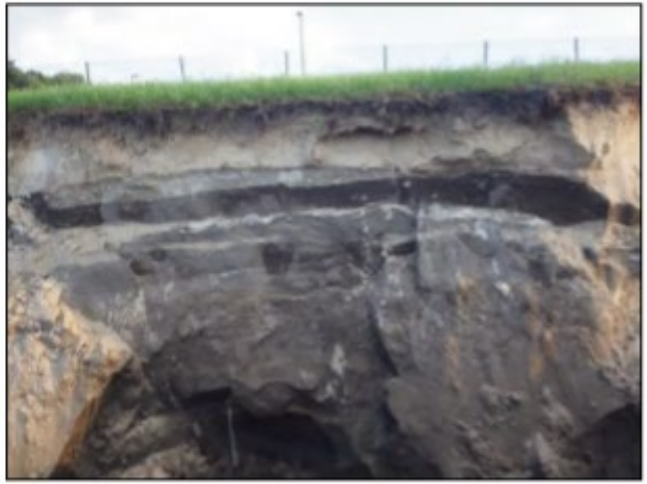


Sinkhole on the roadside on **South I-75 and SR-26** of central Florida which located in Gainesville.

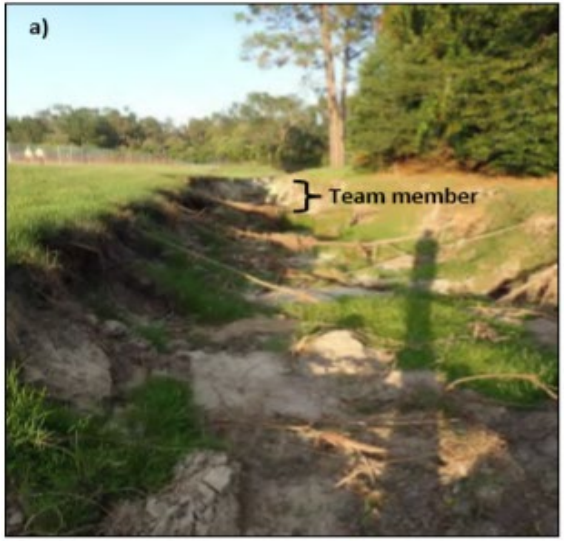
Apopka Middle school had experienced a massive erosion on the south end of the school property between the run track and the school bus parking area.

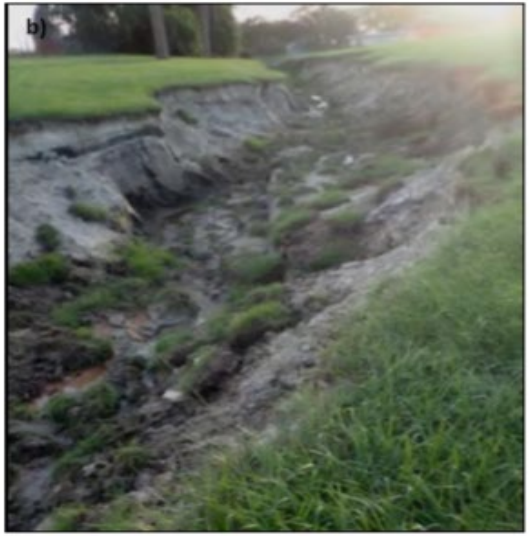


The erosion washout at the drainage structure 3 as shown above ended up with the erosion from western extent to the West Orange trail and damage two of the large scale drainage structures which was built to support the drainage of the parking area.



The photos shows the dark layered sand features within the erosion washout which create a steep bank on the side of the channel.

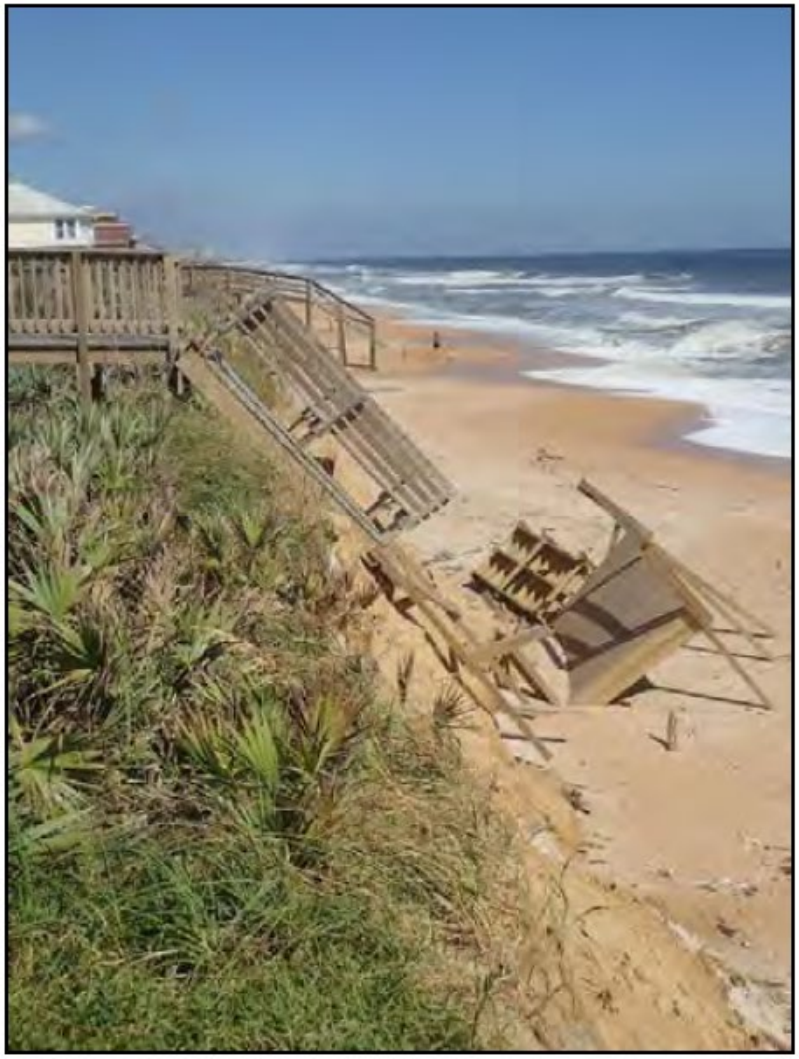




Locations of Geotechnical Damage on Northeast Florida Beaches

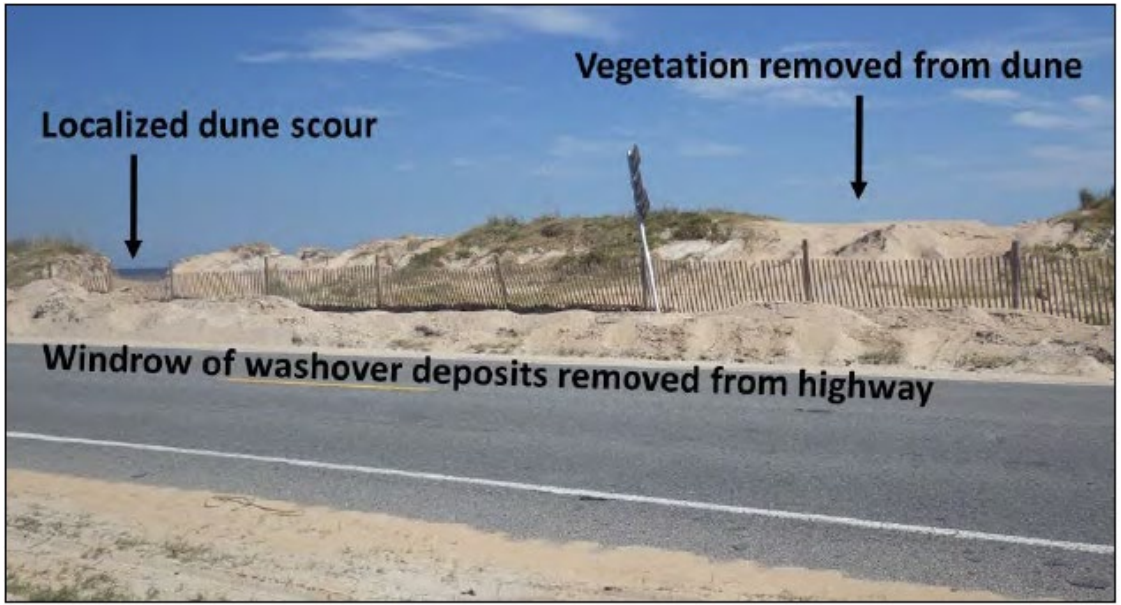
Erosion and scour at Beverly Beach, Flagler County.

A large dune was eroded during the hurricane at the Ocean Shore Boulevard of Painters Hill,



The property right next to the above property had experienced a similar erosion damage which caused the collapse of timber staircase along the shore.

The overwash and washover deposit were shown clearly in the photo below. Due to the overwash and prevent further scour, a large amount of fill material on the side were required to protect the highway.



The Breach side, 1.7 km away from the Marineland, experienced some serious scour during the event.

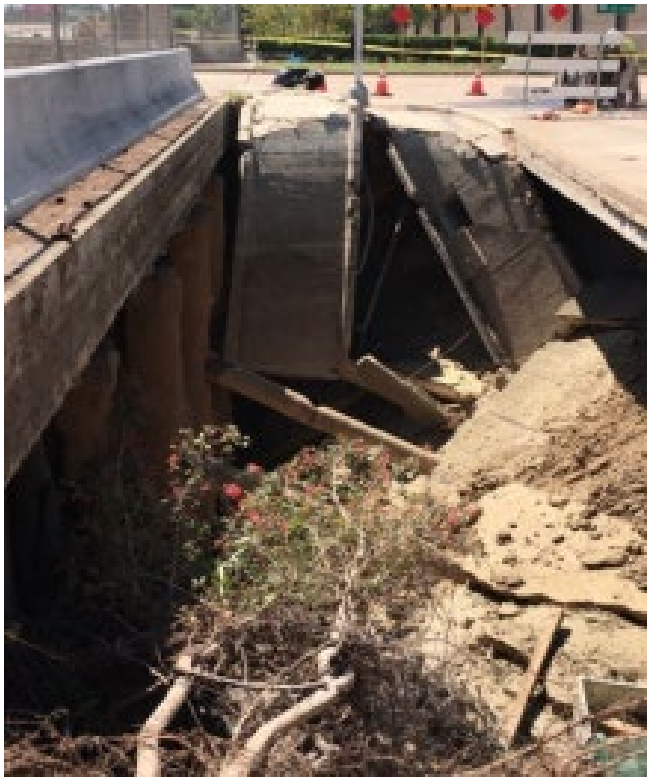
A residential house was collapsed because of the erosion of the dune system along the Coastal Highway in Vilano Beach.

Hurricane Harvey

The east bank of the Colorado River was eroded considerably seemingly at the time of the flood. The flood apparently caused significant damage to the sheet pile wall on the upland of the east bank.

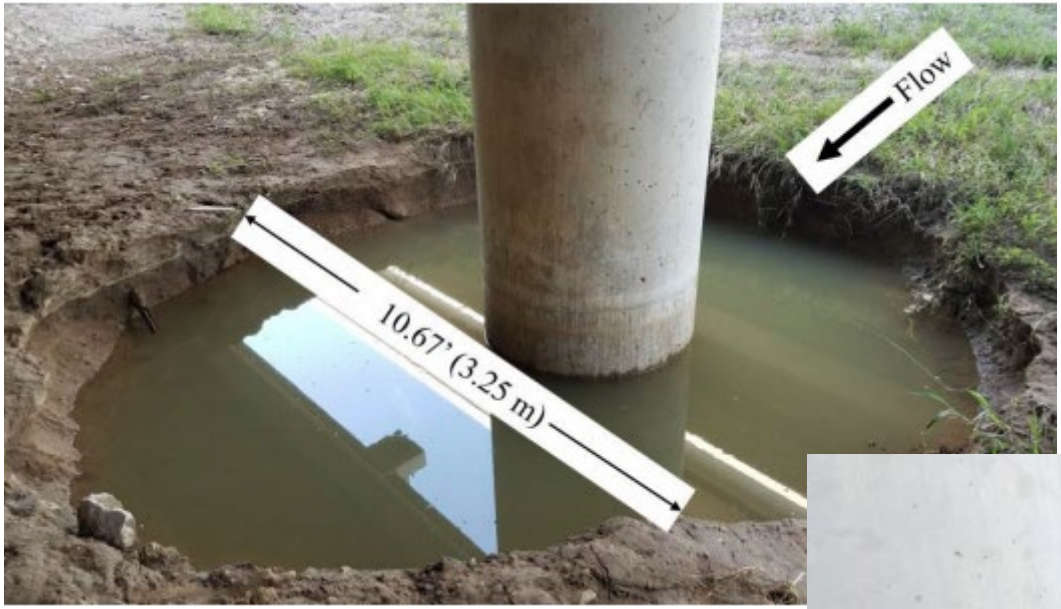

09/02/2017

Comparison of pre- and post-satellite imagery suggests a failure crack is present in the seawall along the southern side of the Aransas Pass.



Damage of the walkway slab on Beltway 8 (left photo courtesy a resident in the area, August 27, 2017, and right photo courtesy of a construction worker on site

The fast moving flood seemingly caused significant erosion in the culvert foundation, and consequently led to the culvert bridge failure.


Flow
10.67' (3.25 m)


1.25' (0.38m)