Coastal Case Studies: Lessons Learned

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How do you protect against Coastal Storms like Sandy?



You can't

Coastal engineering structures

Large rip rap

smaller rip rap

gabions

breakwatek

5,0E.2007

groynes

Deverment

THE R.

222

Seawalling rap

Sea wall

UNIX?

"Living Shorelines"



Beach replenishment



Stone+bioengineering

Photo by Wilkinson Ecological Design

Soft engineering not durable, but Permittable Bank restoration along tidal River

After one year, plants established, Starting to gain land.

Established coastal bank

Bank protection using coir fascines also known as "biologs"



Coir covered with "sacrificial sand" and planted with beach grass



Native plants are Becoming established

Coastal bank 1m erosion/year Little Compton, RI



Sprigs Installed

1.



After planting

Conditions after 10 years



Bank has naturalized



Beach Restoration-Spain



Dune restoration completed Removal of infrastructure

Dune Restoration



Secondary dunes

Dune Restoration, Bay of Biscay 2007

High coastal bank (MA)



Unconsolidated sand on 30m high coastal bank







Install baffle system, plant, then hydro-seed slope



Establishment period.



Use <u>flexible</u> mesh biodegradable fabric to capture sand and to protect establishing vegetation



After one year of growth



One year after establishment



After two years



Completed slope after two years



Rock Toe of slope, covered with sand



Creating wooden staging to prevent slope erosion during planting



Installation of baffles & dune plants







Hydro-seed slope with native seed mix

Completed: June, 2008

Site after one year (August, 2009)

Connecticut River-Tidal bank Restoration 2013







Darien salt marsh and coastal bank Restoration- 2001





Post construction: Salt marsh established Bank re-vegetated





Restore or give up?







Hard Engineering (reduce wave energy)

- Groynes
- Revetment
- Gabions
- Rip Rap
- Sea Wall
- Cliff Drains
- Breakwaters

Pros: Effective erosion control, long Life span Cons: high cost, poor esthetics

Soft Engineering:

- beach nourishment
- Bio-engineering
- Dune stabilization
- Living shorelines

Pros: good aesthetics, wildlife use, low cost, easier to permit

Cons: cannot endure severe storms

Oakwood Beach, NY Response to Sandy: buyout



remove infrastructure

Create wetland

Mitigation bank

Ecological Restoration thoughts:

do no harm! Plan ahead with defined goals/targets don't force restoration use natural processes restore ecological trajectory Build in ecosystem stability Use Reference ecosystems

Comments/Questions?

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