

Revetments as a Last Line of Defense

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www.startwithmiller.com

What we bring to the table...

- 55 years of experience along the shores of the Great Lakes
- Over a century of professional staff experience in storm water mitigation and naturalized design
- Over 40 Great Lakes beaches redesigned under grant funding to reduce contamination and restore natural dynamics

Egg Harbor Beach

BEFORE



AFTER



Ridges Sanctuary Beach

BEFORE



AFTER



Samuel Myers Park

BEFORE



AFTER



Sheboygan's Harbor Centre (South Pier)

BEFORE

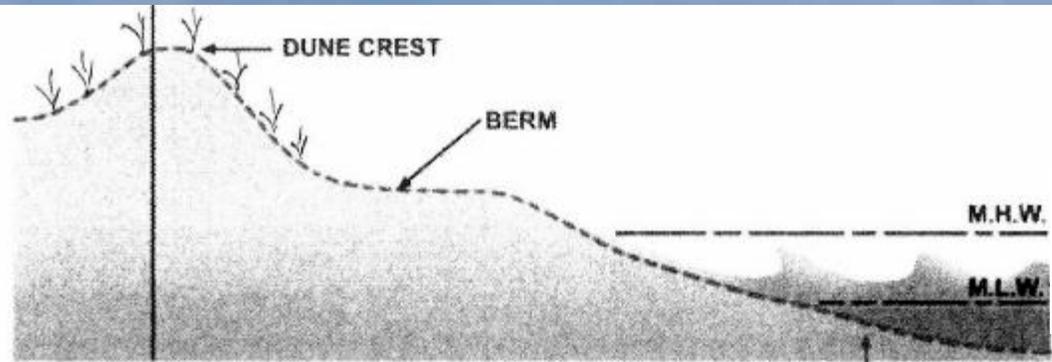


AFTER

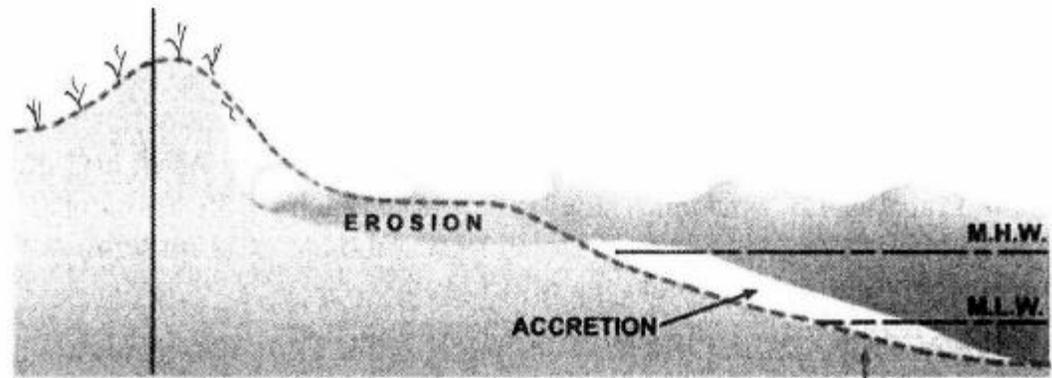


October 2016

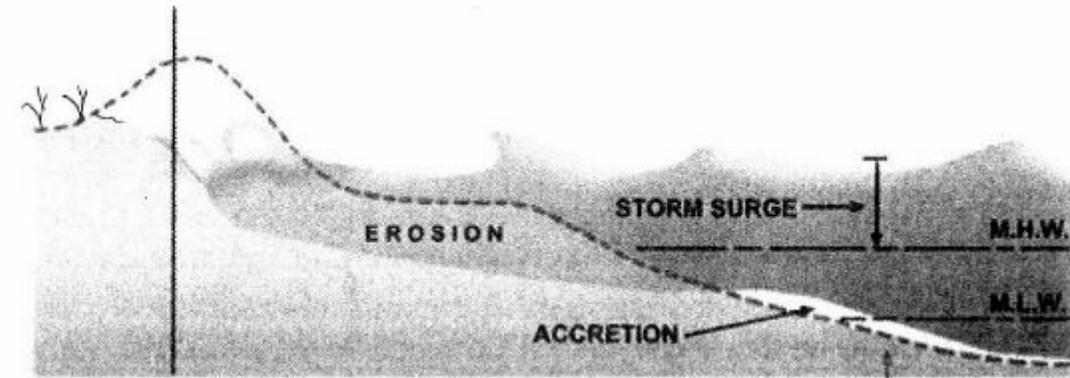




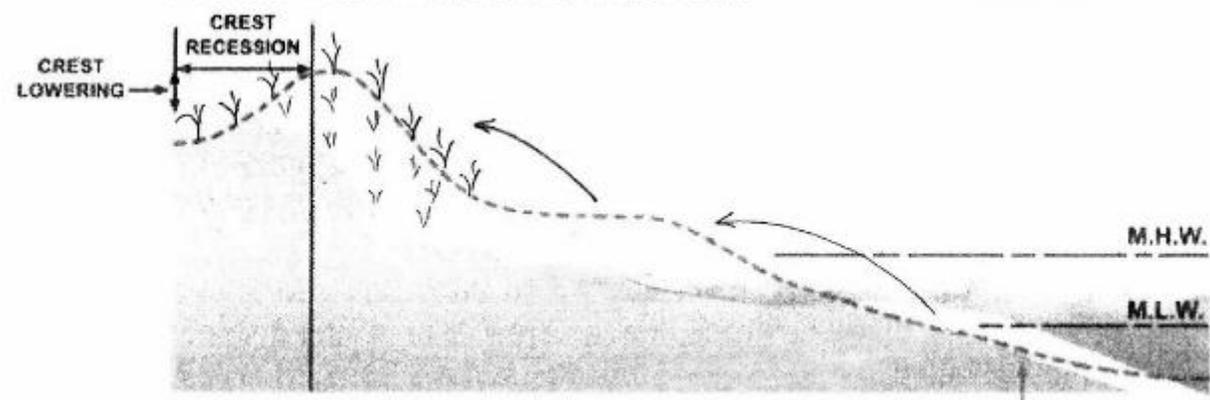
Profile A - Normal wave action



Profile B - Initial attack of storm waves



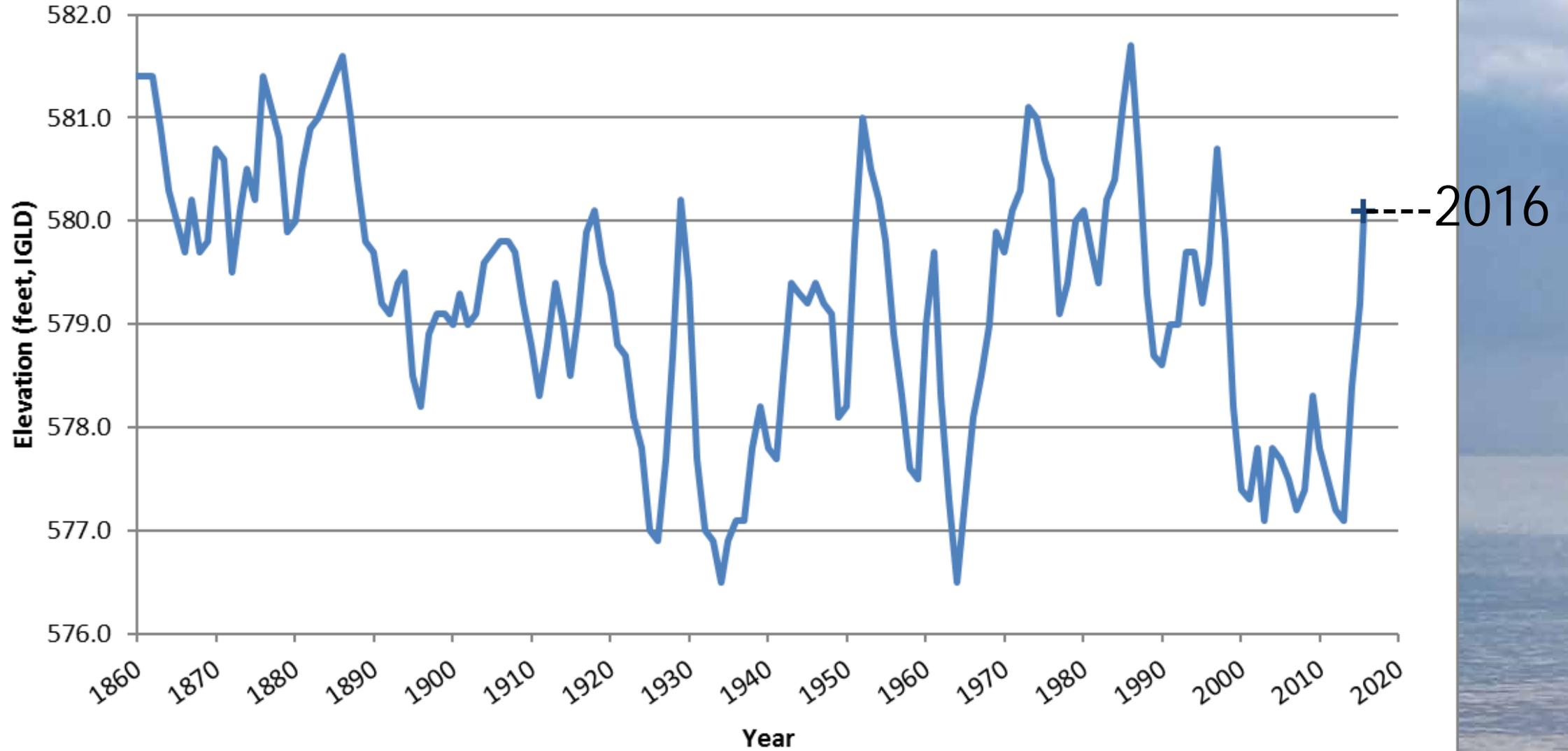
Profile C - Storm wave attack of foredune



Profile D - After storm wave attack, normal wave action

Lake Michigan - Huron

Annual Average Water Levels





2010

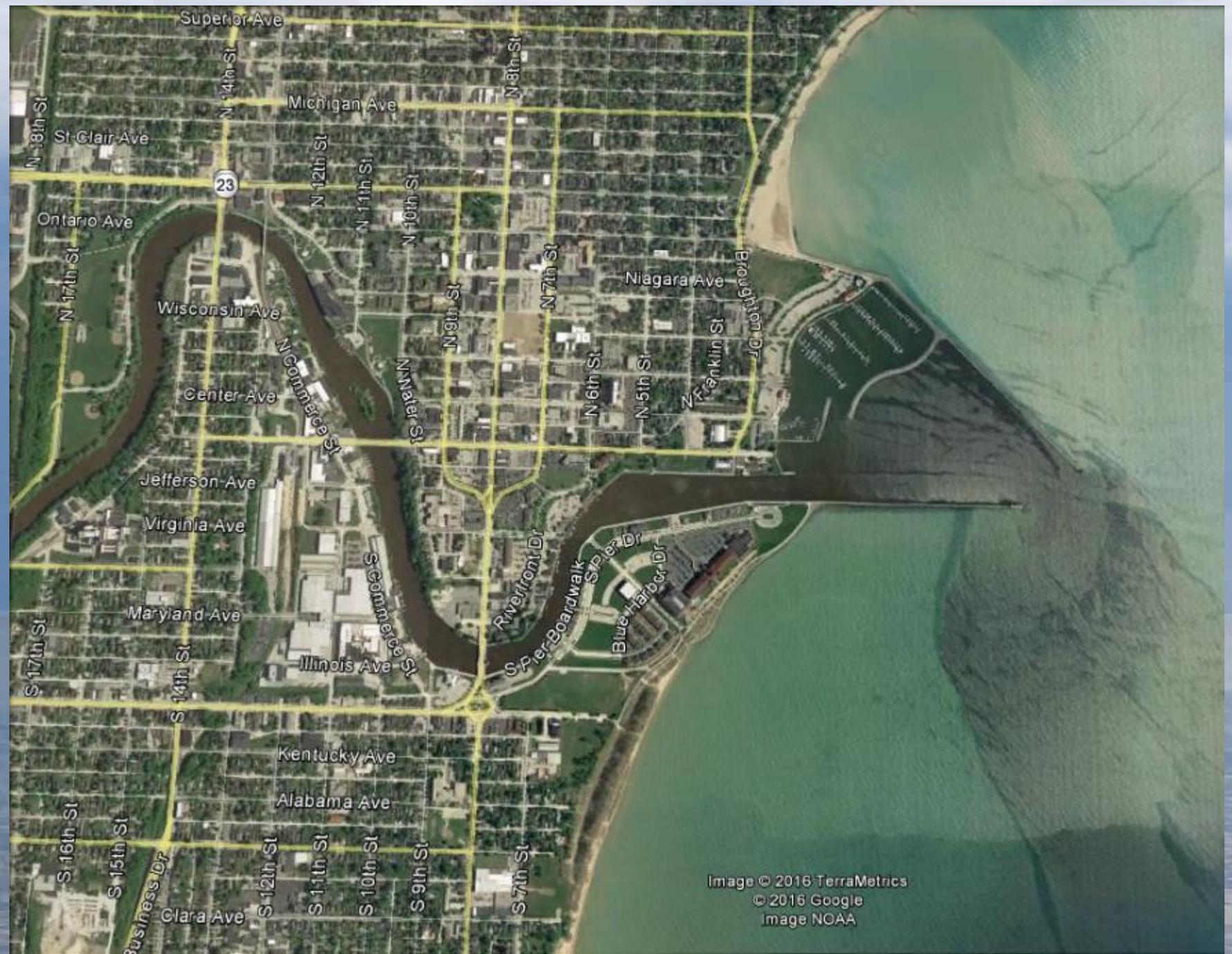


2014



2016

Littoral Drift



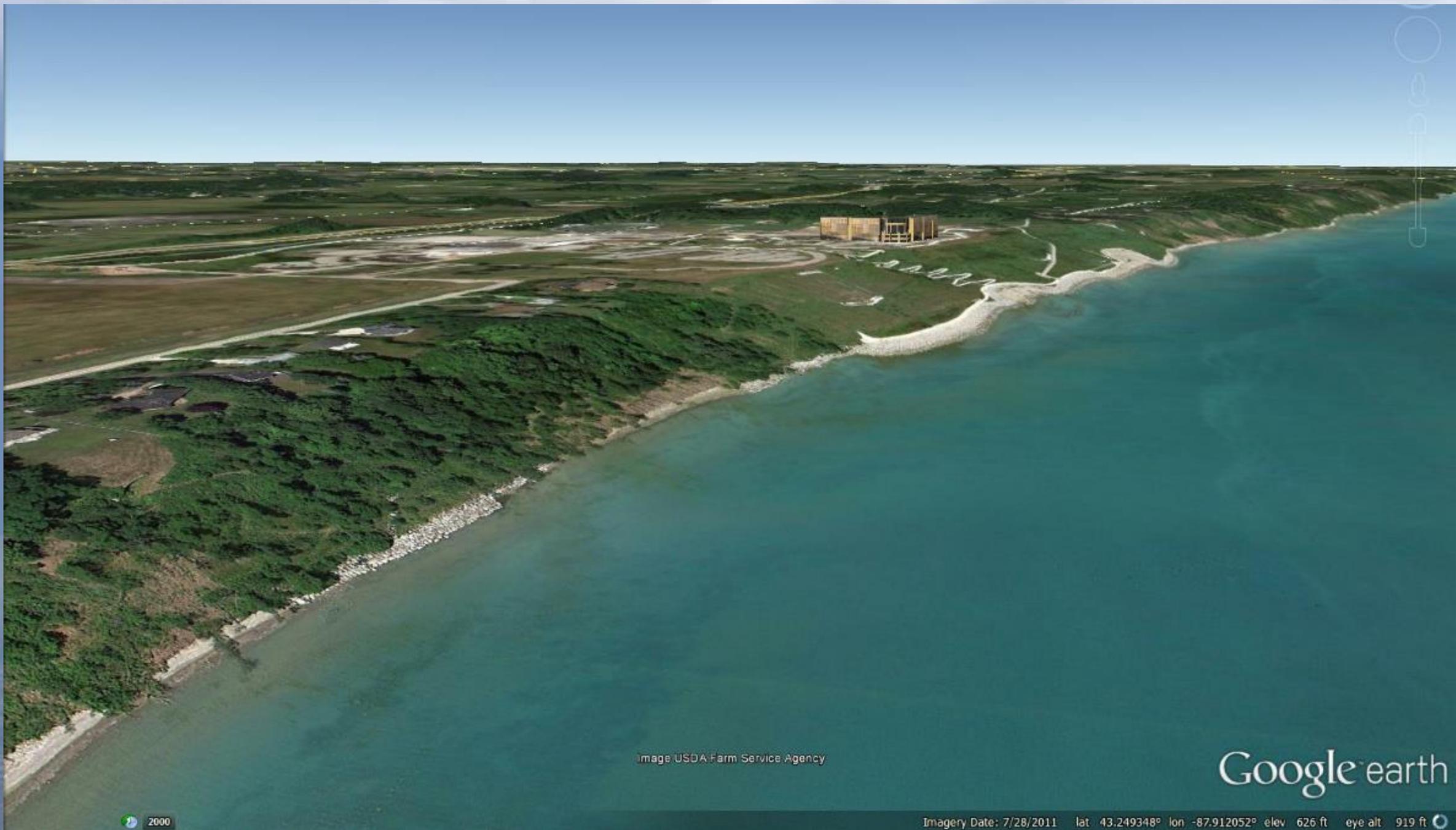


Image: USDA Farm Service Agency

Google earth

2000

Imagery Date: 7/28/2011 lat: 43.249348° lon: -87.912052° elev: 626 ft eye alt: 919 ft

Direction of Littoral Drift

S

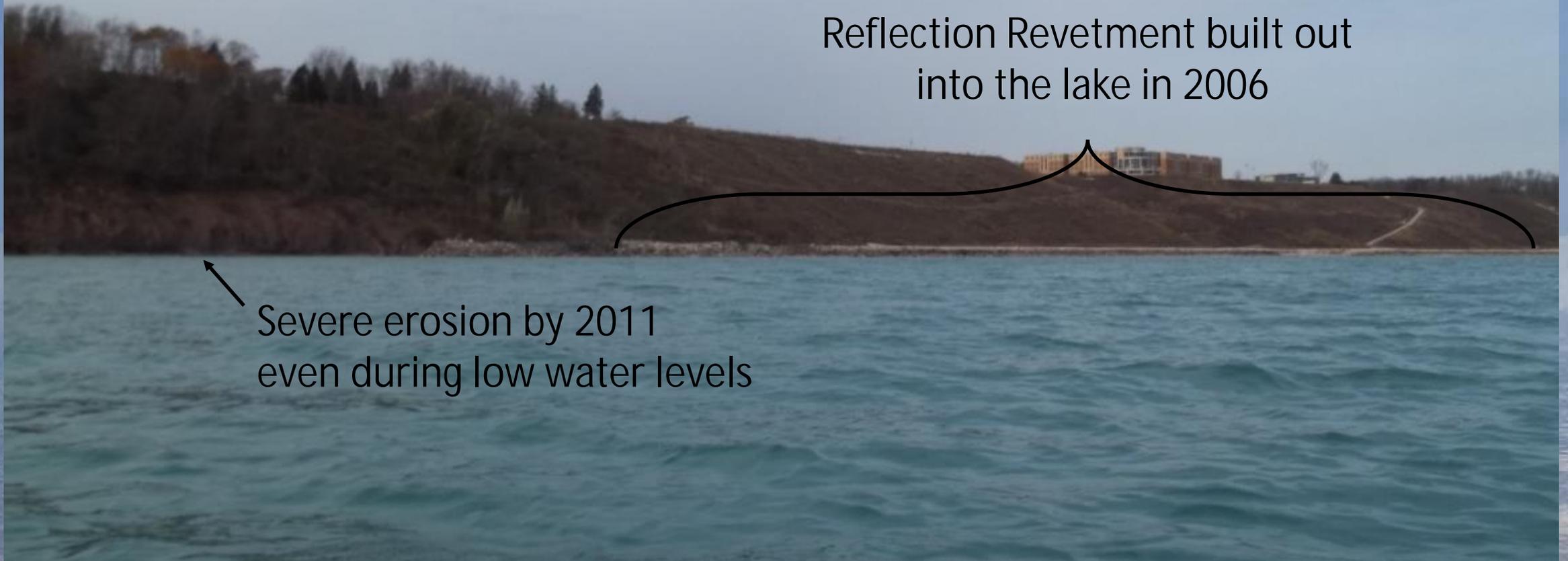


N

Reflection Revetment built out
into the lake in 2006



Severe erosion by 2011
even during low water levels



Updrift



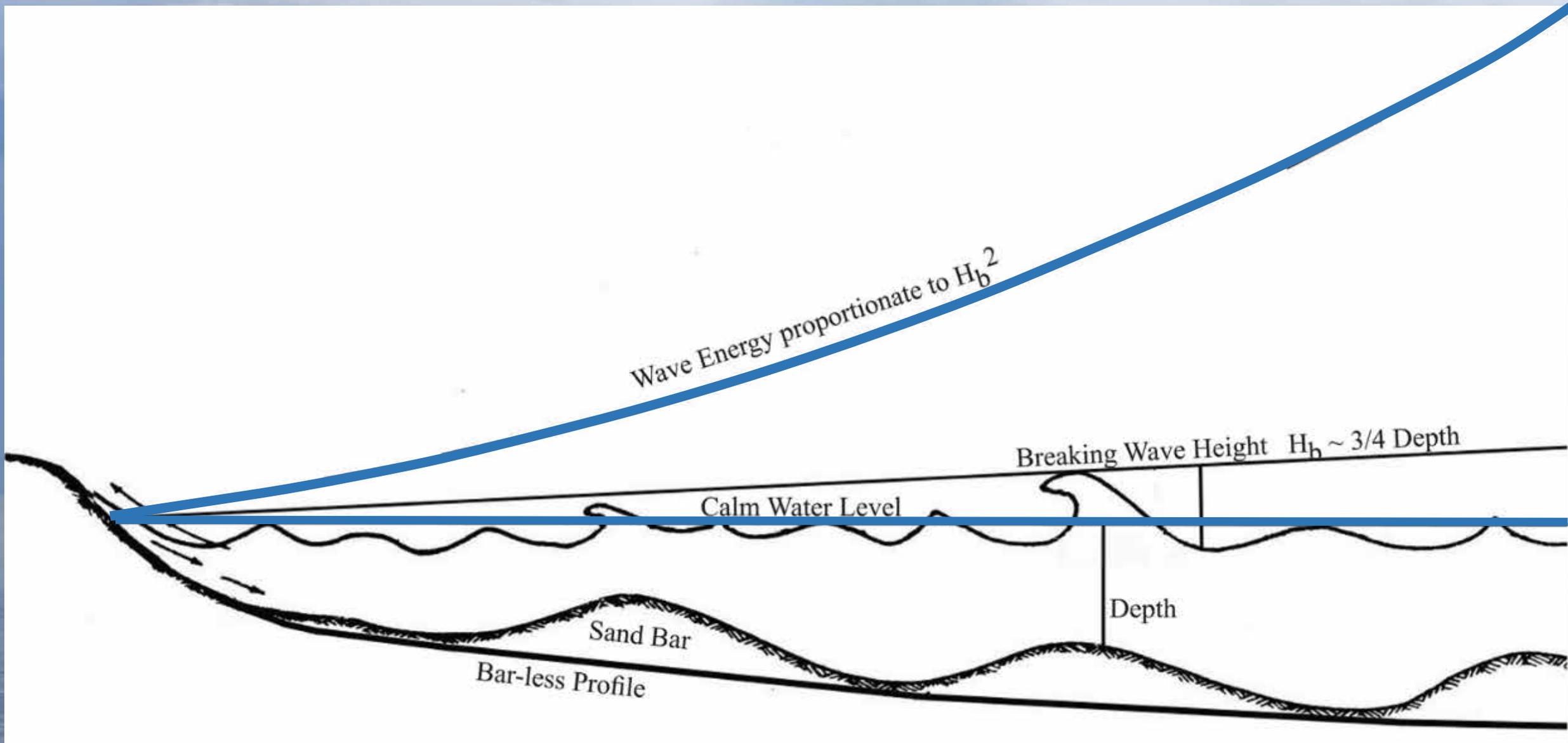
2011

Downdrift Erosion

Revetment reflection causes
near shore sand drift to
bypass adjacent shoreline



11/30/2011



Wave Energy proportionate to H_b^2

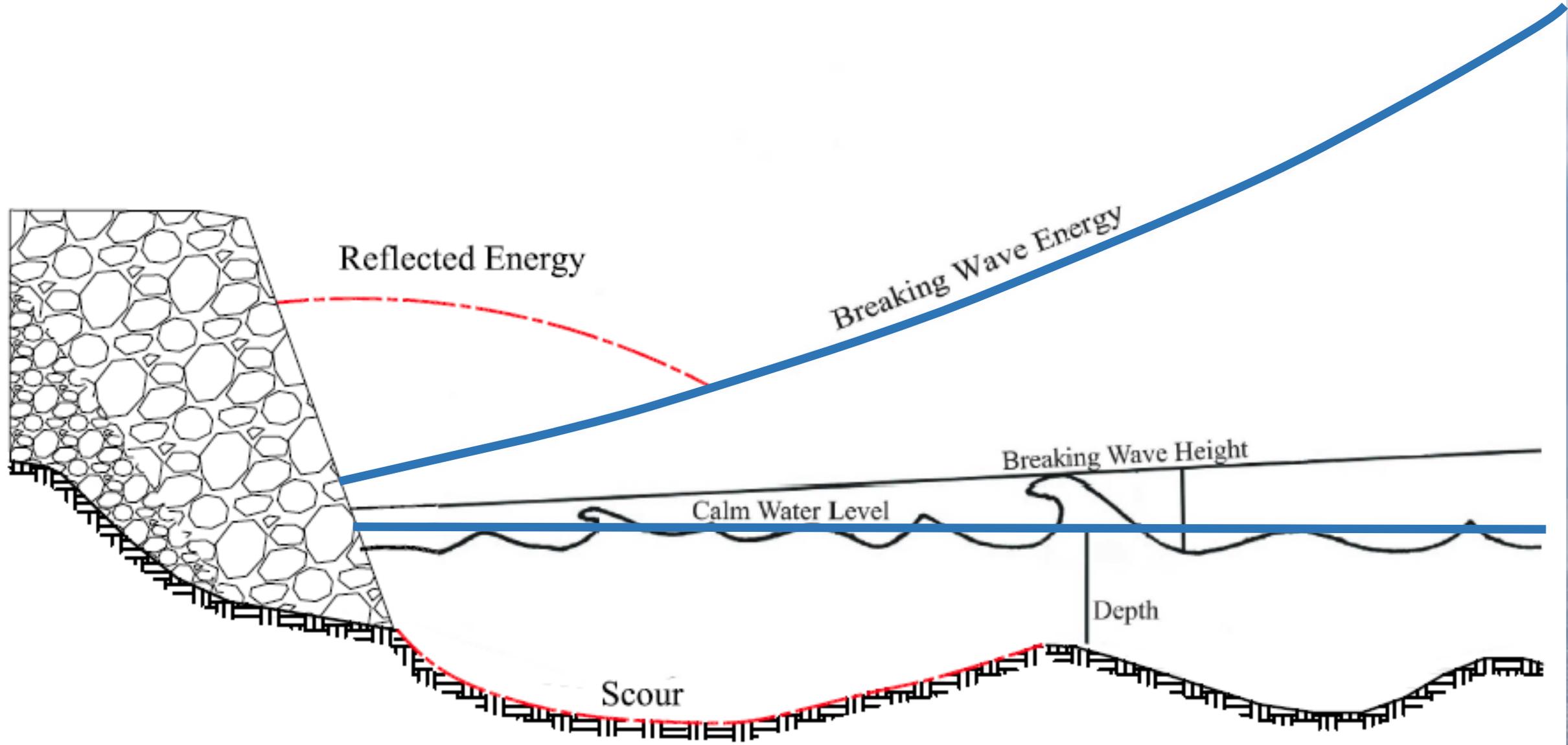
Breaking Wave Height $H_b \sim 3/4$ Depth

Calm Water Level

Depth

Sand Bar

Bar-less Profile



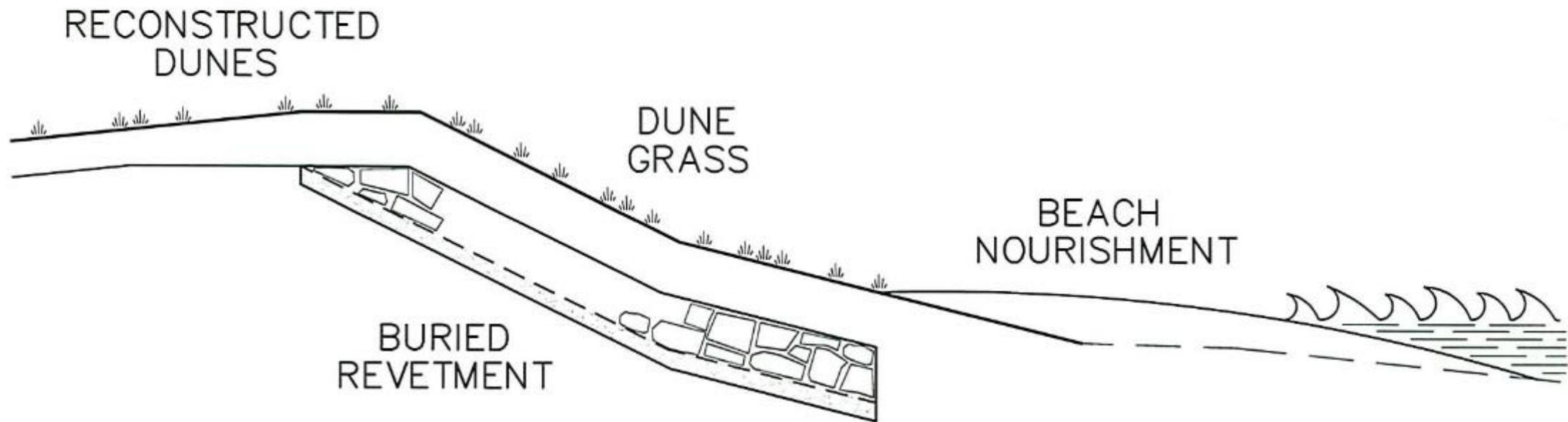
Give the lake and beach plenty of room to exercise its natural dynamics without interference at common water levels

THIS



NOT THIS

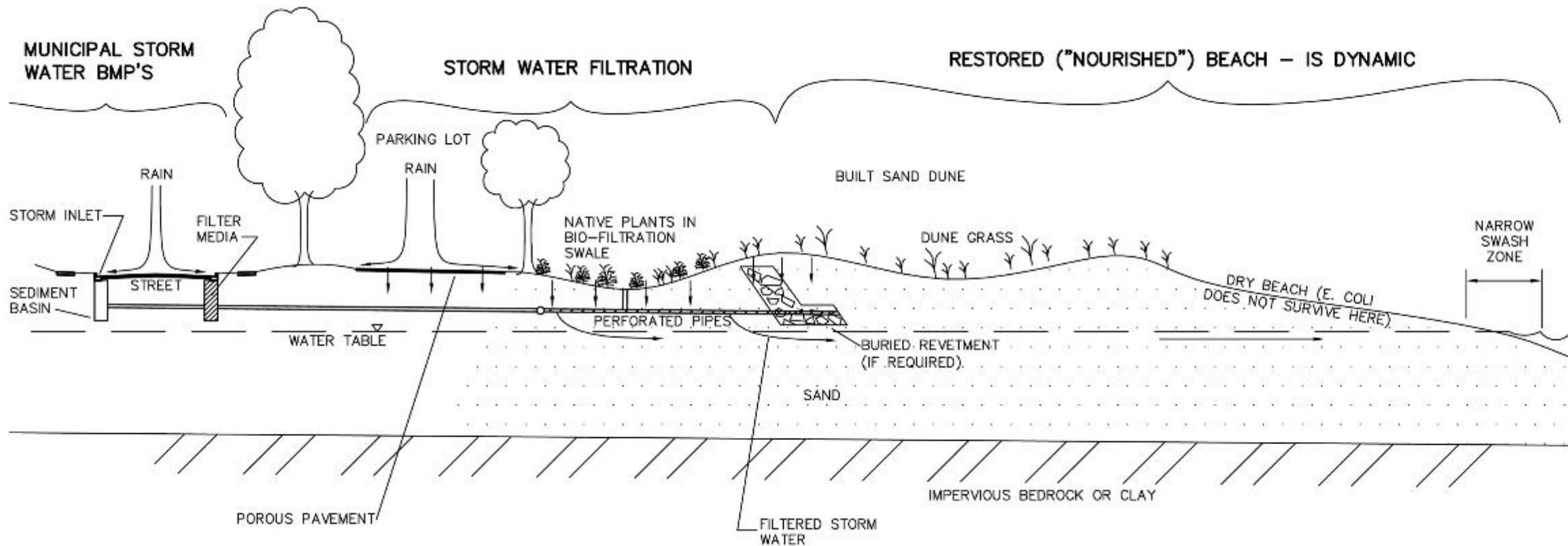




Inland ("Buried") Revetment Construction







Questions?

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