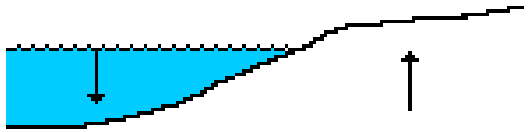
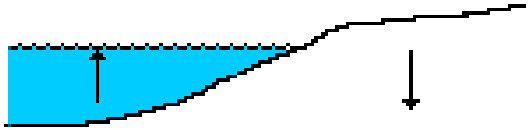
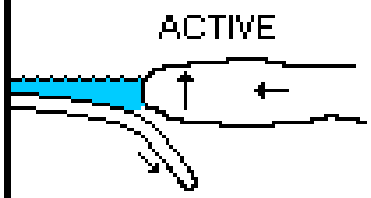
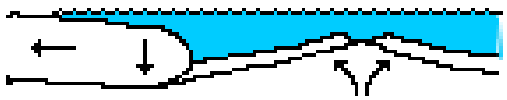
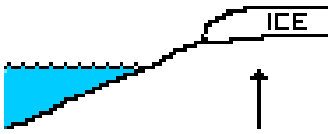
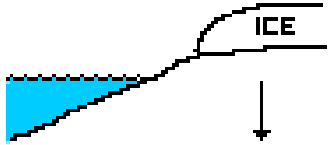
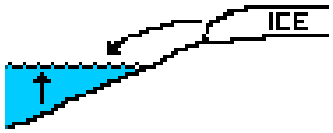
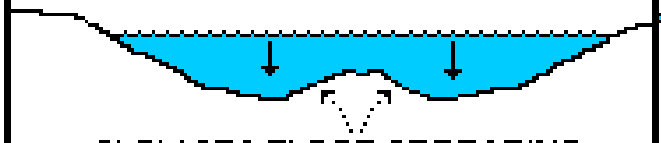
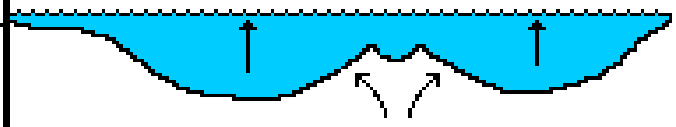
Coast Types:

1. Emergent vs. Submergent
2. ~~Primary vs. Secondary~~
3. Erosion vs. Deposition

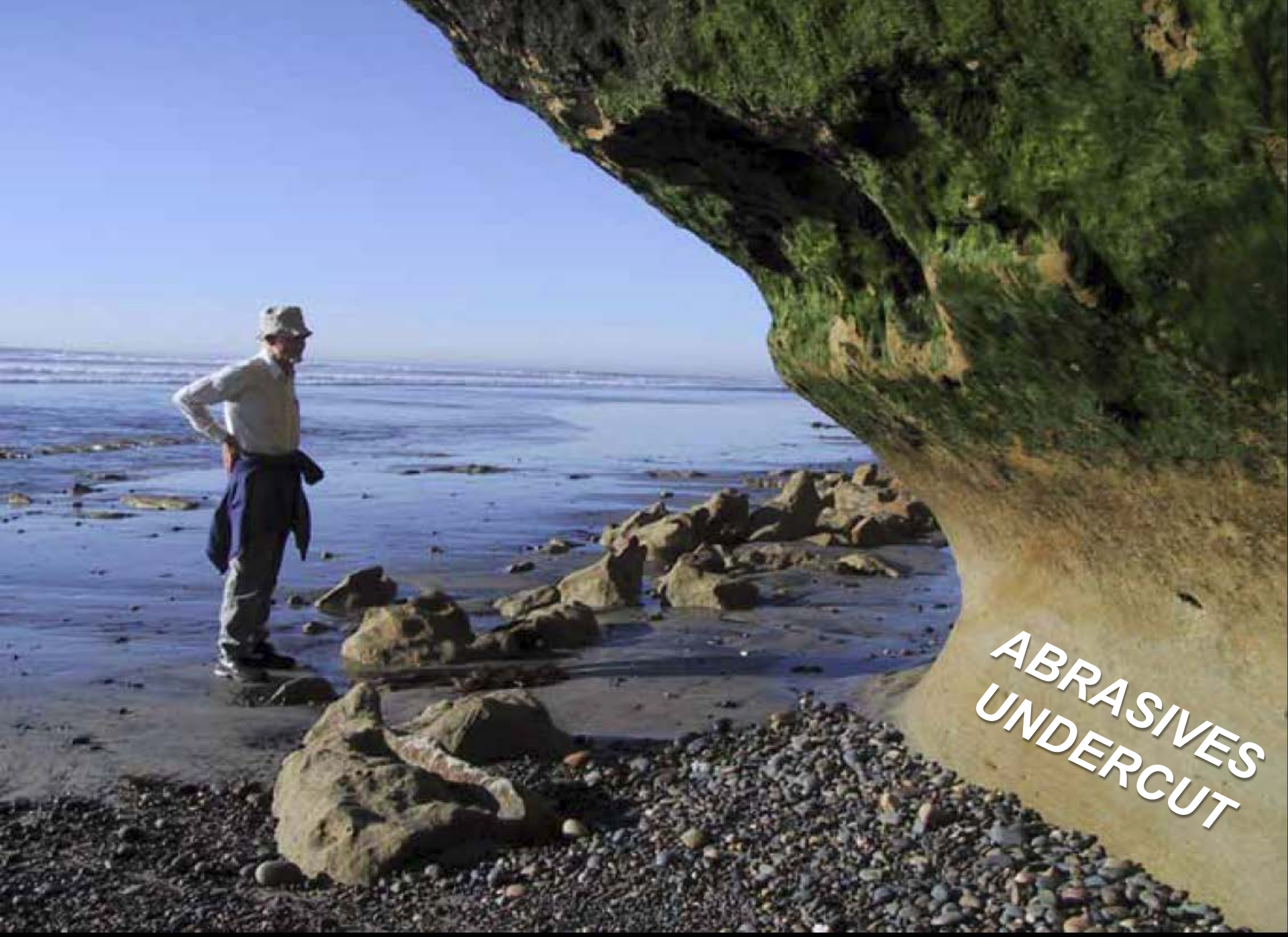
		EMERGENCE	SUBMERGENCE
			
CHANGES ON LAND (effects are local)	**TECTONIC**	 	
	ISOSTATIC		
CHANGES AT SEA (effects are world-wide = eustatic)	**GLACIAL**		
	SEA FLOOR SPREADING	 SLOW SEA FLOOR SPREADING	 RAPID SEA FLOOR SPREADING

EROSION


847

HYDRAULIC ACTION

ABRASIVES

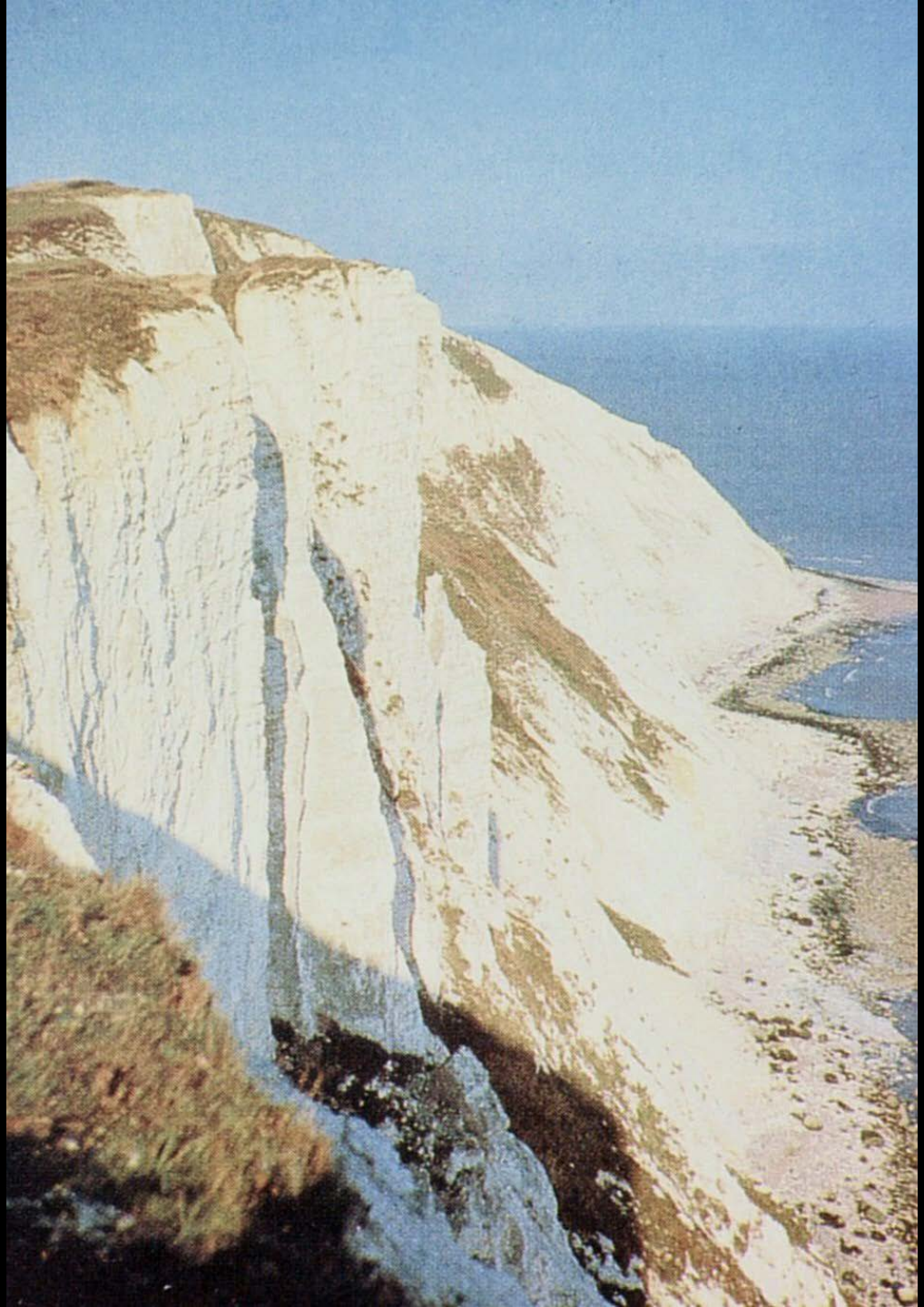


03 k5-4

Solana Beach January 2003

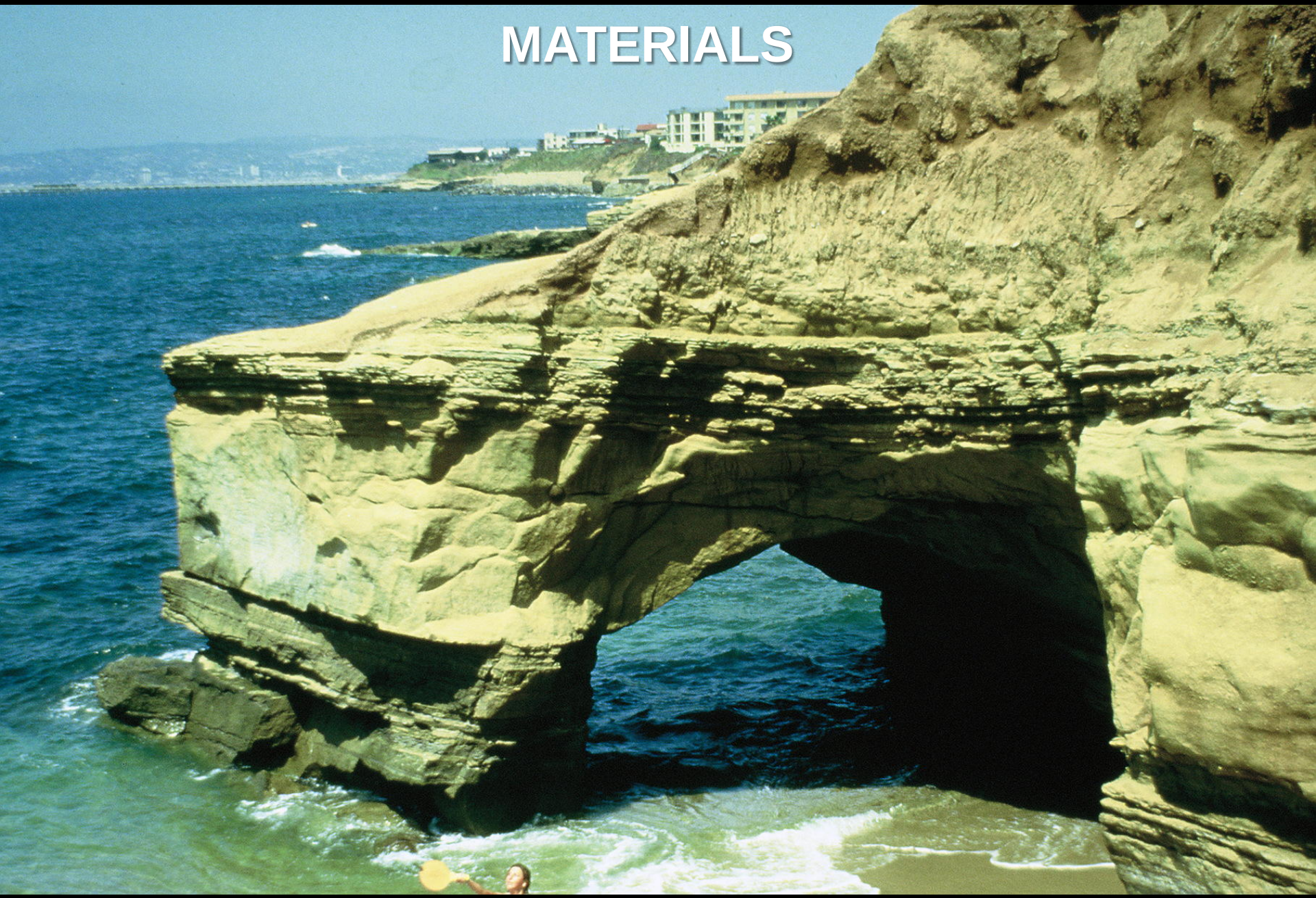
UNDERCUT COASTS COLLAPSE TO FROM CLIFFS

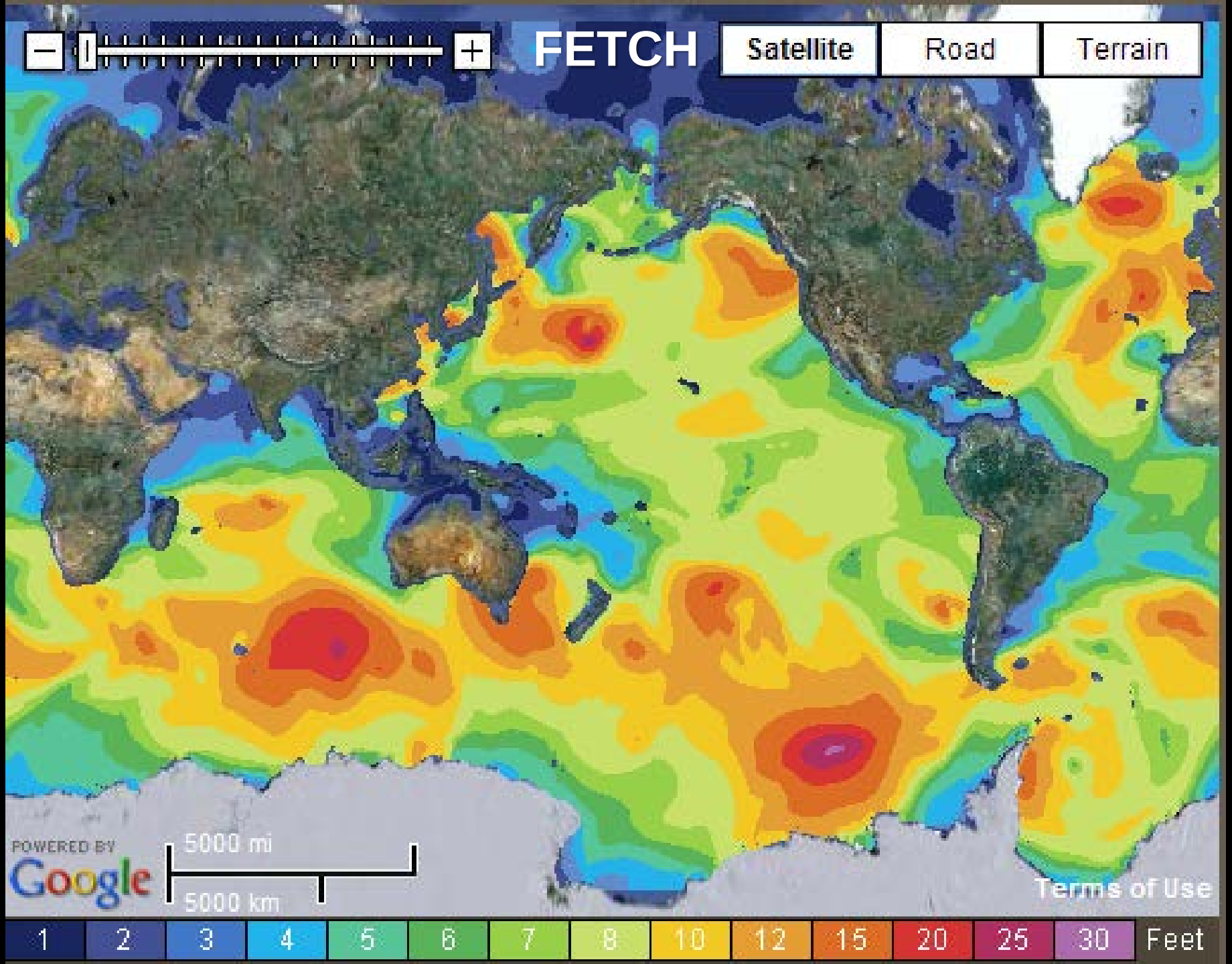
SOLUTION

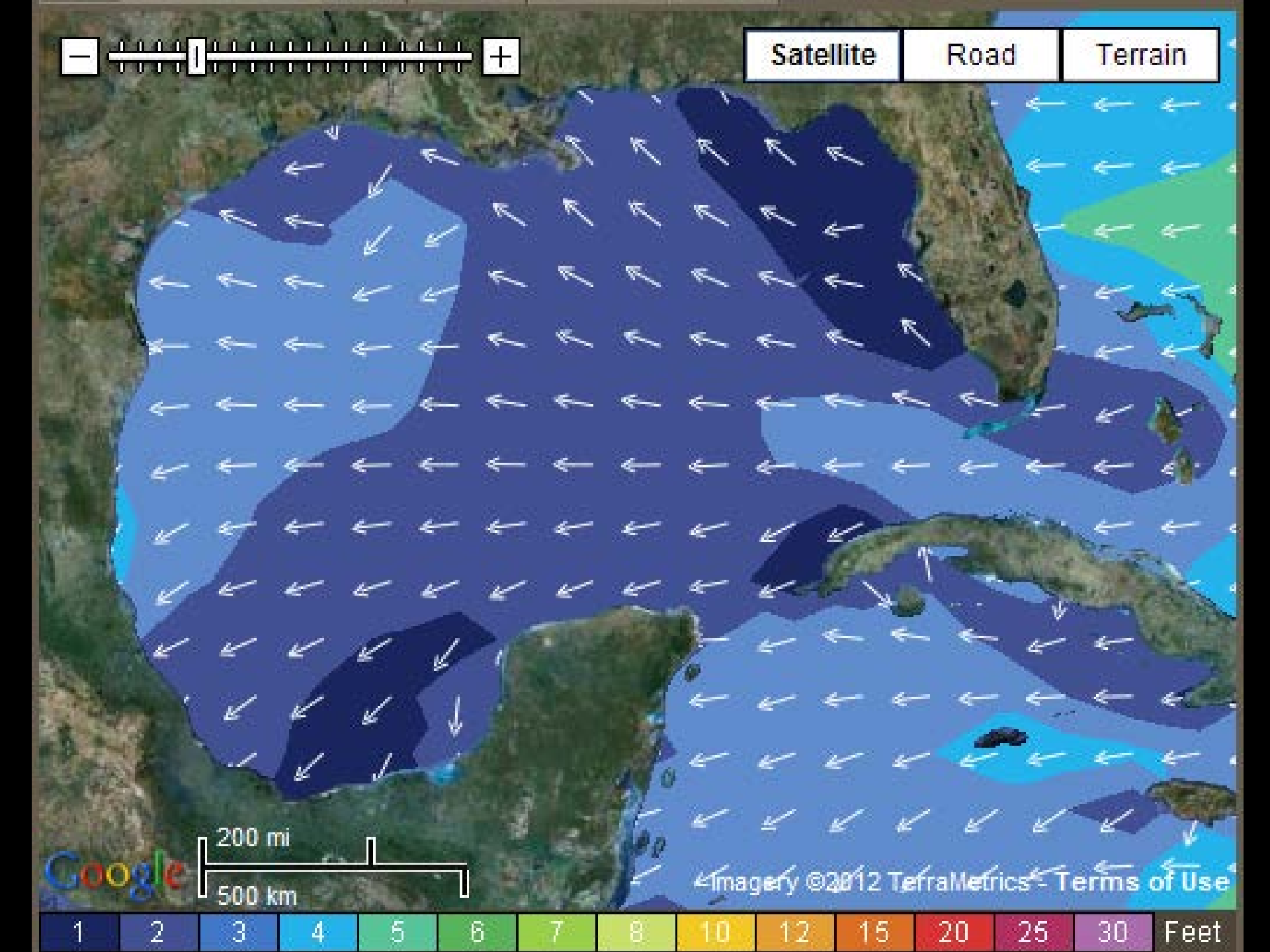


RAPID EROSION

MATERIALS




FETCH
Satellite
Road
Terrain
POWERED BY
Google
5000 mi
5000 km
Terms of Use
1
2
3
4
5
6
7
8
10
12
15
20
25
30
Feet

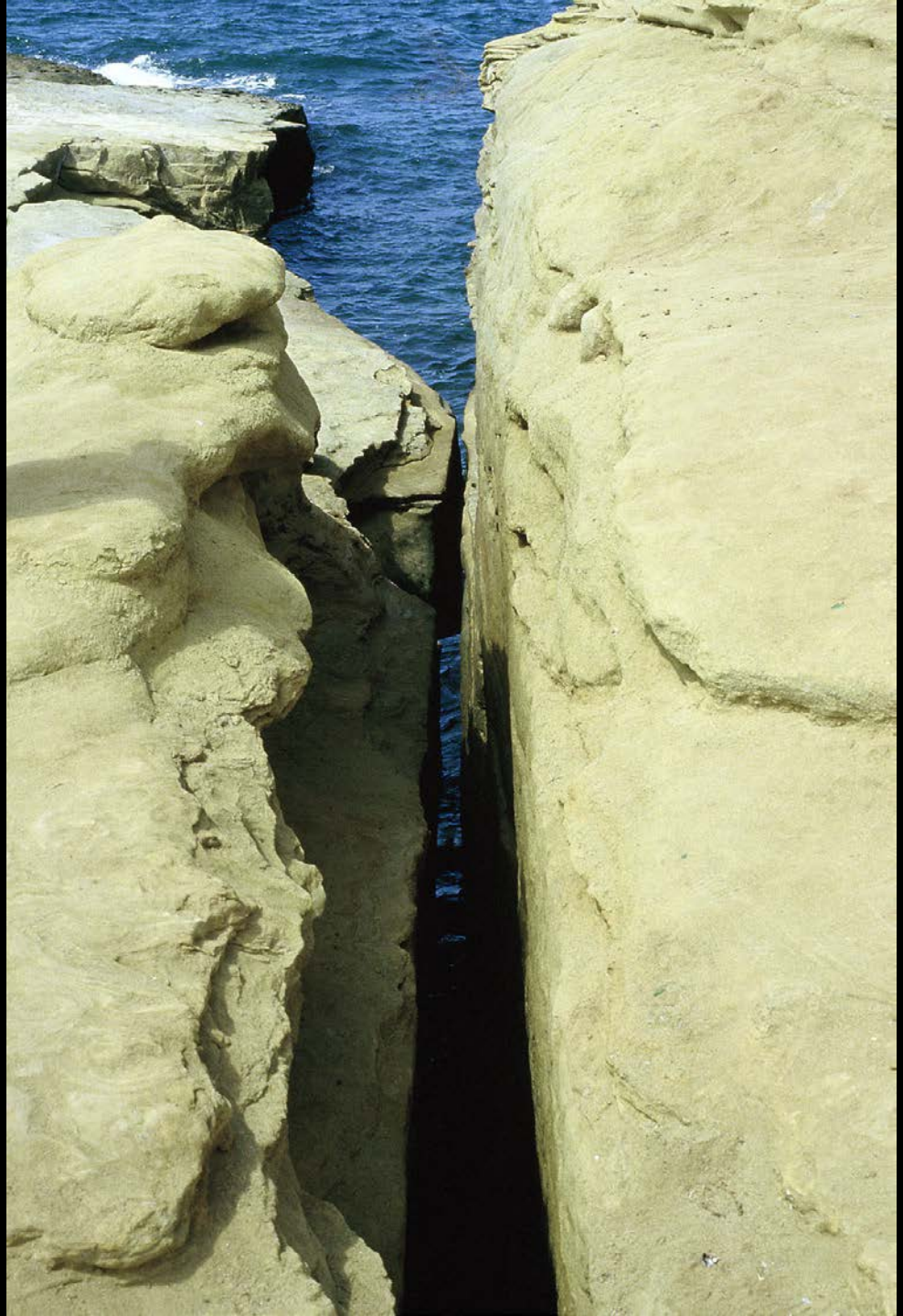

Satellite
Road
Terrain
200 mi
500 km
Google
Imagery ©2012 TerraMetrics - Terms of Use
1
2
3
4
5
6
7
8
10
12
15
20
25
30
Feet

TIDAL RANGE (less is more)

Effects of Wave Erosion

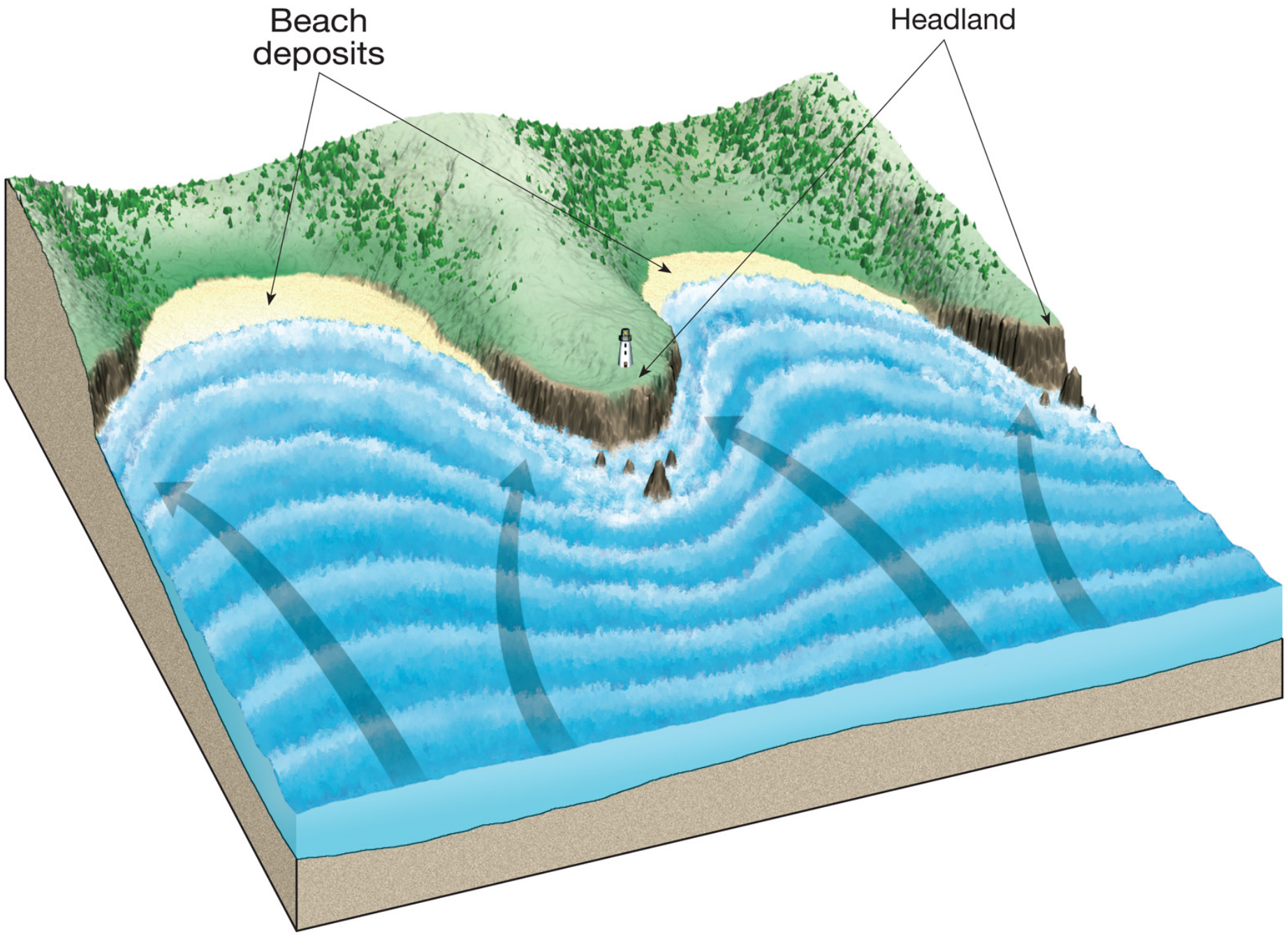
a. Differential erosion
b. Coastal straightening
c. Leveling

Differential Erosion



Coastal Straightening

Figure 13.8



0 %

Loading

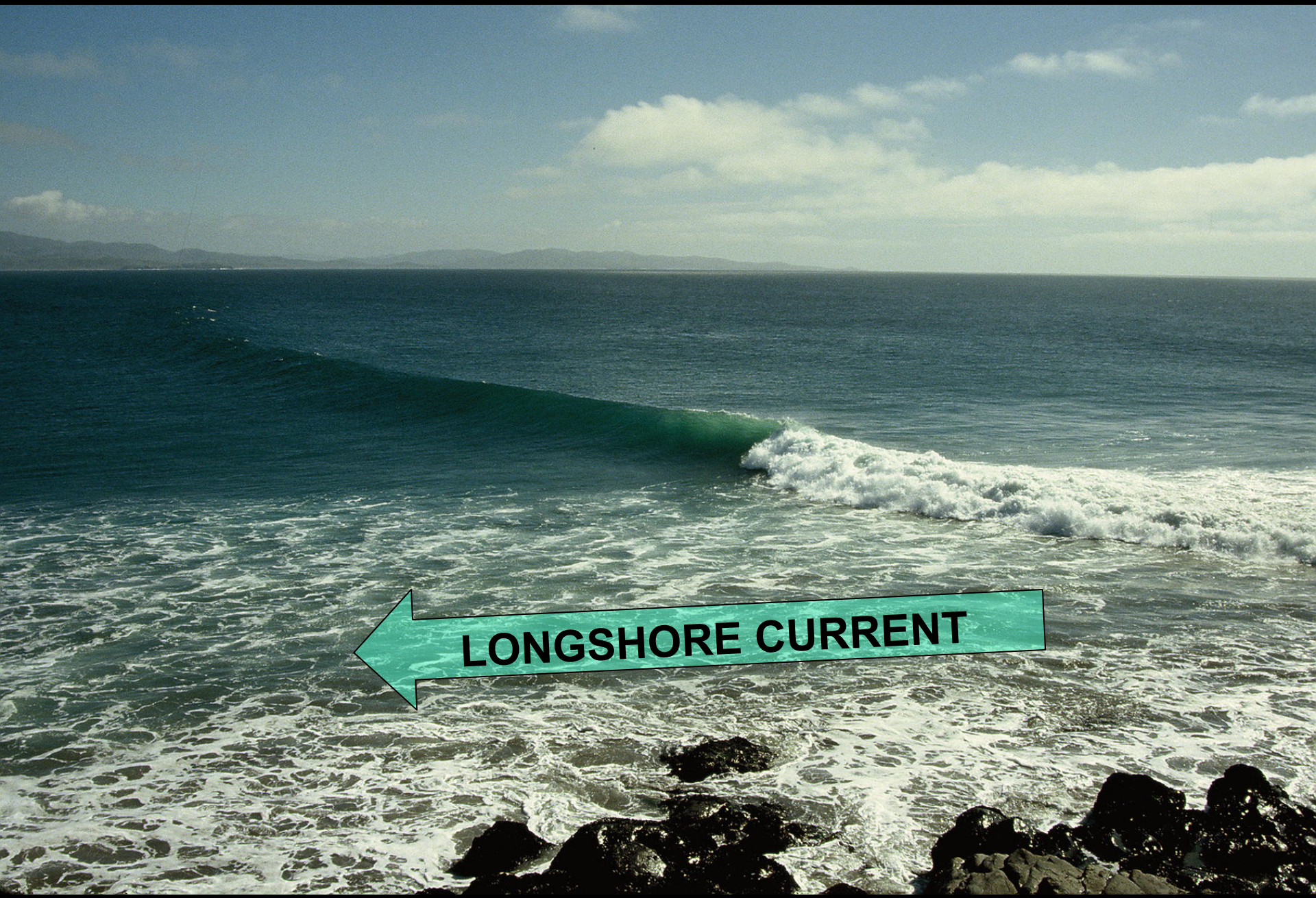

LONGSHORE CURRENT

Figure 13.10

DEPOSITION

Sources of Sediment

1. local

Sources of Sediment

1. Local
2. Rivers

Transportation of Sediment is “Longshore Drift”

(= longshore transport)

Longshore Transport has 2 Components

Longshore Transport has 2 Components

0 %

Loading

Deposition of Sediment

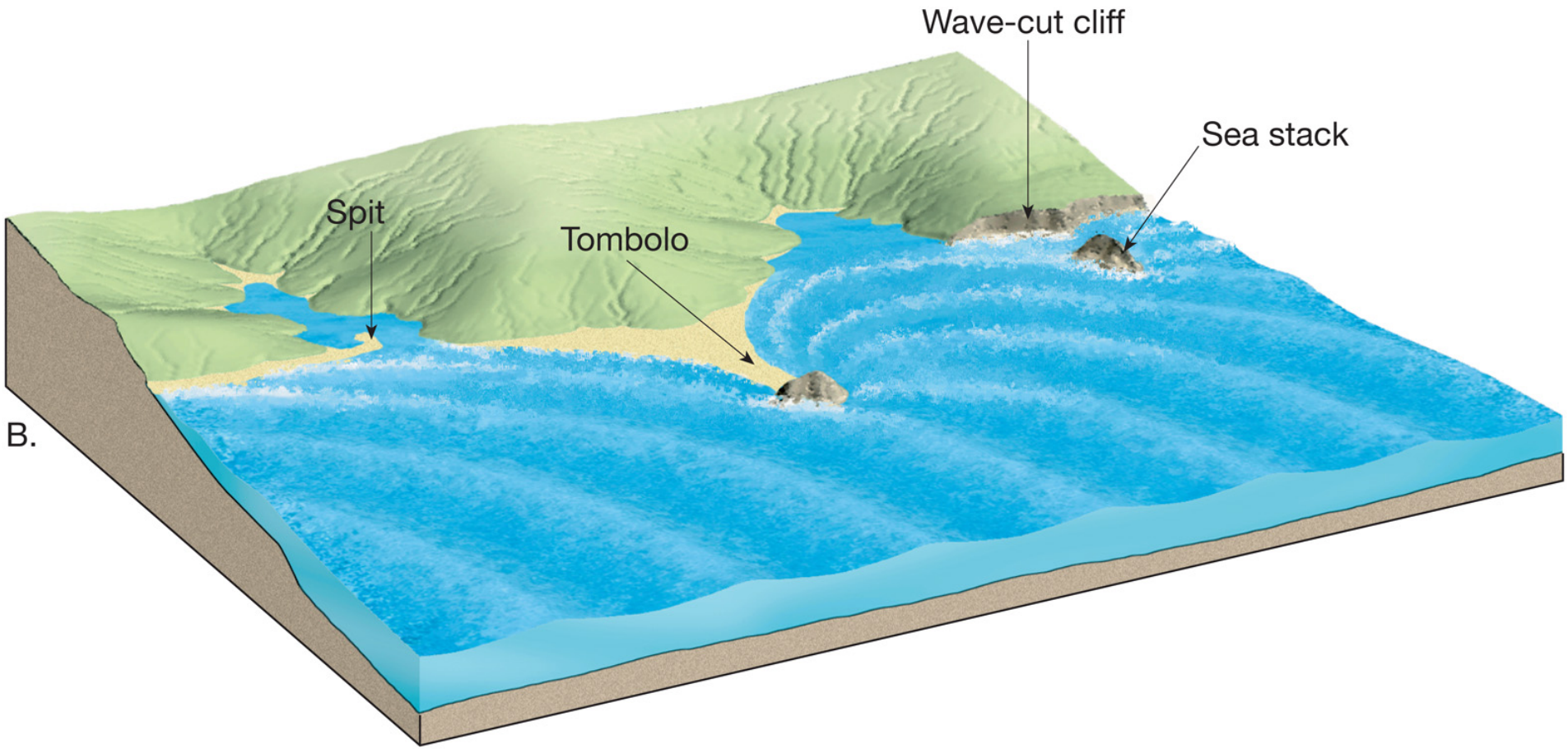

Spit

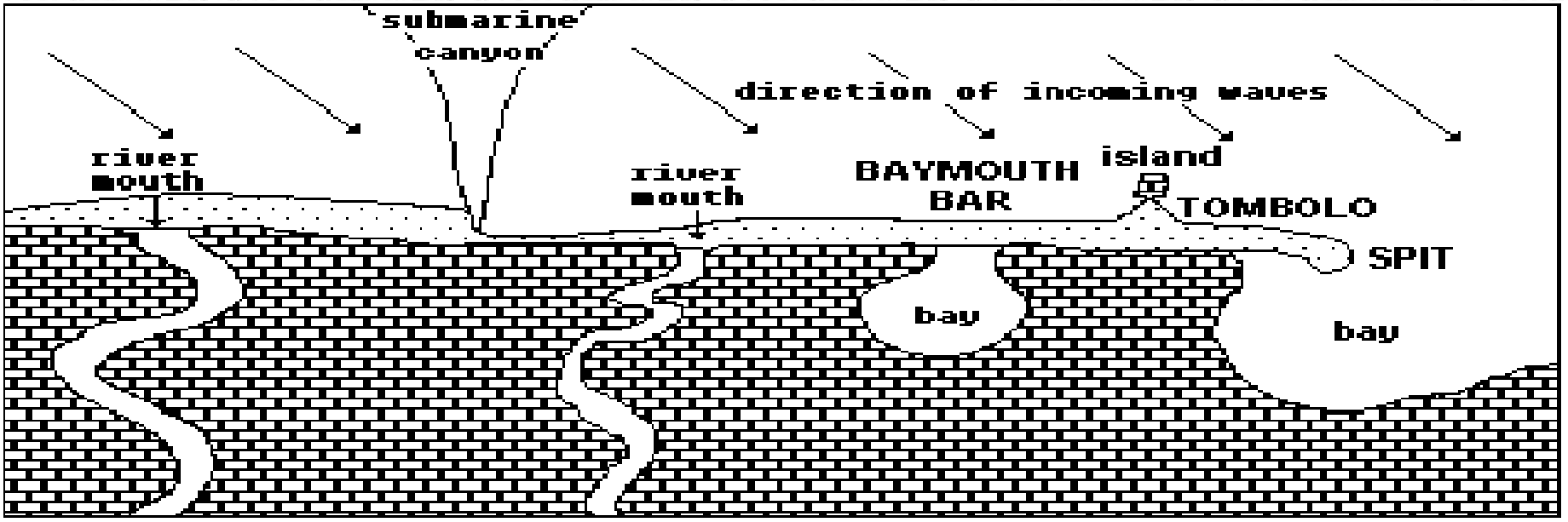
Baymouth Bars


National City
South San Diego Bay
San Diego Bay
Bonita
Crown Cove
Chula Vista
Emory Channel
Telegraph Canyon
Judson Reservoir (historica
Otay Valley
Imperial Beach
Highland Reservoir (historical)
Oneonta Slough
N
W
E
Image © 2006 DigitalGlobe
Image © 2006 TerraMetrics
© 2006 Europa Technologies
© 2005 Google

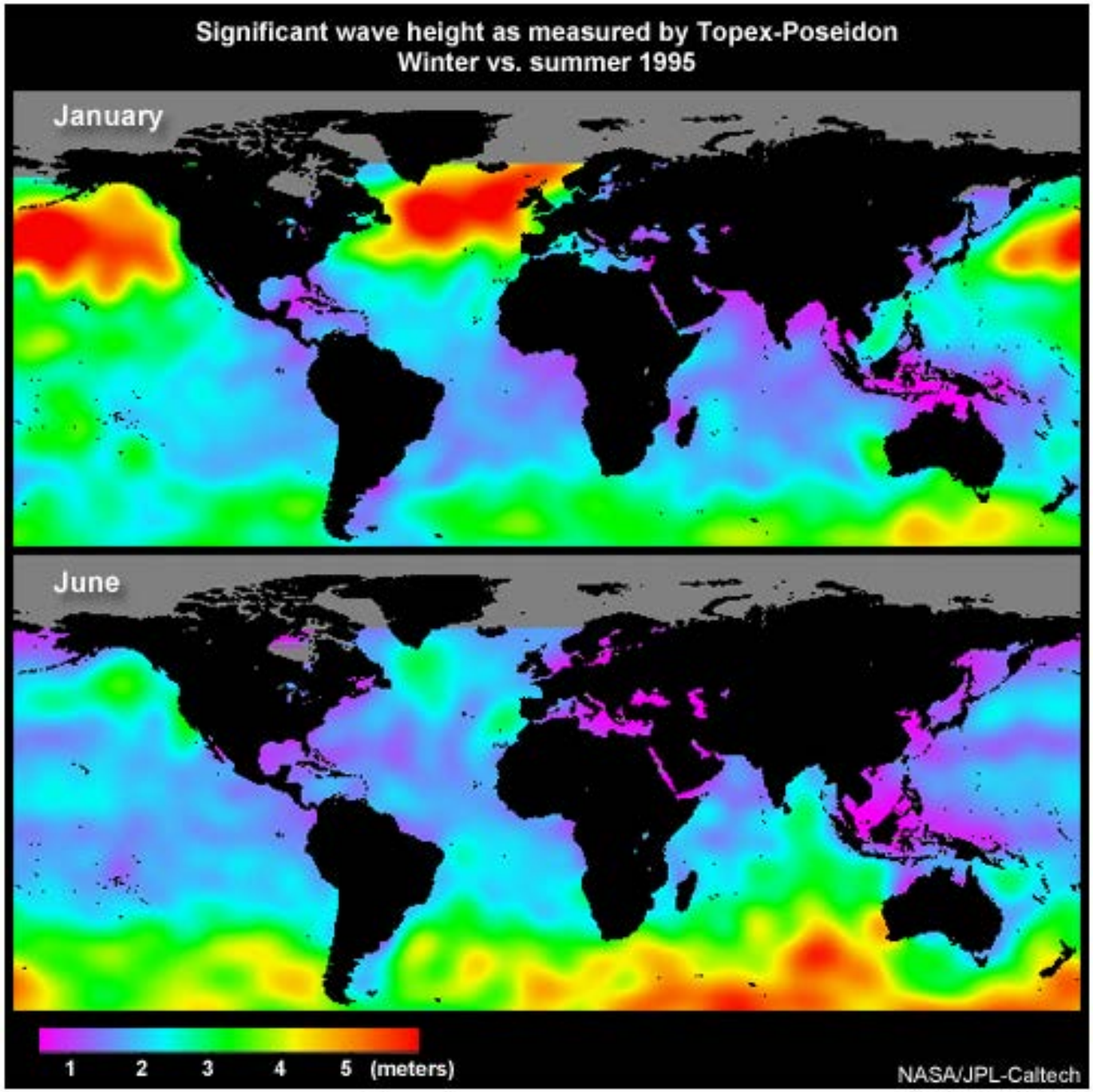

Salmon Creek
Bodega Bay
Horseshoe Cove
Campbell Cove
Bodega Rock
© 2014 Google
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data CSUMB SFML, CA OPC

Figure 13.14b (left)



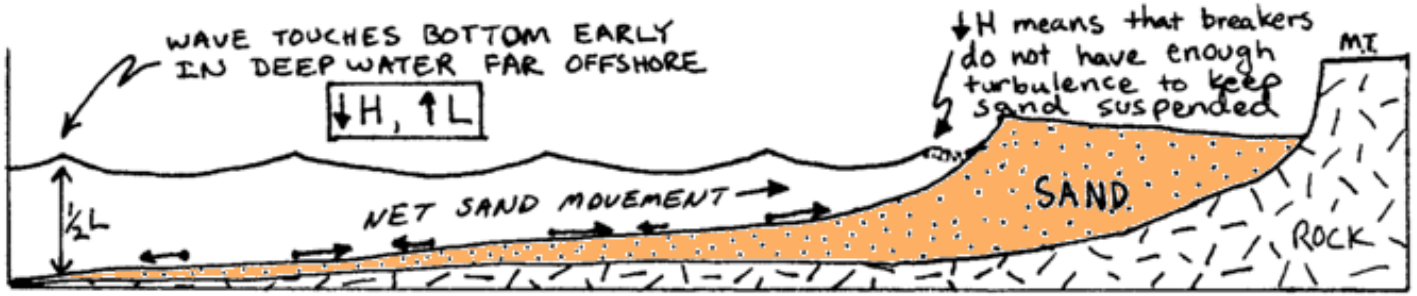

submarine
canyon
direction of incoming waves
river
mouth
river
mouth
BAYMOUTH
BAR
island
TOMBOLO
SPIT
bay
bay

Seasonal changes

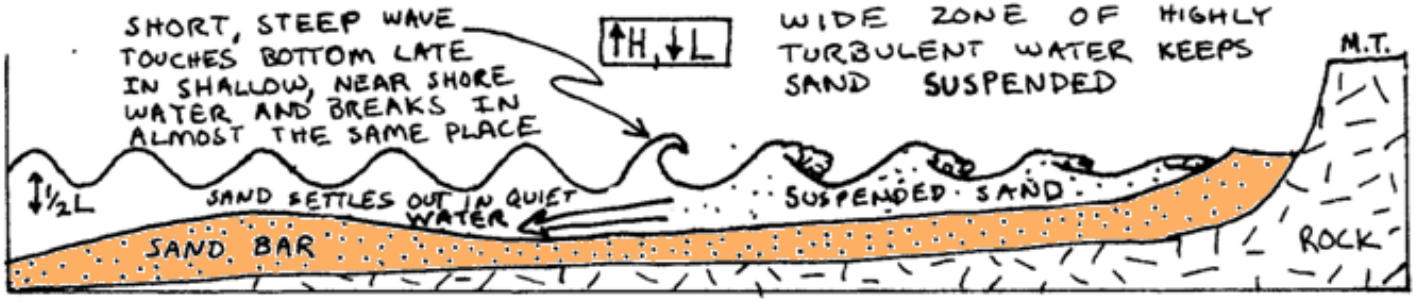

Significant wave height as measured by Topex-Poseidon
Winter vs. summer 1995
January
June
1
2
3
4
5
(meters)
NASA/JPL-Caltech

SAND TRANSPORT PERPENDICULAR TO SHORE:

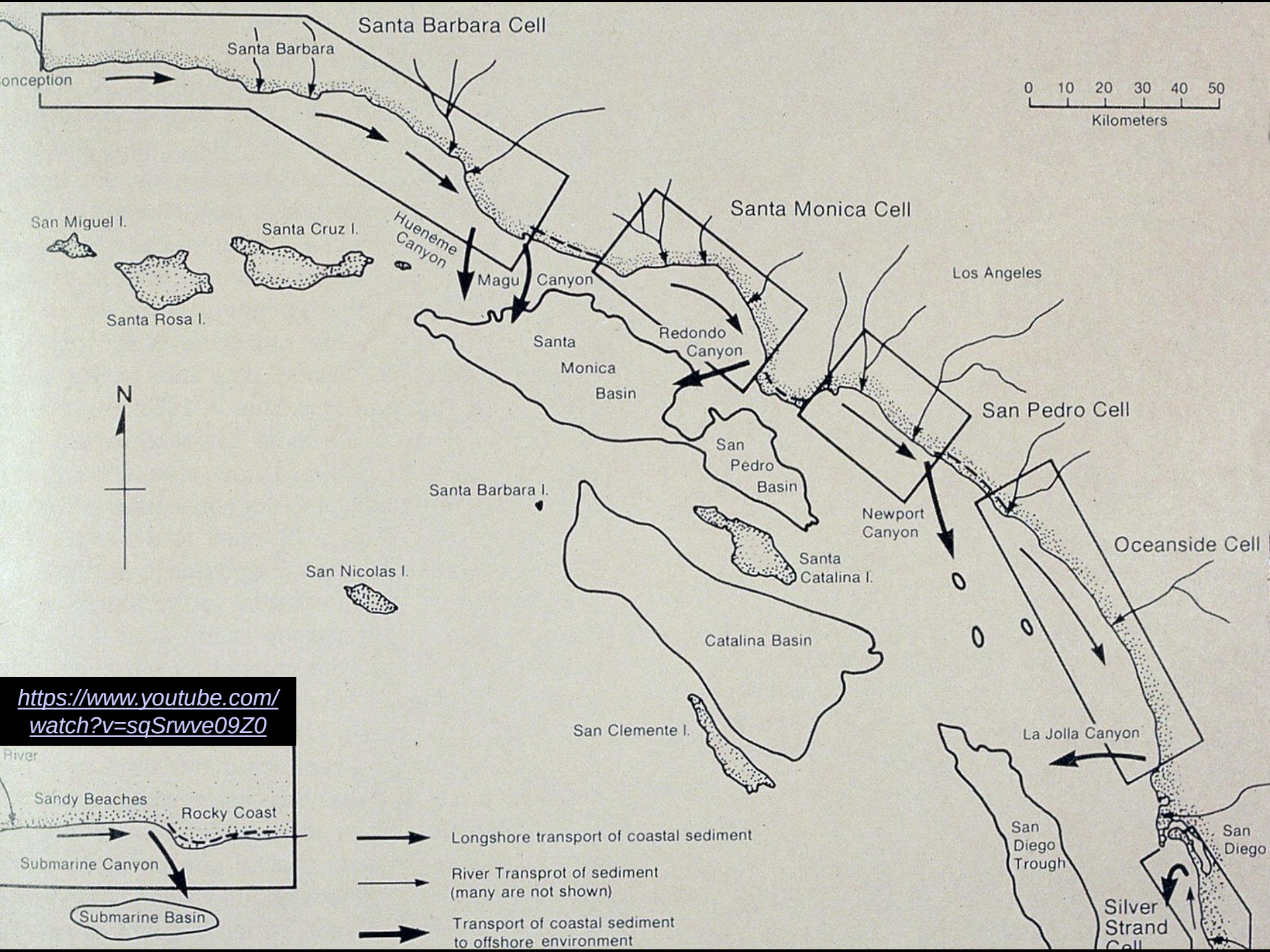
Summer



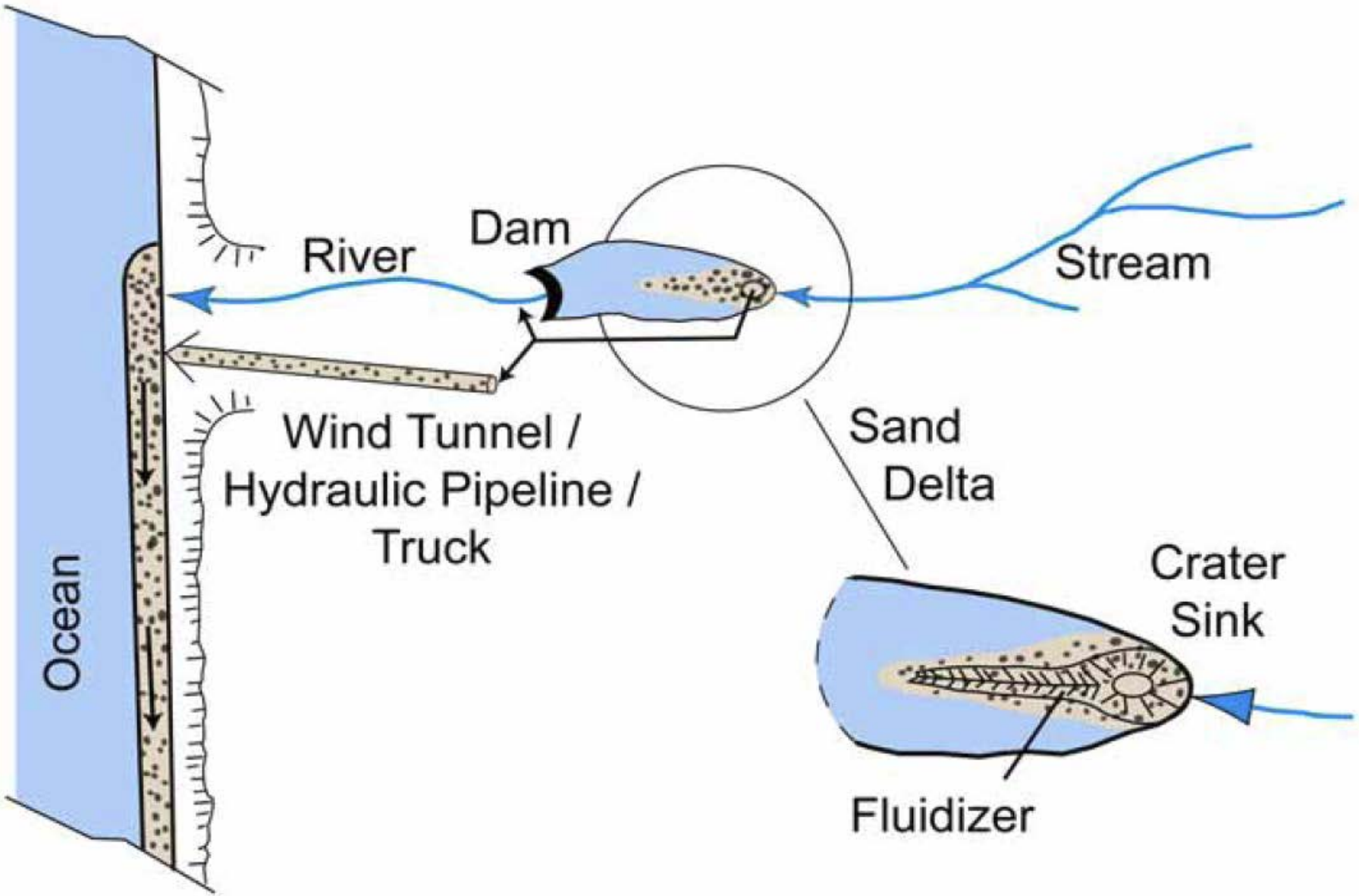
Winter




© Nick Steers



https://www.youtube.com/watch?v=sqSrwve09Z0



Schematic of a dam bypass system [after Inman, 1989].

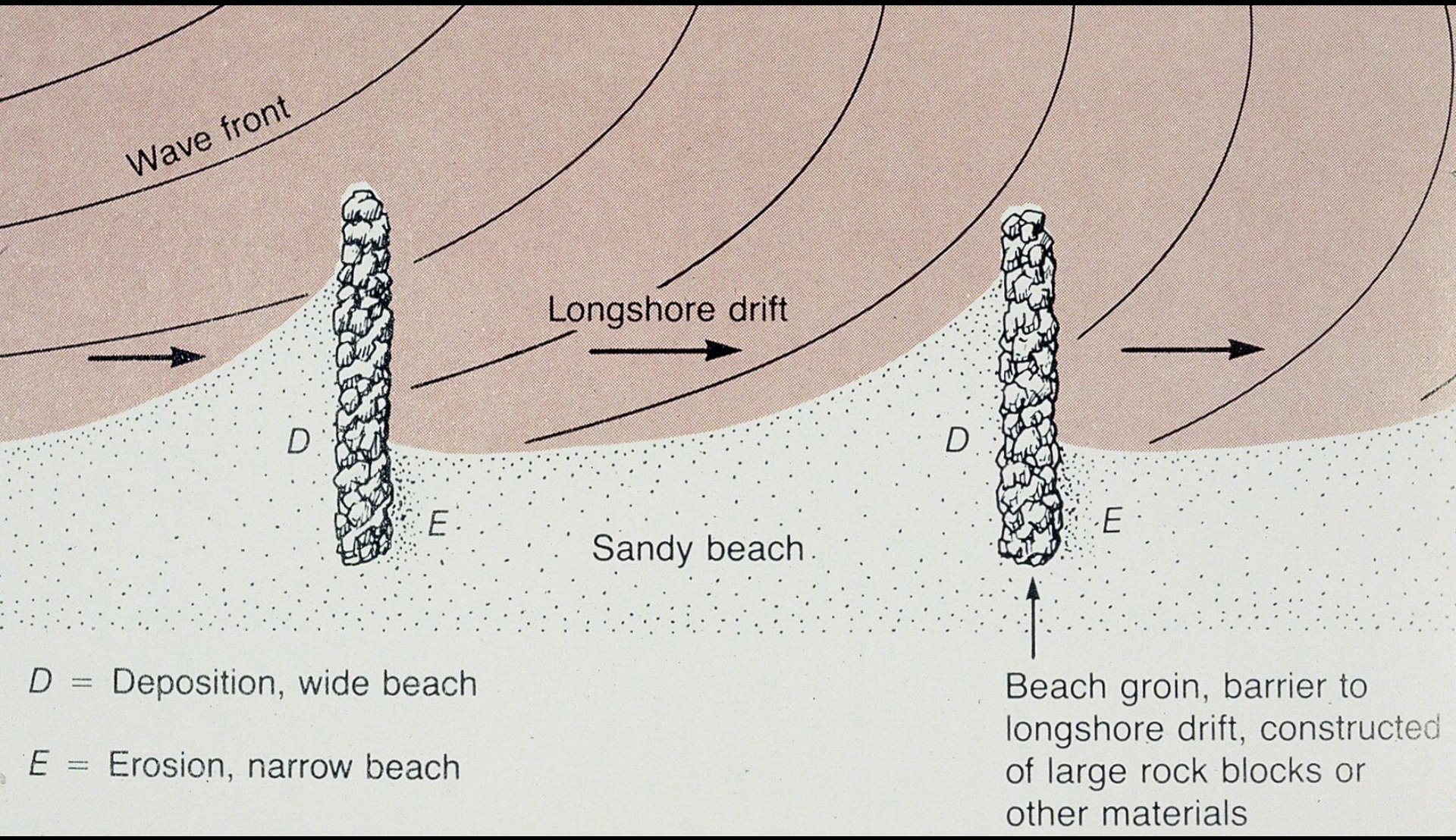

Wave front
Longshore drift
D
E
Sandy beach
D
E
D = Deposition, wide beach
E = Erosion, narrow beach
Beach groin, barrier to longshore drift, constructed of large rock blocks or other materials

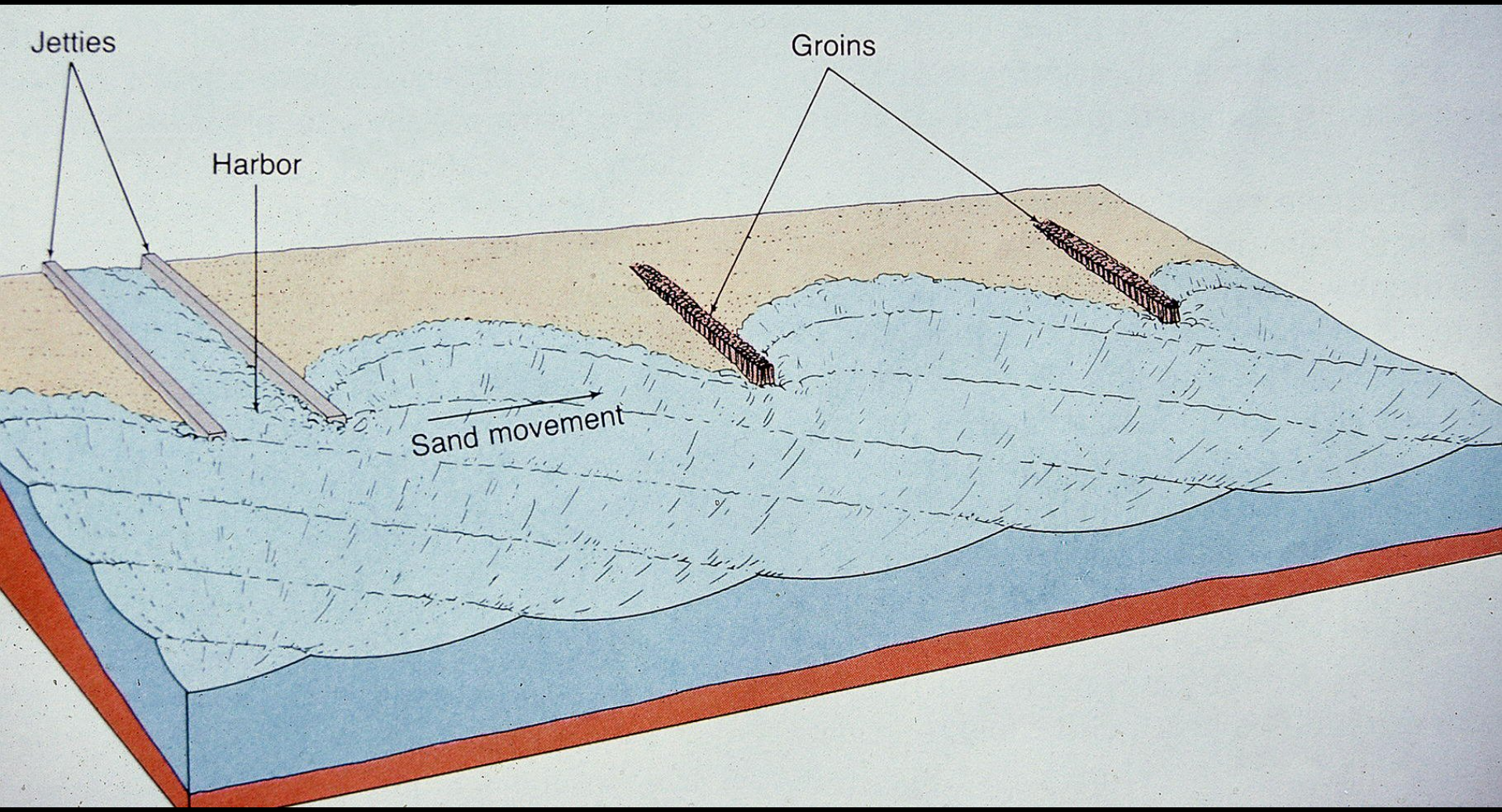
Figure 13.15

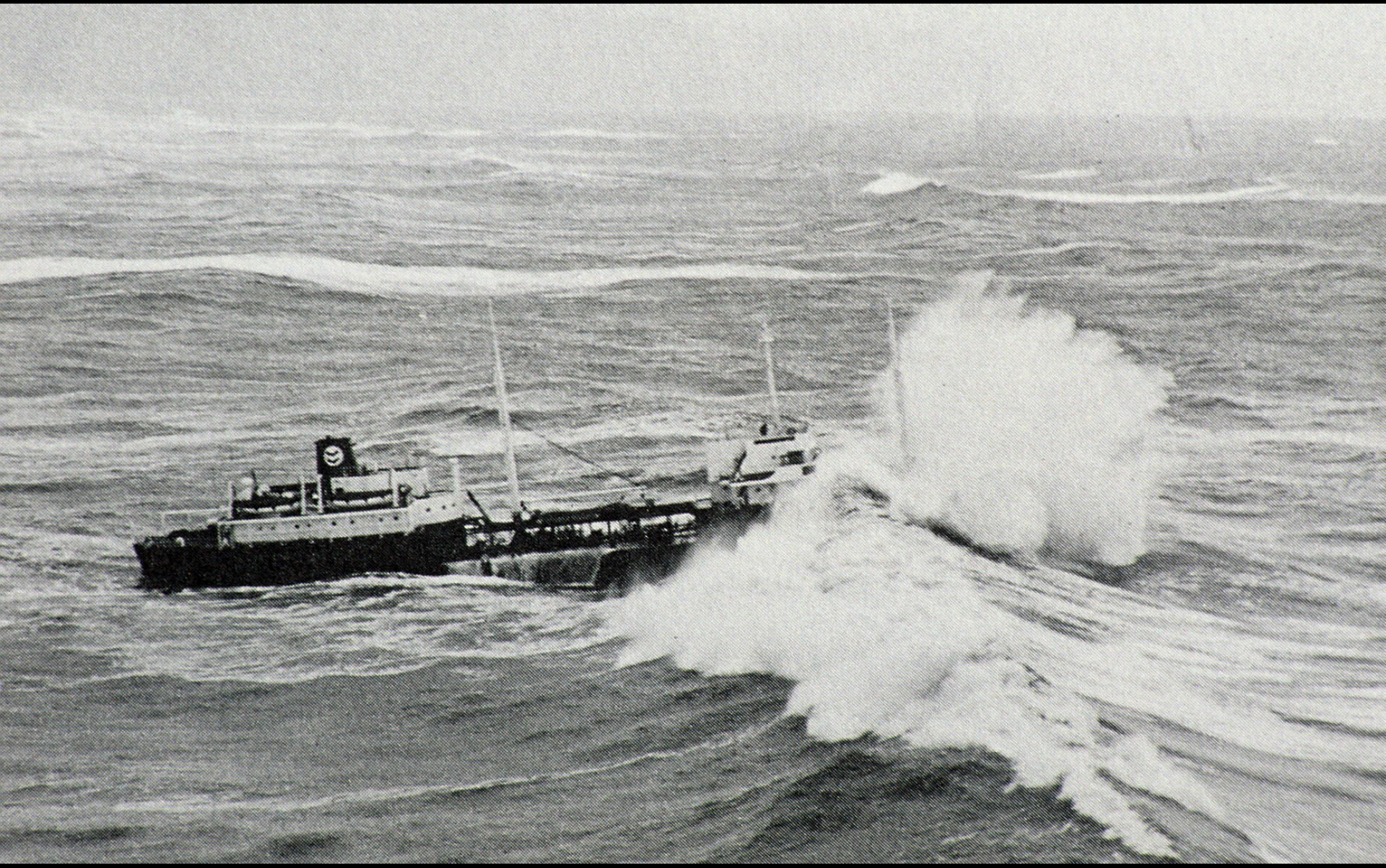
Figure 13.18a

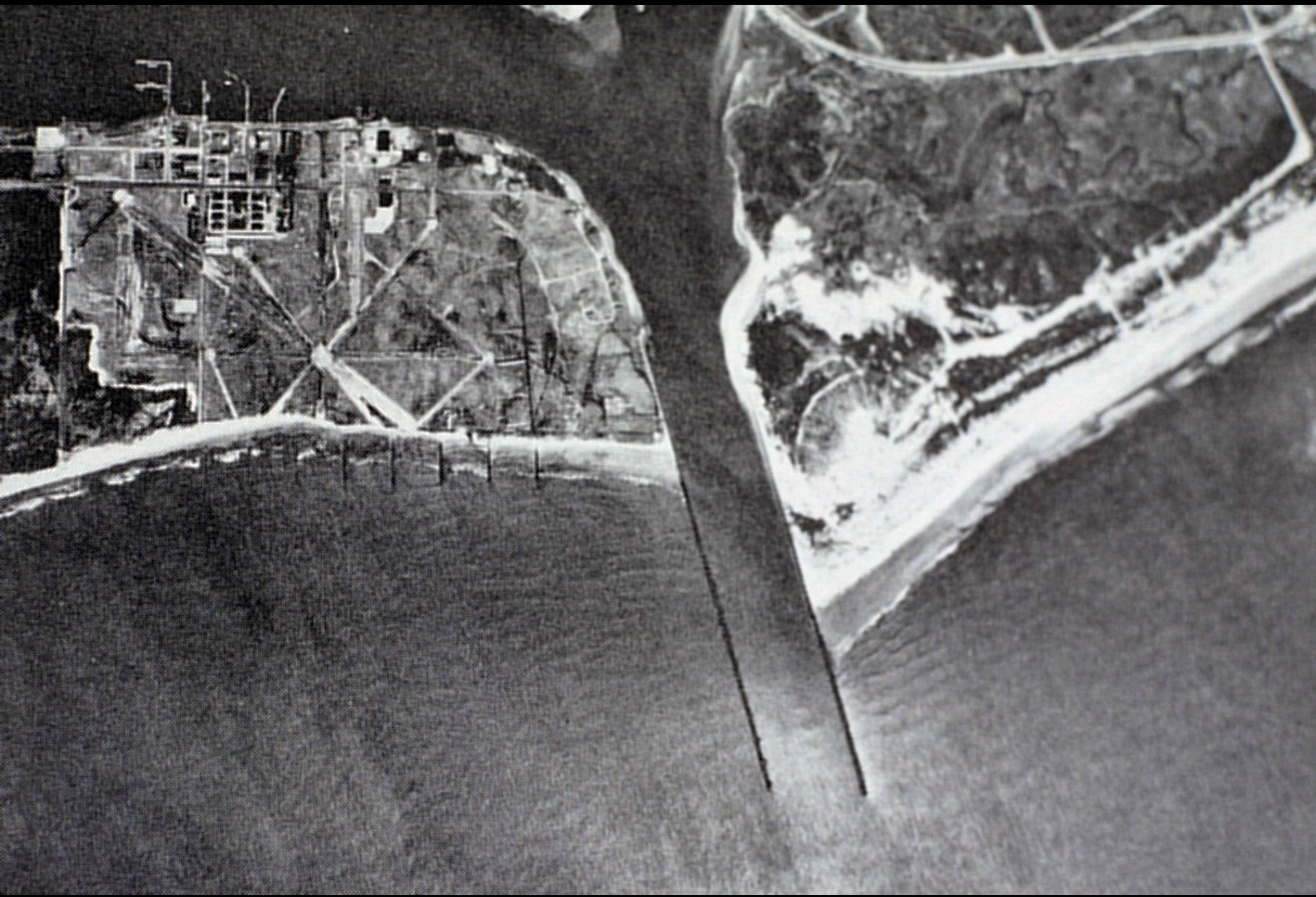
A.

Figure 13.18b

B.


Jetties
Harbor
Groins
Sand movement






Map
Satellite
Hybrid
W Ocean Blvd
47
110
S Gaffey St
S Pacific Ave
1 mi
1 km
©2005 Google - Map data ©2005 NAVTEQ™ - Terms of Use

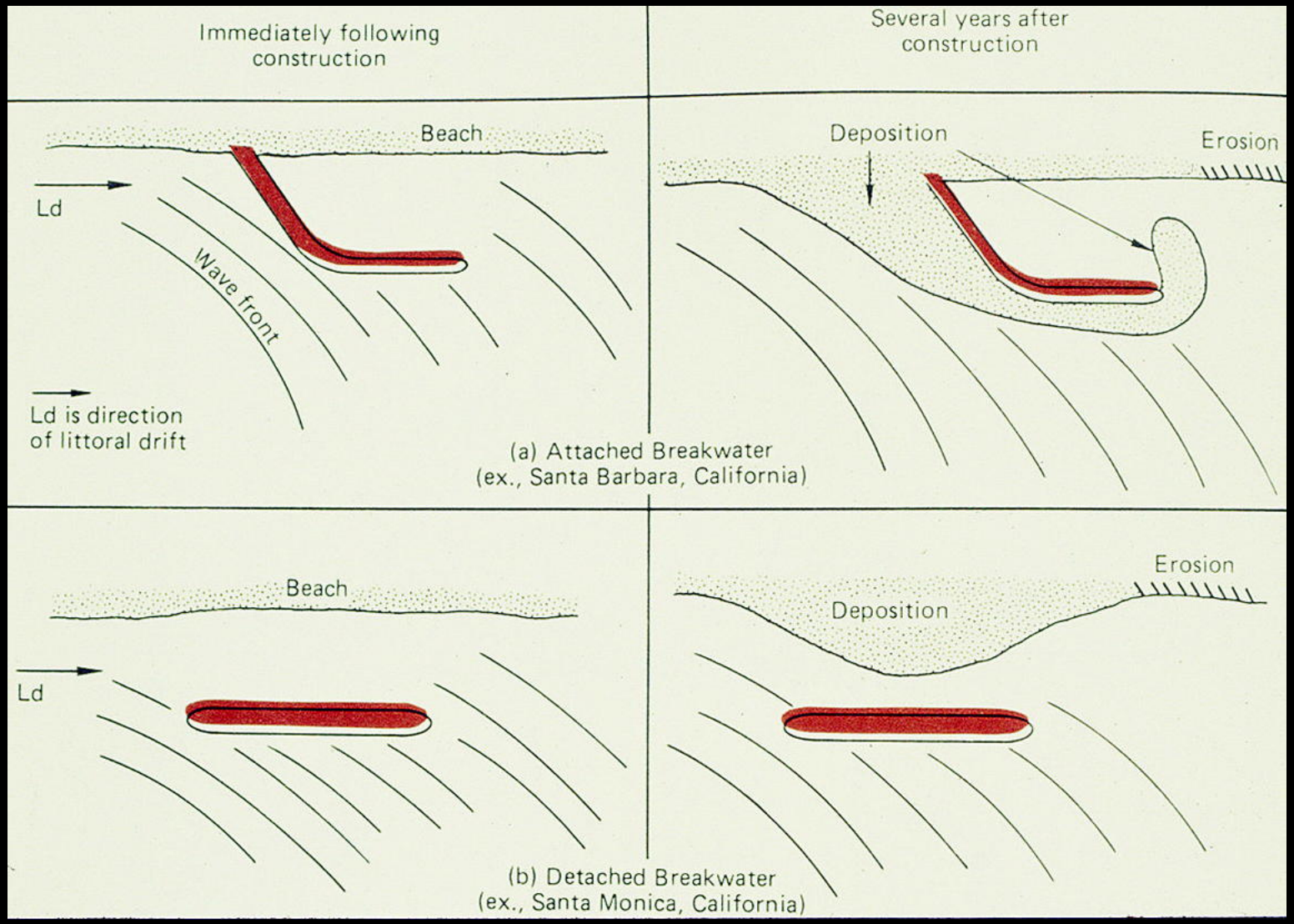
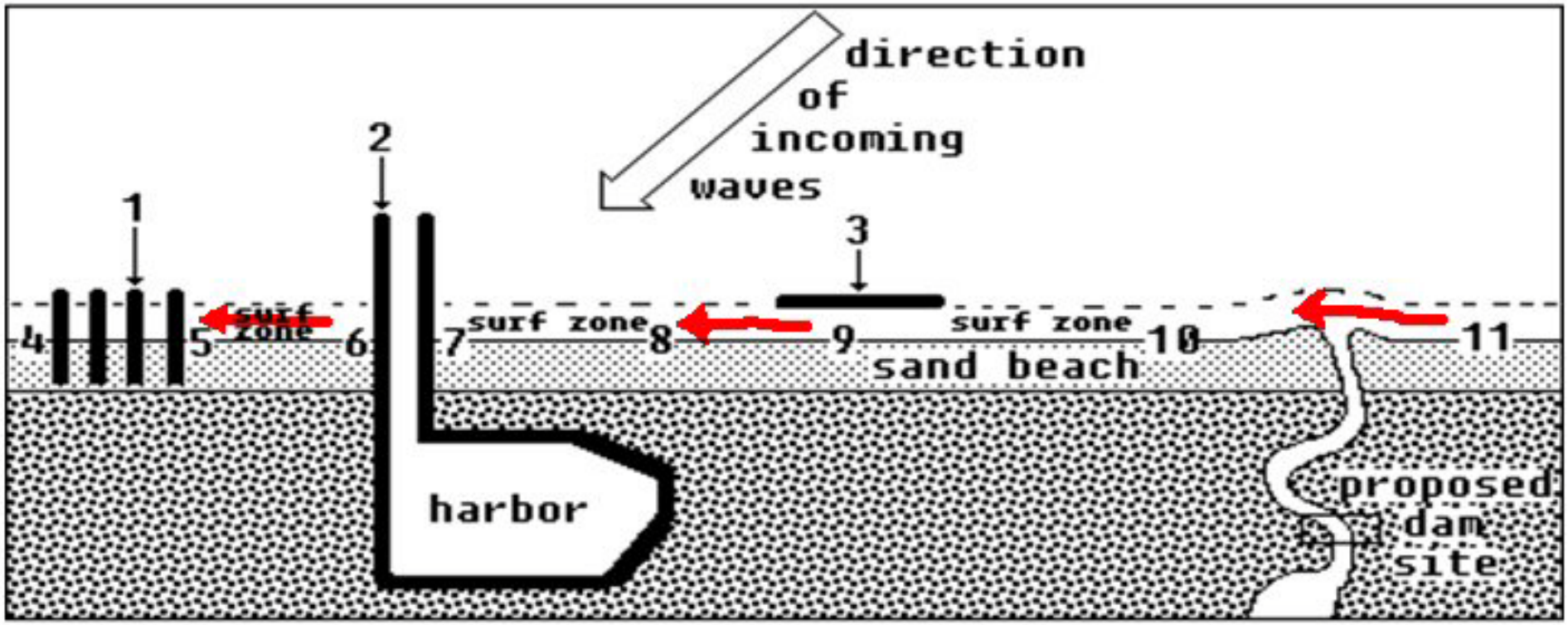

Immediately following construction
Several years after construction
Beach
Ld
Wave front
Ld is direction of littoral drift
Deposition
Erosion
(a) Attached Breakwater
(ex., Santa Barbara, California)
Beach
Ld
Erosion
Deposition
(b) Detached Breakwater
(ex., Santa Monica, California)

Figure 13.16

0 %

Loading


direction
of
incoming
waves
1
2
3
4
5
surf
zone
6
7
surf zone
8
9
surf zone
10
11
sand beach
harbor
proposed
dam
site