

Shore Protection: Nourish or Armor?

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It's normal for beaches to change



- Sand dissipates the energy from waves
- Seasonal changes
- Beaches move landward as sea level rises

Increased AK winter storm damage

- Alaska's western coast is shallow and flat; not naturally protected by rocks or barrier islands
- GHG and global warming
 - Weather changes
 - Rising sea level
 - Melting permafrost
 - Sea ice comes later vs. winter storms
- Winter storms arrive with a lot of wind
 - Wind causes storm surges (big waves)
 - Wind driven waves cause inland flooding

Teller seawall

waves

Teller, AK



Teller – inland flooding

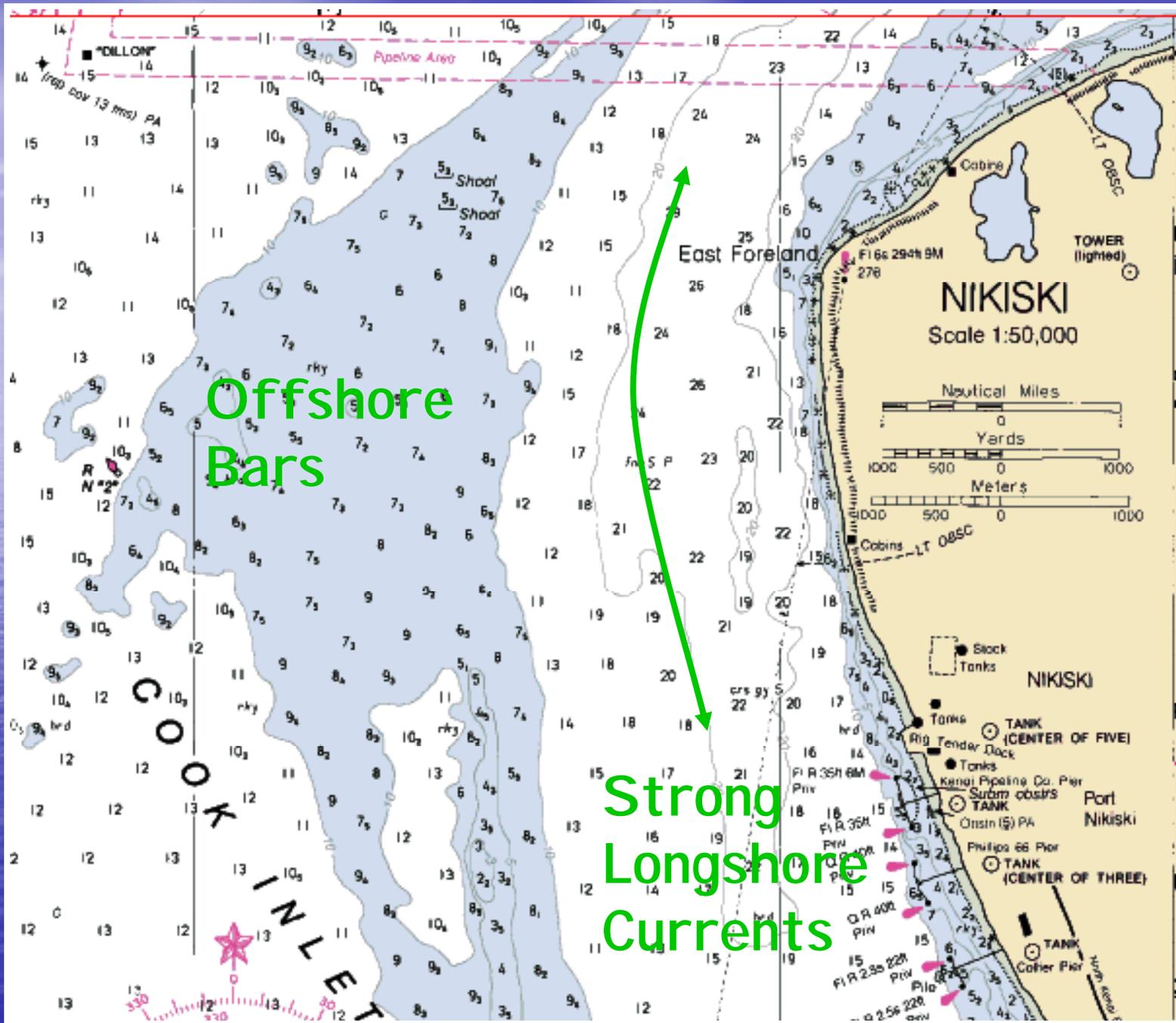


Kivalina winter storm damage



Sediment Budget





Offshore
Bars

Strong
Longshore
Currents

Effect of Coastal Structures



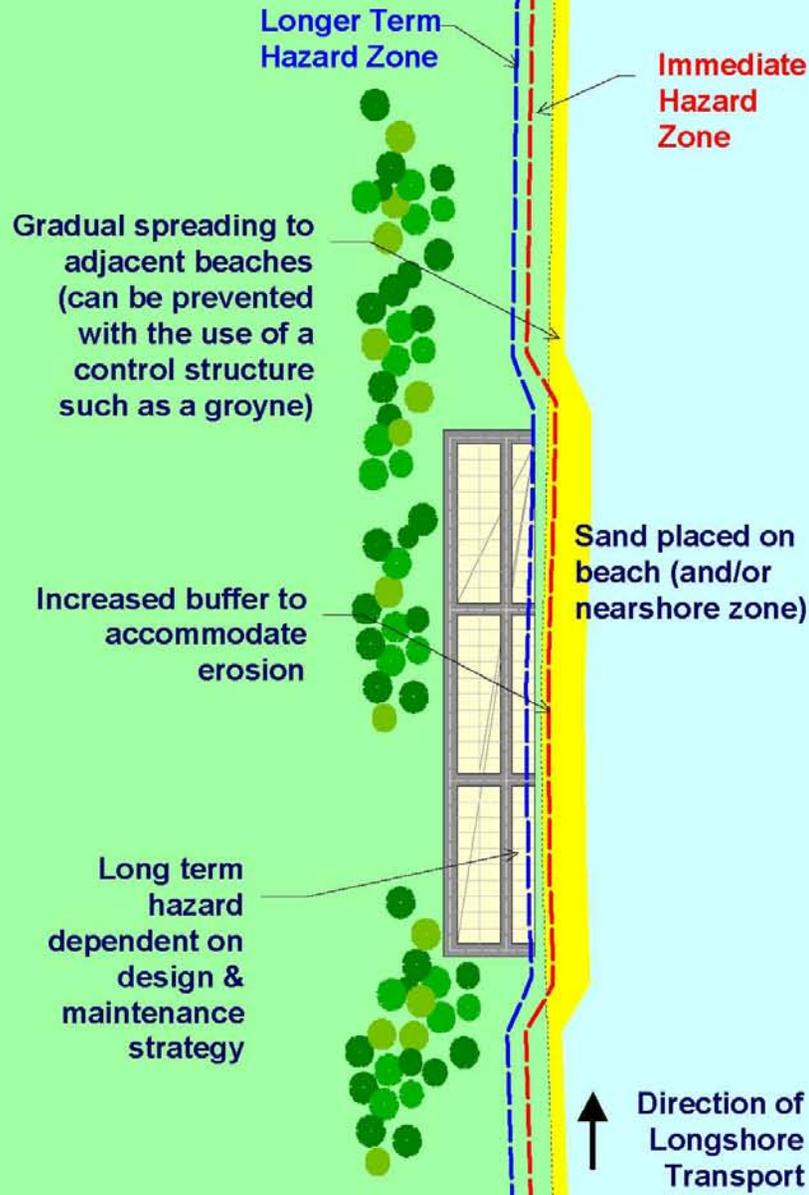
Norton Sound

Attended 1600.0400Z.
Migratory birds vicinity arpt during season.
Numerous unlighted towers 3 mi east.
Traffic pattern alt 1100 AGL.
Fuel hrs vary during year.
VASI and PAPI continuously on.
Activate MIRL, HIRL MALSR, REIL
via CTAF when OME FSS closed.



Delong Mountain Terminal (Red Dog)

Beach Nourishment

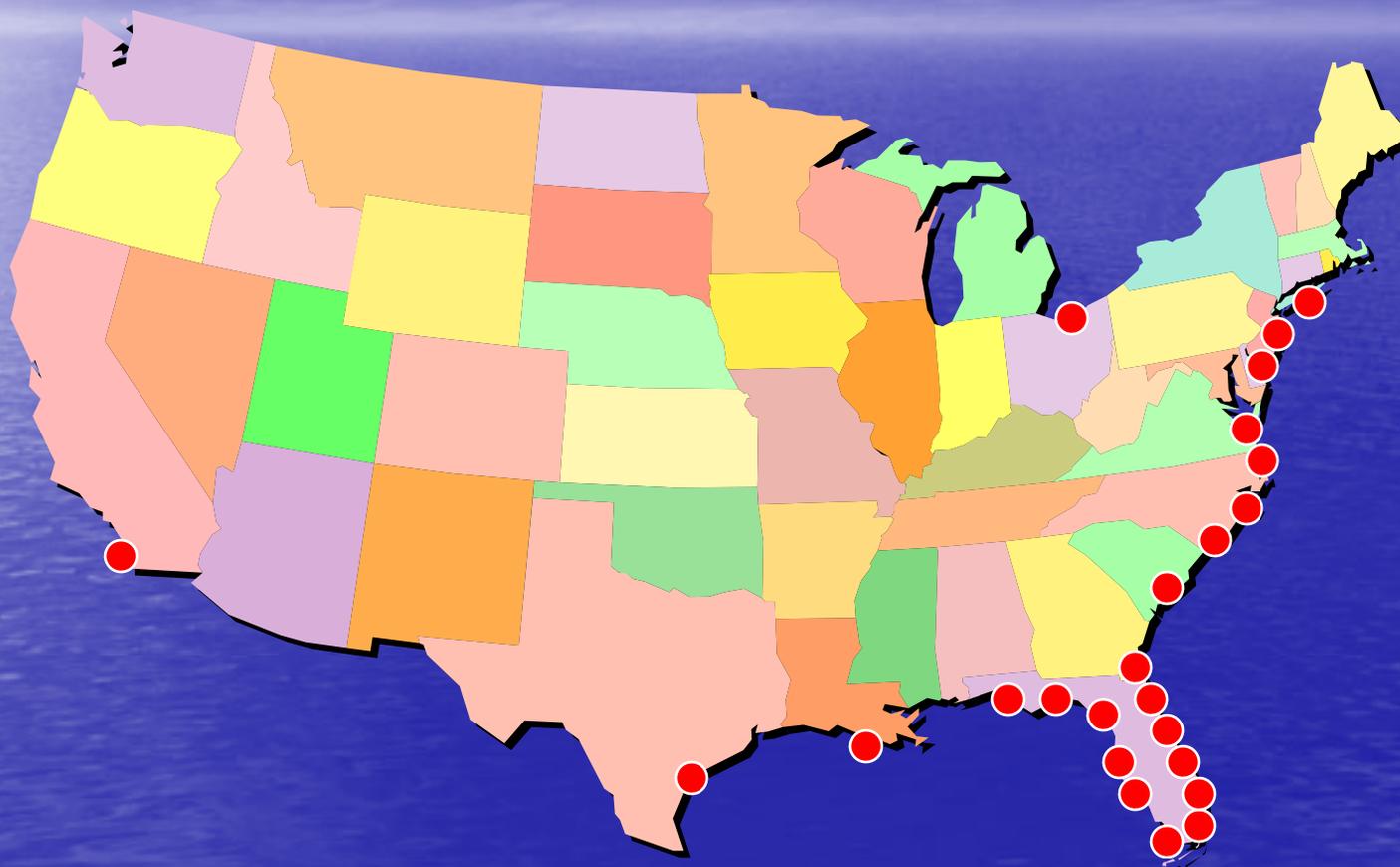


The importation of sand of a type equivalent to that on the natural beach to increase the volume within the active beach/dune system. The sand may be placed on the beach, dune or nearshore zone within the the zone of normal active onshore-offshore exchange associated with storm erosion.

The source of sand must be from outside the active beach system to provide a positive gain in the quantity rather than just a transfer from one part of the system to another. Nourishment can be used in conjunction with control end structures to minimise dispersion to adjacent beaches.

Advantages
<ul style="list-style-type: none"> ➢Increases buffer width to accommodate future erosion ➢Provides protection while retaining beach character & amenity ➢Allows beach and dune to behave naturally
Disadvantages
<ul style="list-style-type: none"> ➢Cost effective and environmentally acceptable sources of sand may not be available ➢May temporarily disturb beach amenity and ecology
Comments
<ul style="list-style-type: none"> ➢Often best approach to many problems ➢Beach amenity maintained or reinstated ➢Need to identify suitable sand source ➢Can be used with accompanying structures

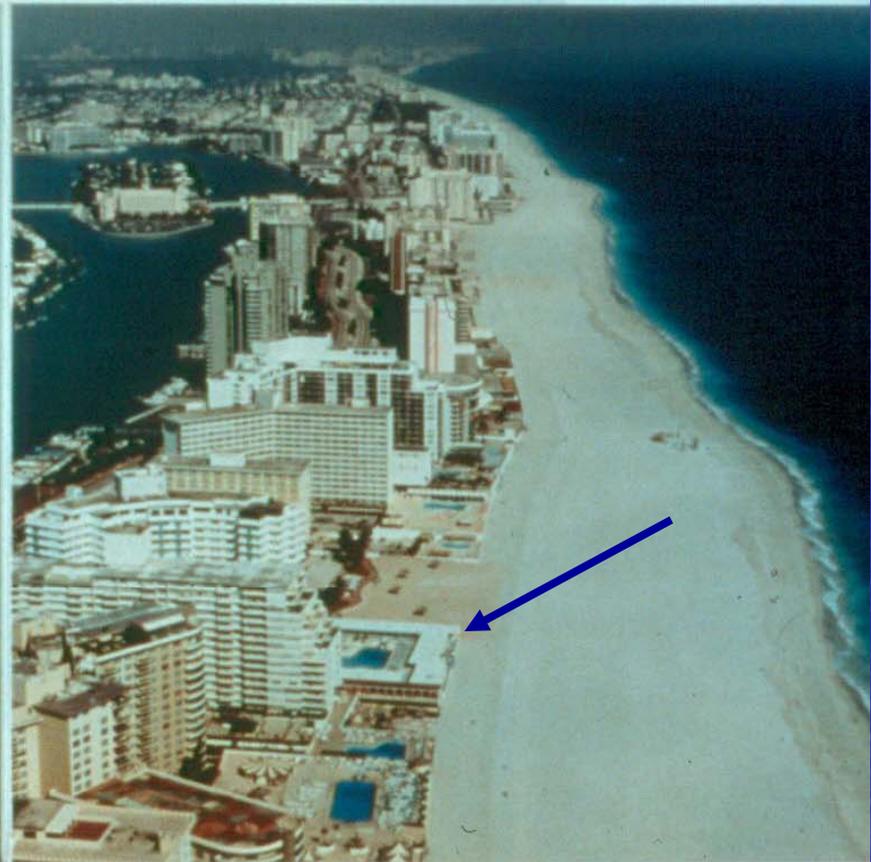
Many Beach Nourishment projects in
lower 48 states



DADE COUNTY

BEFORE

AFTER



St. Augustine Beach, FL



Brevard South Project



Miami Beach – before Beach Nourishment



Miami Beach – after Beach Nourishment



Beach Nourishment Issues

- Difficulty of finding suitable material and borrow sites.



Beach Nourishment Issues

- Cumulative and long-term impacts to coastal resources are difficult to quantify.
- As artificial sand enters the sediment budget mix, it may fill in an inlet or channel until it can find an equilibrium

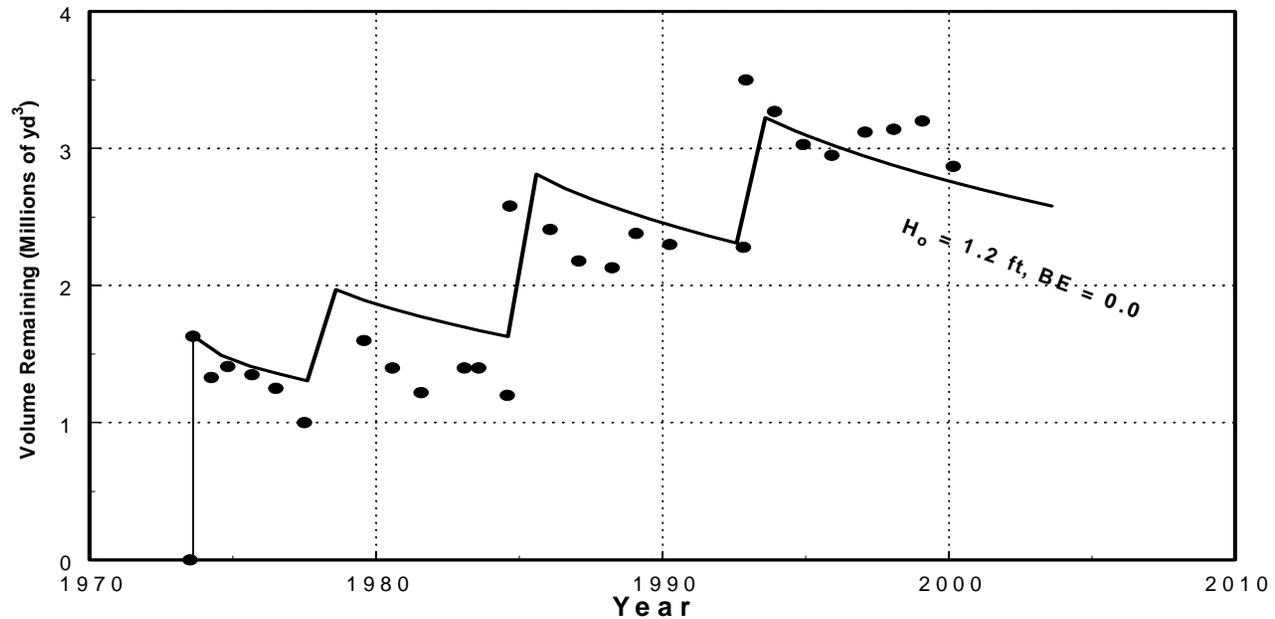


Beach Nourishment Issues

- Maintenance
- Need for repeated replenishment



Replenishment – every 5-8 yrs



Evolution of Delray Beach Nourishment Project,
Comparison of Calculations and Monitoring Results



Keys to success

1. Community buy-in
2. Must be cost effective
3. Agency reviews and permits

- State

- ADF&G
- DEC
- DNR
- SHPO
- DCCED
- DOT&PF

- Federal

- USACE
- EPA
- NMFS/NOAA
- USF&G
- MMS

Summary

- Beach nourishment is another alternative
- It is untried in Alaska
- The initial and long-term cost is unknown

■ Advantages

- Increases width of protective sand buffer
- Retains beach character
- Beach access and amenity restored
- Can be used with existing structures
- Allows beach to behave naturally

■ Disadvantages

- Cost effective sand sources may not be available
- Disturb beach ecology
- May not be environmentally acceptable to agencies