

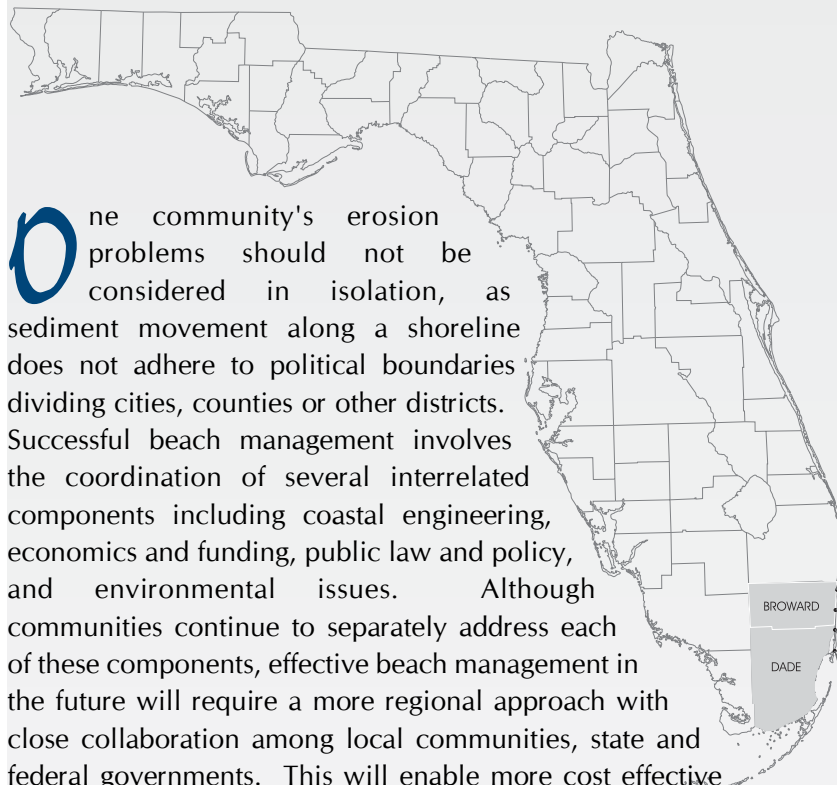
Perspective

Volume 1

B E A C H M A N A G E M E N T

A REGIONAL APPROACH

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One community's erosion problems should not be considered in isolation, as sediment movement along a shoreline does not adhere to political boundaries dividing cities, counties or other districts. Successful beach management involves the coordination of several interrelated components including coastal engineering, economics and funding, public law and policy, and environmental issues. Although communities continue to separately address each of these components, effective beach management in the future will require a more regional approach with close collaboration among local communities, state and federal governments. This will enable more cost effective projects with improved cost sharing resulting in increased benefits to the entire coastal region.

Beach Management is dependent upon a thorough understanding of regional coastal dynamics and the causes of erosion. Coastal Systems has conducted a number of coastal engineering studies within the geographic region extending from Hillsboro Inlet to Government Cut. This thirty-five mile stretch of shoreline with four inlets encompasses two counties, one taxing district and ten local municipalities. Available reports and recent hydrographic survey data have been utilized to calculate volumetric and shoreline changes within the region and to develop a sediment budget. The results from these studies have been combined to achieve a regional understanding of the coastal dynamics and to develop a beach management plan having a regional perspective.



Hillsboro Inlet



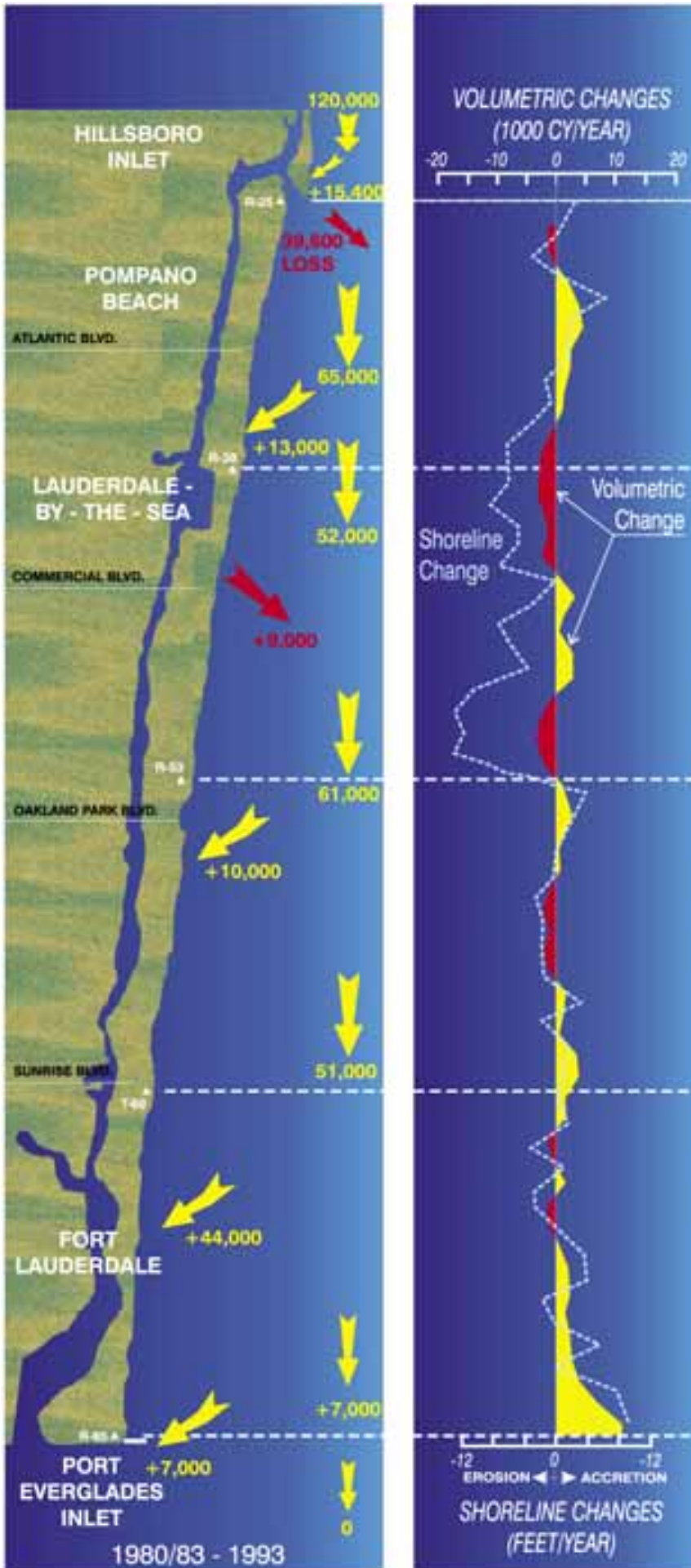
Port Everglades



Bakers Haulover Inlet



Government Cut



HILLSBORO INLET TO PORT EVERGLADES

Management practices at Hillsboro Inlet, together with historical trends of erosion/accretion downdrift were evaluated in order to understand the sand movement within this littoral region. This analysis contributed to the development of procedures to achieve maximum bypassing at Hillsboro Inlet.

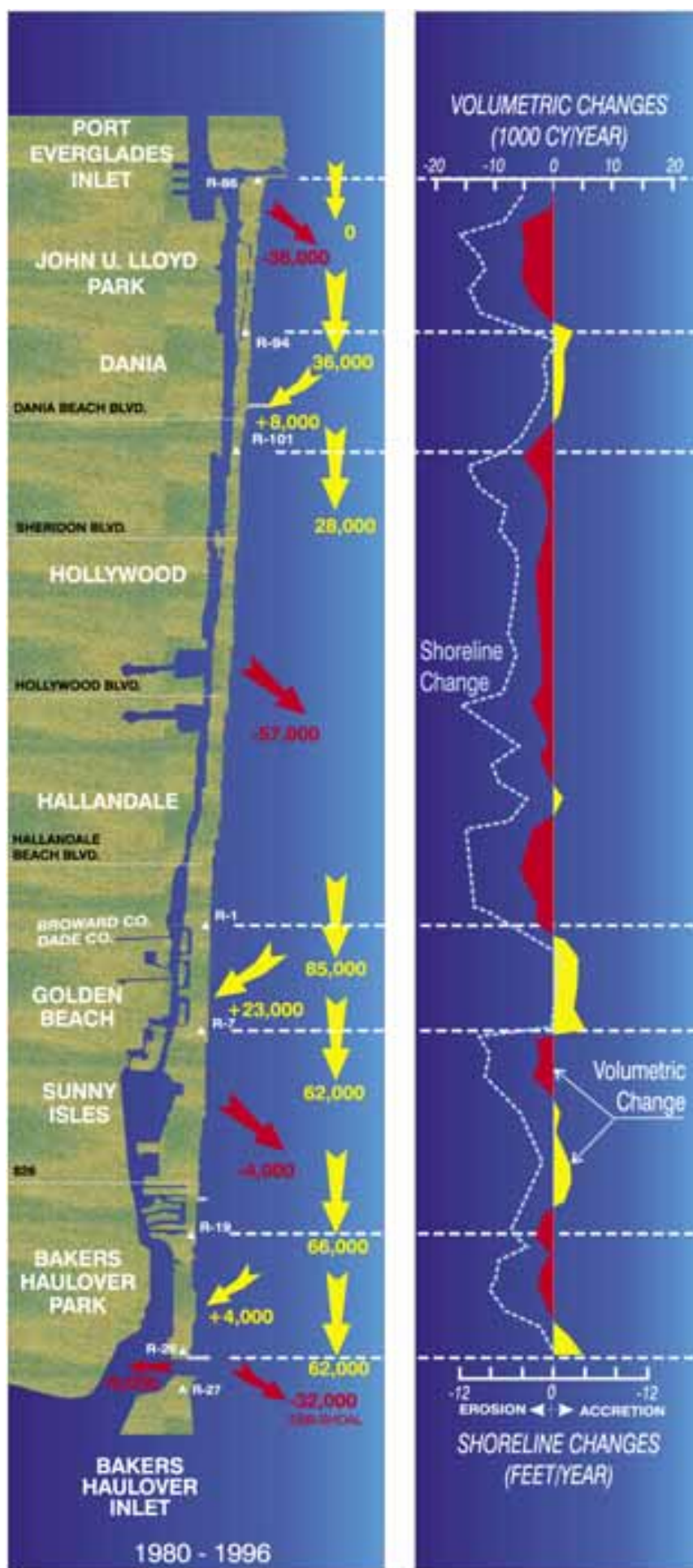
A deeper exterior sand trap/channel was proposed to improve bypassing at the inlet. An estimated 35,600 cubic yards of sand per year are lost from the littoral system seaward of the nearshore hardbottom south of the inlet. The proposed improvements will eliminate this loss and result in the bypassing of 97% of the estimated 120,000 cubic yards per year net longshore transport currently arriving at the inlet from the north. The following conclusions are derived from these studies:

- The 1983 Pompano/Lauderdale-by-the-Sea (Segment II) Renourishment Project has remained stable to accretion al due to the effective bypass ing practices at Hillsboro Inlet. Recent trends of accretion of approximately 20,000 cubic yards per year within the project limits further confirm these findings.
- The five mile stretch of shoreline south of Lauderdale-by-the-Sea has also remained stable. This condition indicates that the proposed beach nourishment necessary to achieve an optimum design width would be sustained with limited renourishment requirements.
- Substantial accretion is occurring within the two mile stretch north of Port Everglades Inlet due to the configuration of the north jetty, the nearshore spoil shoal, and the lack of a sand bypassing program.
- The proposed improvements to Hillsboro Inlet will result in reduced offshore losses thereby creating an increased sediment supply to the downdrift region. The volume of sediment arriving at Port Everglades will similarly increase further warranting the need for a sand bypassing program at Port Everglades.

PORT EVERGLADES TO BAKERS HAULOVER INLET

The 13½ mile segment of shoreline extending from Port Everglades to Bakers Haulover Inlet is one of the most unstable segments within all of Broward and Dade Counties. Beach renourishment projects are required on an ongoing basis at John U. Lloyd, Hollywood/Hallandale and Sunny Isles in order to maintain an acceptable beach width. The volumetric and shoreline changes within this region were analyzed to evaluate the short-term performance of these projects and to develop a long-term regional sediment budget. The following conclusions are drawn:

- The 1983 Pompano/Lauderdale-by-the-Sea (Segment II) Renourishment Project has remained stable to accretion al due to the effective bypass ing practices at Hillsboro Inlet. Recent trends of accretion of approximately 20,000 cubic yards per year within the project limits further confirm these findings.
- The John U. Lloyd segment eroded at an average rate of 36,000 cubic yards per year over the 16 year study period. These losses are due to both the no-bypassing condition at Port Everglades Inlet and losses into the non-nourished shoreline segment of Dania.
- The Hollywood/Hallandale segment is eroding at a unit rate comparable to John U. Lloyd due to the limited volume of sand arriving at the project limits and to end losses.
- Overall, the Sunny Isles segment has not eroded as severely as the above reaches. However, nearshore erosion rates (above -6.0 feet NGVD) were in the order of 60,000 cubic yards per year indicating a significant post-nourishment, cross-shore profile equilibration.
- A cursory analysis utilizing limited survey data at Bakers Haulover Inlet indicates an ebb shoal accretion rate of 32,000 cubic yards per year. This high accretion rate may be attributed to recent modifications to the northern inlet jetty and the substantial volume of sand placed along the beaches to the north over the last 10 years.
- This segment is most unstable due to the deficit of sand created by Port Everglades and the end losses induced by the discontinuities between renourishment projects.

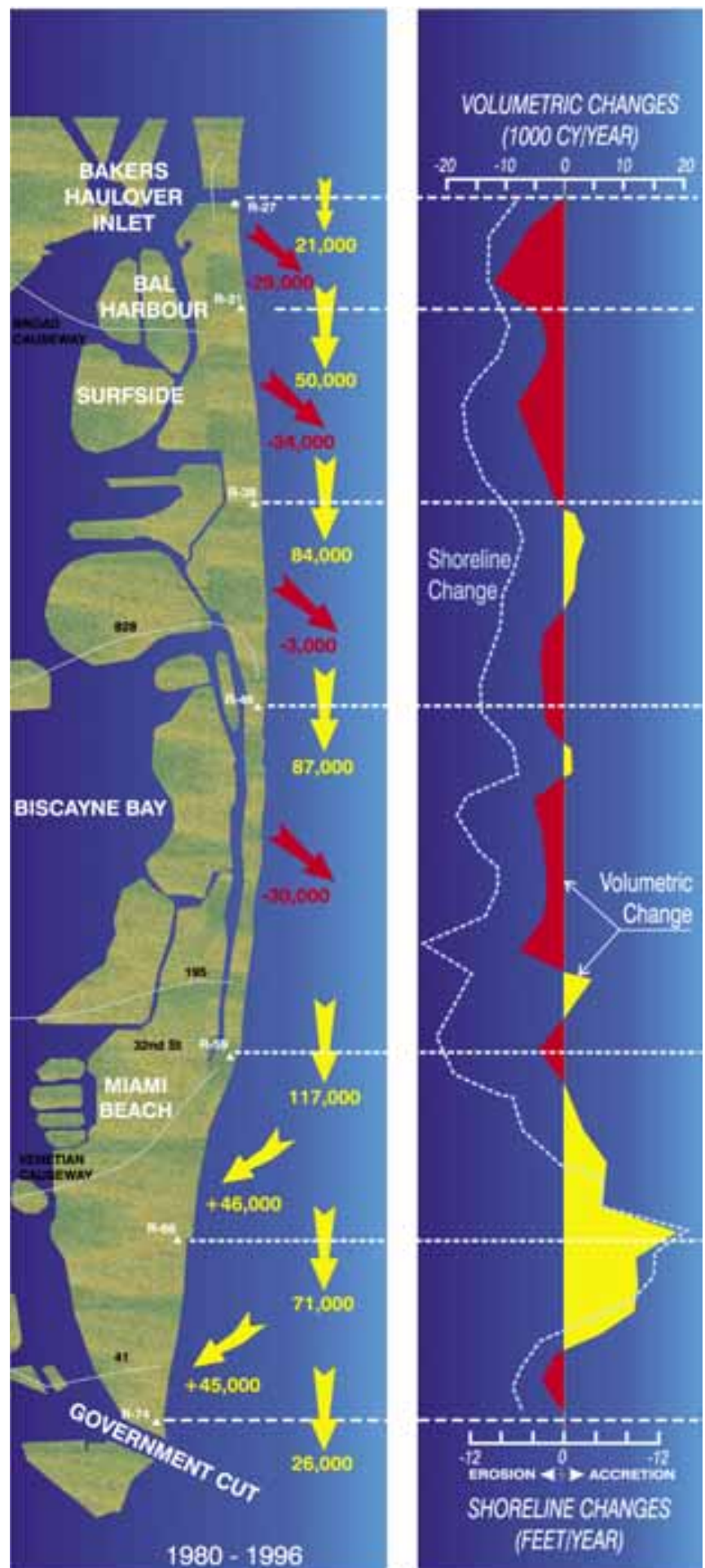


BAKERS HAULOVER INLET TO GOVERNMENT CUT

The littoral segment between Bakers Haulover Inlet and Government Cut represents one of the largest beach nourishment projects in the United States. Approximately 18 million cubic yards of sand have been placed along this shoreline since the 1960's. The size of this region and the renourishment requirements warranted a regional approach to its management through the development of a regional sediment budget.

Historic shoreline and volumetric changes were examined in order to develop this budget and to identify existing hotspot and coldspot areas. Several conclusions and recommendations are drawn from this study:

- This segment receives a very limited natural supply of sand from the north. Only 21,000 cubic yards per year bypass Bakers Haulover Inlet. This results in a deficit within the system which requires ongoing renourishment efforts. Increased sand bypassing at the inlet would reduce the deficit within Bal Harbour and Surfside.
- A large percentage of the observed nearshore sand losses have accumulated below the 6 feet NGVD contour resulting in a small net loss from the system.
- As much as 20,000 cubic yards per year are lost from the system at Government Cut through and around the north jetty.
- The significant hotspot at 32nd Street may be attributable to changes in shoreline orientation. The use of structures to correct this hotspot should be considered. This would result in a better distribution of the available sand supply.
- Alternatively, it may be feasible to recycle the surplus sand being transported south of 32nd Street (117,000 cubic yards per year) to offset the gross erosion (96,000 cubic yards) occurring to the north.



BENEFITS OF A REGIONAL APPROACH

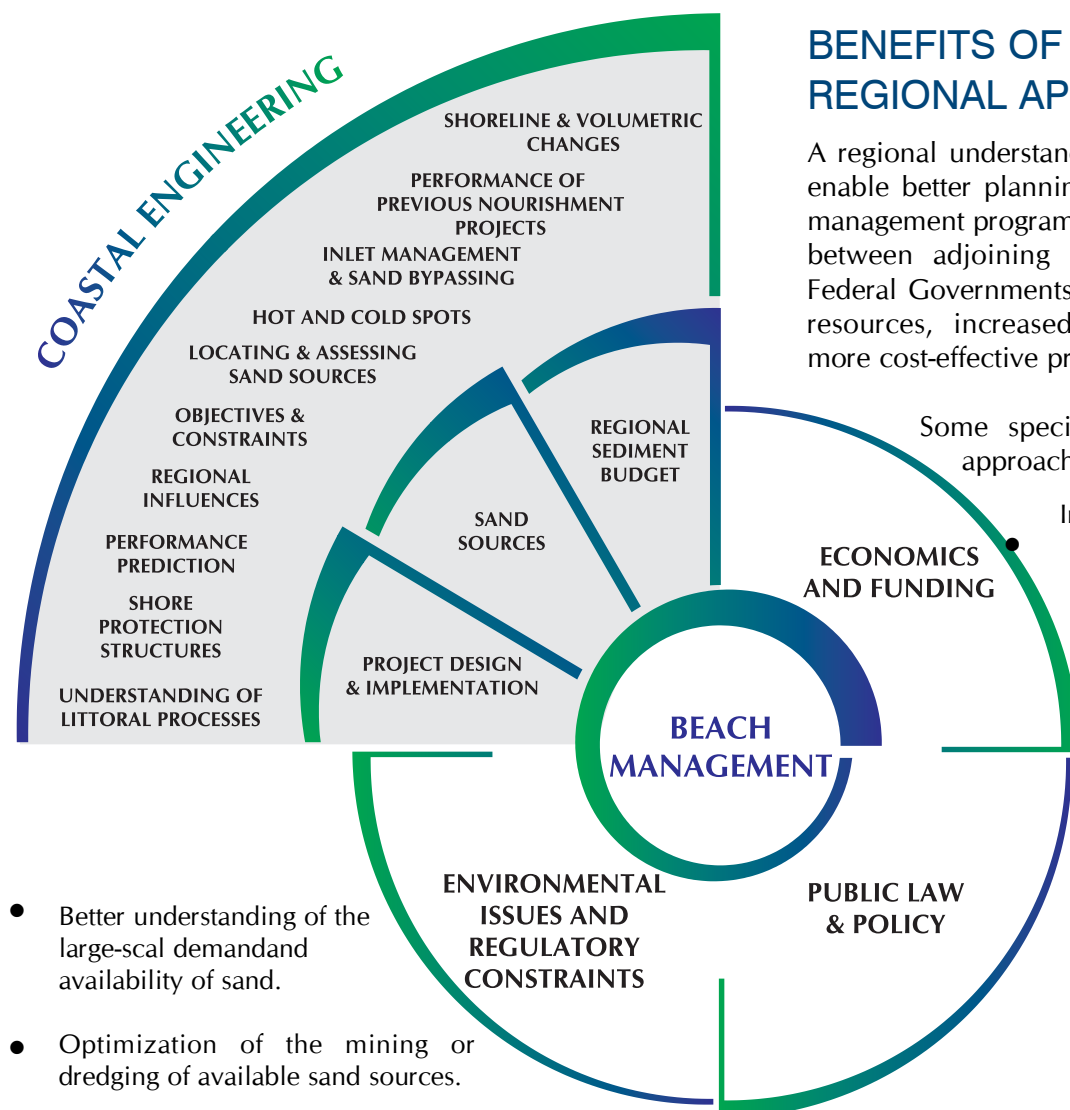
A regional understanding of coastal dynamics will enable better planning and coordination of beach management programs. A more collaborative effort between adjoining communities and State and Federal Governments would result in better use of resources, increased funding opportunities and more cost-effective projects.

Some specific benefits of the regional approach include:

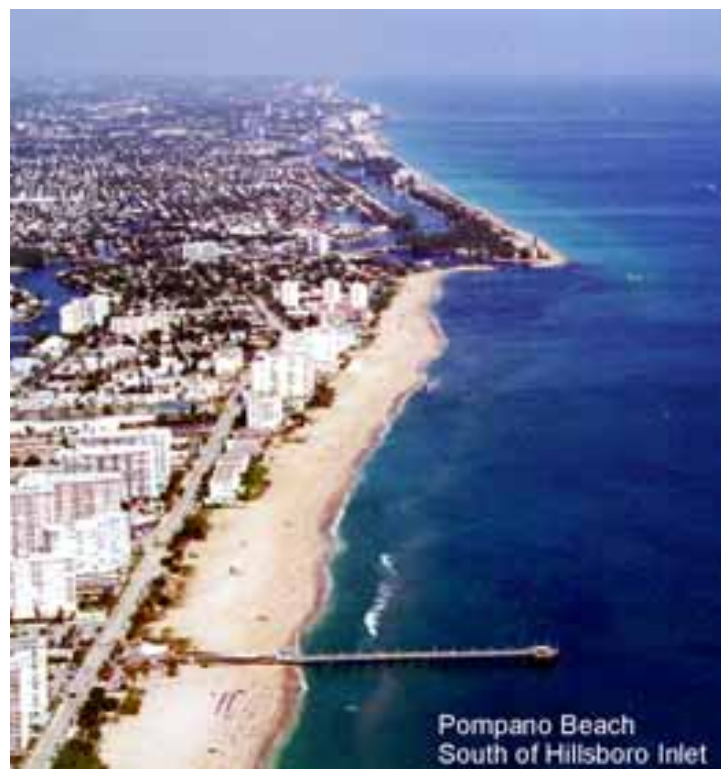
- Increased public involvement and understanding of beach management issues.

- Integration of inlet/port and beach management plans toward maintaining an entire regional littoral system.

- Potential for shoreline "smoothing" by redirecting sediment from coldspots into hotspots.



- Better understanding of the large-scale demand and availability of sand.
- Optimization of the mining or dredging of available sand sources.
- Higher priority could be given to the processing of permits for projects having an opportunity to share resources.
- Coldspots and their negative effects on the region could be taken into consideration during both the permitting and funding allocation of projects.
- Recognition of benefits to adjacent areas resulting in better cost/benefit ratios, increased justification, and prioritization for project funding.
- Cost optimization through the consolidation of smaller projects into a larger littoral regional project.
- Pooling of resources through local, state and federal cooperation to cut costs during project implementation.



HISTORIC BEACH NOURISHMENT PROJECTS IN BROWARD AND DADE COUNTIES			
Beach Nourishment Project	Year	Length miles	Fill Volume 1000 cu. yd.
BROWARD COUNTY			
Hillsboro Beach R5-R11	1972	1.0	500
Pompano Beach R32-R49	1970	3.2	1,067
Pompano Beach/Lauderdale-by-the-Sea R25-R53	1983	5.3	1,909
John U. Lloyd Park R56-R94	1977	1.5	1,090
Hollywood/Hallandale R101-R128	1989		603
	1971	5.2	350
	1979		1,980
	1991		1,108
TOTAL FILL VOLUME PLACED			8,616
SHORE PROTECTED PROGRAM COST			\$39 million
DADE COUNTY			
Sunny Isles R7-R19	1988	2.6	1,320
Haulover Beach R19-R26	1990		60
	1955-84	1.6	976
	1960		180
	1978		300
	1987		240
Bal Harbor R27-R31	1960-69	0.8	305
	1975		1,625
	1990		225
Surfside R31-R38	1978	1.4	2,940
Miami Beach R38-R46		9.4	
	1979	1.5	1,530
R46-R59	1980	2.5	3,177
R59-R66	1980-81	1.3	2,200
R66-Government Cut	1982	1.5	2,400
R41-R46	1985	1.0	110
R57-R60	1985	0.6	50
R55-R56 (Estimated)	1994	0.2	120
Fisher Island R75-R77	1991	0.5	25
Virginia Key R79-R86	1969	1.3	177
	1974	1.0	110
Crandon Park R92-R96, R99-R101	1969	1.8	196
Key Biscayne R101-R111, R112-R113	1987	2.1	420
Central Miami Beach R53-R56	1997		450
TOTAL FILL VOLUME PLACED			19,137
SHORE PROTECTION PROGRAM COST			\$93.3 million

CONCLUSIONS

Beach management practices may be made more efficient by recognizing the differences between the natural coastal system and the political framework. Whereas sand flows across political boundaries, projects are largely being implemented according to the needs and efforts of individual communities. Currently, design, permitting, and funding procedures for implementing beach projects are generally structured to accommodate these individual community efforts.

Changes in public policy could provide for stronger regional beach management planning with greater emphasis on the benefits and detriments associated with activities in adjacent communities. Specifically, projects with a larger regional benefit may be given increased funding, a high prioritization and/or qualify for accelerated regulatory approvals. Regions inducing a sediment deficit or other system inefficiencies should also be encouraged to implement improvements.

A continued evolution and adaptation of laws, policies and procedures will be required to synchronize the political and natural systems toward successful regional beach management.



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