September 16, 2021

The Process of getting added to a CSRM Feasibility Study to Evaluate Inclusion into a Federal Shore Protection Project

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Key Biscayne Beach Management

Florida DEP Strategic Beach Management Plan

Strategy: Maintain the project through monitoring and nourishment.

When future maintenance dredging of Government Cut is required, then placement of beach compatible sand on the beach of Key Biscayne should be considered.

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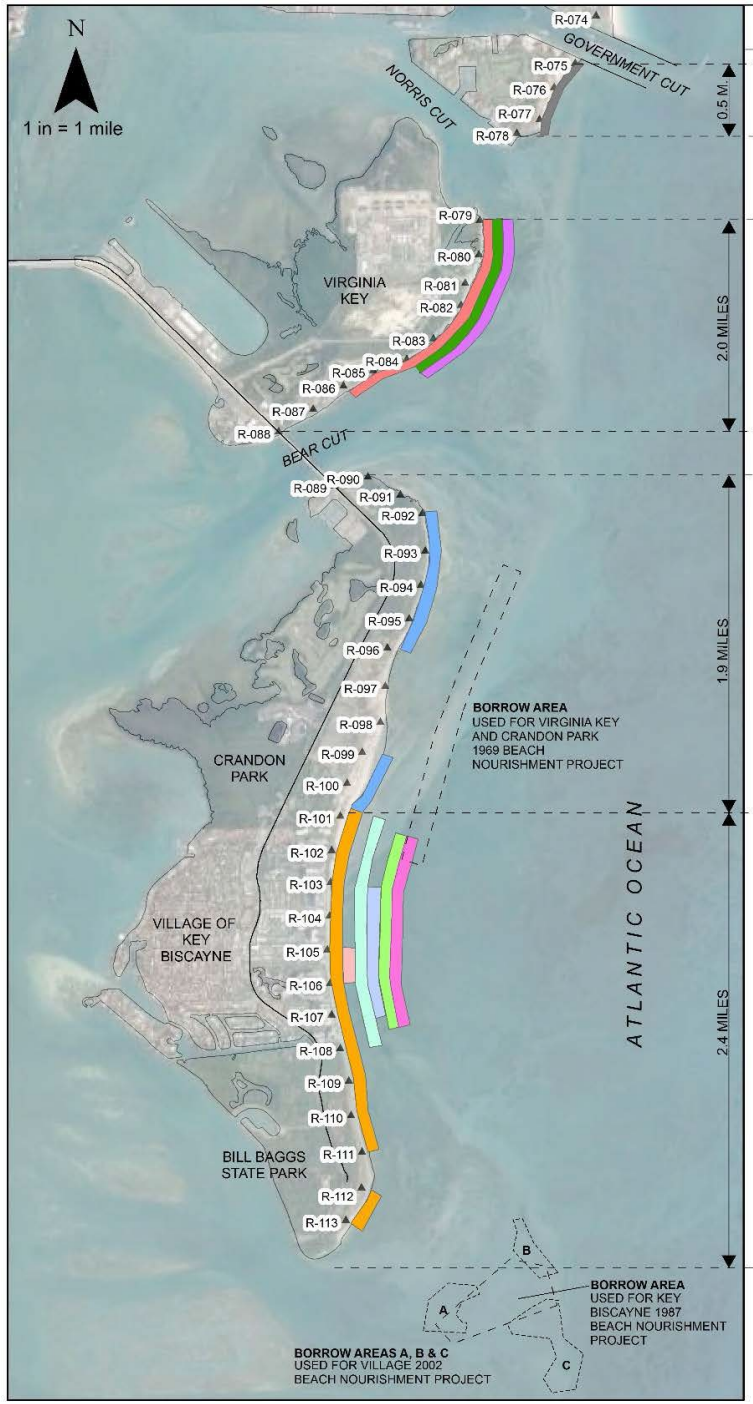
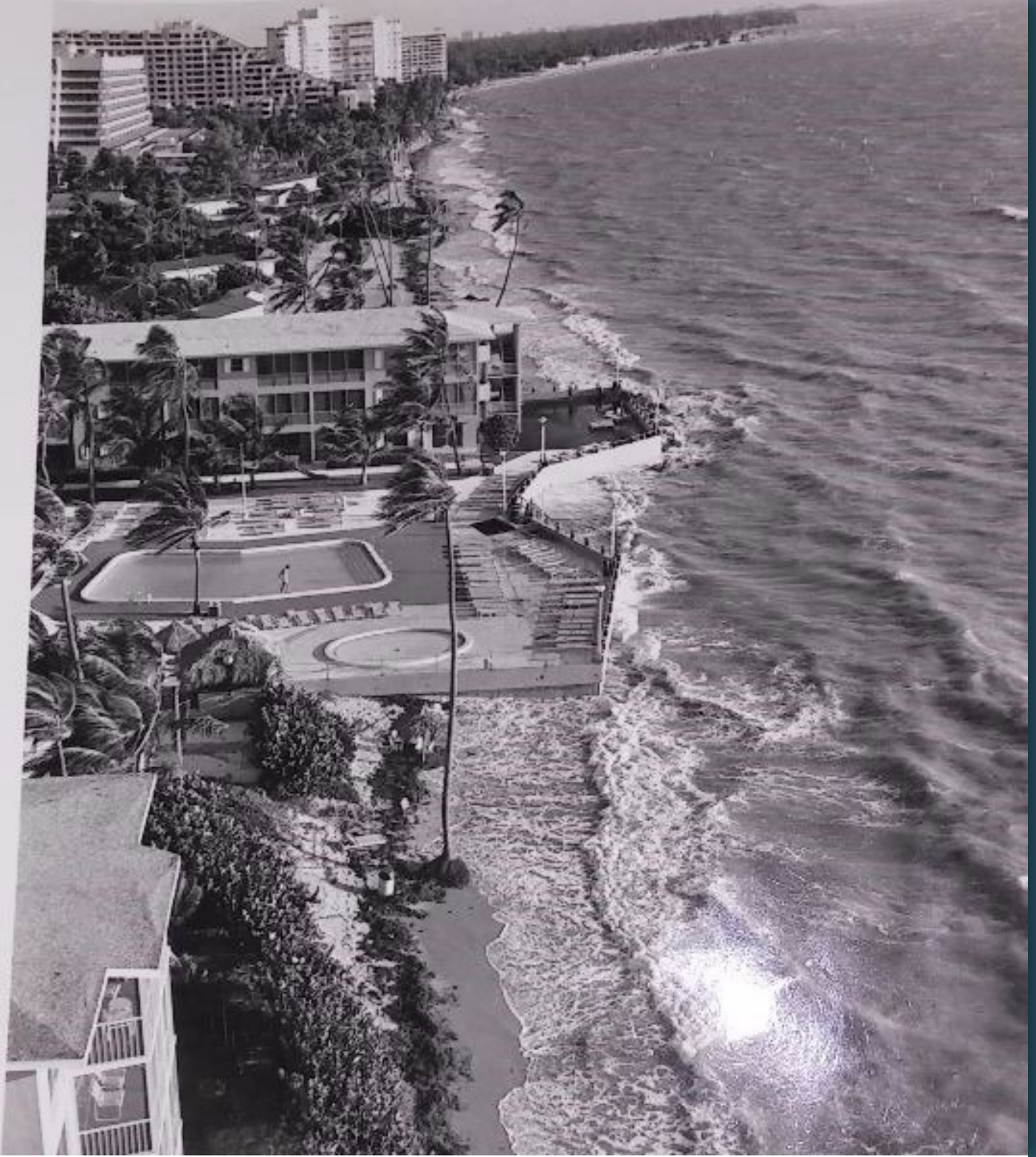


PROJECT	YEAR	VOLUME (CU.YD.)
FISHER ISLAND	1991	25,000
VIRGINIA KEY		
R-079 - R-086	1969	176,800
R-079 - R-084	1974	110,000
R-079 - R-084	2003	GROIN IMPROVEMENTS
CRANDON PARK		
R-092 - R-096	1969	196,300
R-099 - R-101		
VILLAGE AND BILL BAGGS STATE PARK		
R-101 - R-111	1987	420,000
R-112 - R-113		
VILLAGE		
R-105 - R-106	1998	34,000
R-101 - R-108	2002	121,000
R-103 - R-107	2008	2,400
R-101.3 - R-107.6	2012	37,500
R-101.3 - R-107.6	2017	26,100

Key Biscayne Beach Management

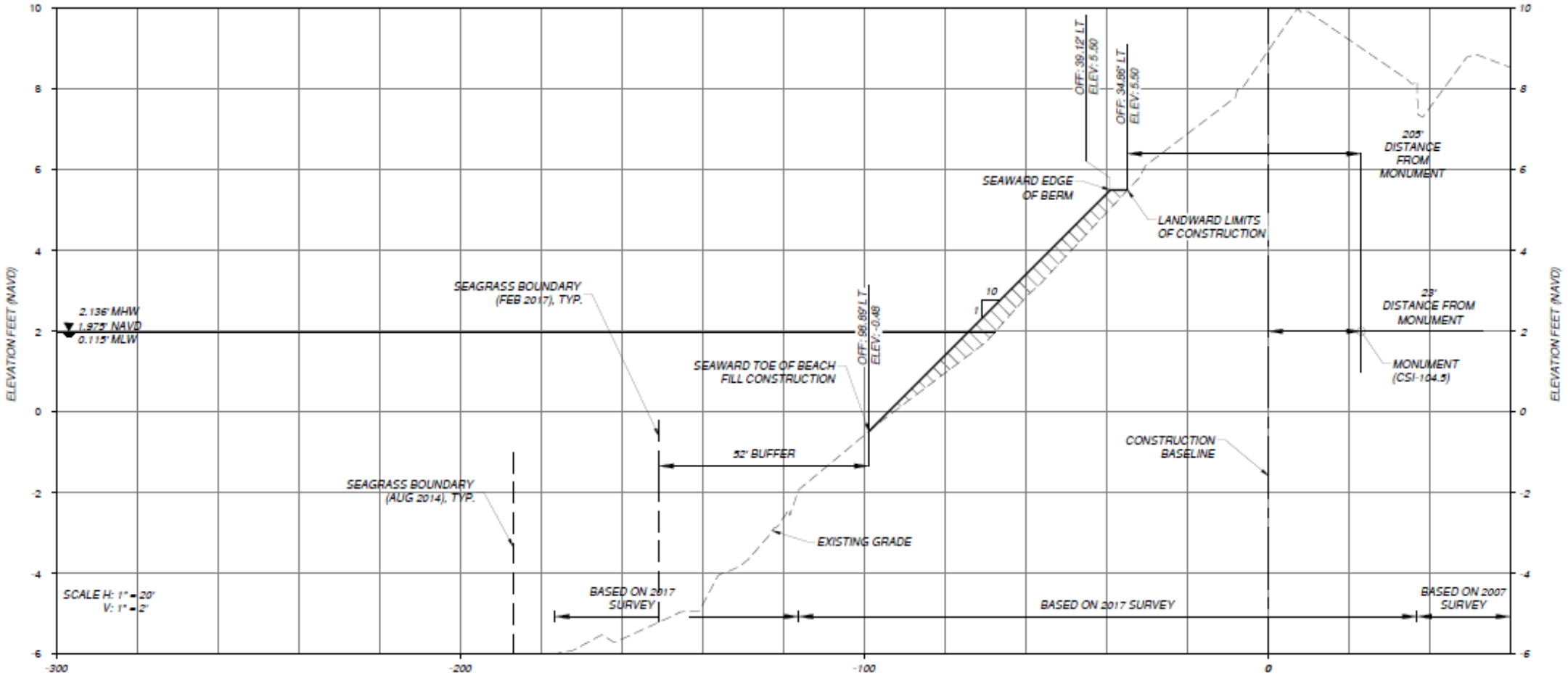
Background



Key Biscayne Beach Management
Background

- Beach condition
- Prior to 1987

Beach Nourishment Section
Truck Haul



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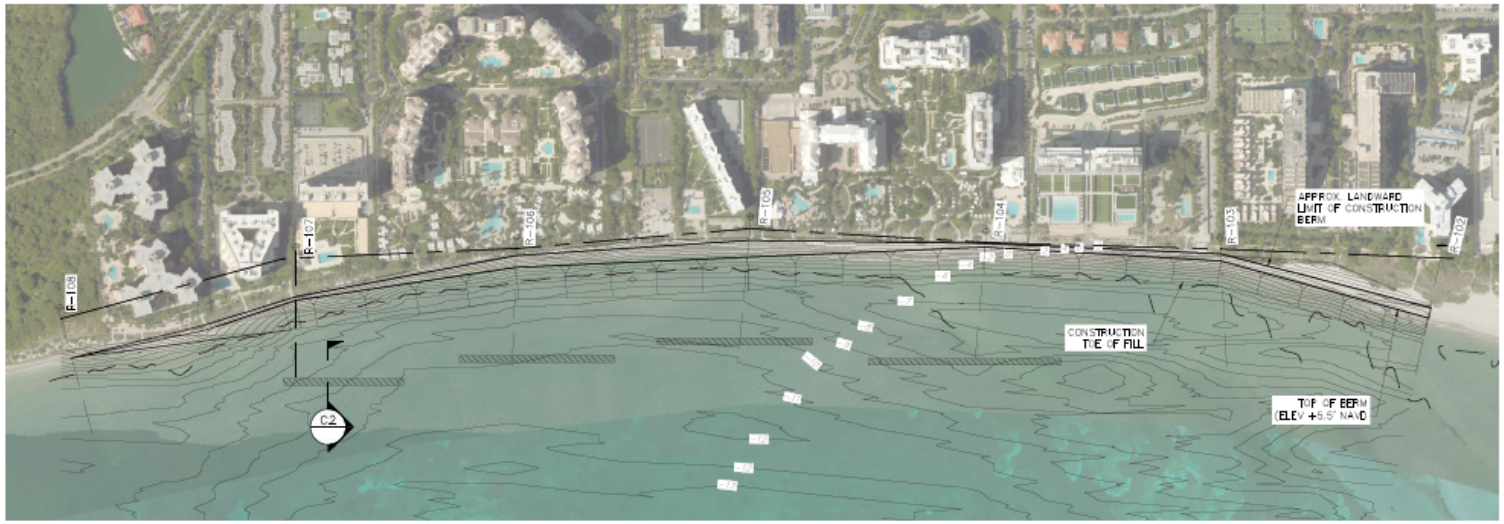


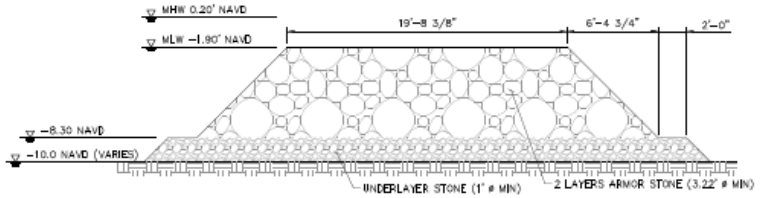
PLAN – PROPOSED BEACH NOURISHMENT
SCALE: 1" = 240'

NOTES:

1. THE HYDROGRAPHIC AND BEACH TOPOGRAPHIC CONTOURS AND CROSS-SECTION PROFILES PRESENTED ON THE PLANS AND SECTIONS ARE BASED ON A SURVEY FROM MARCH, 2017.
2. HORIZONTAL COORDINATES ARE BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983, FLORIDA EAST ZONE (0901).
3. ELEVATIONS ARE IN FEET RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

LEGEND:

- EXISTING CONTOURS
- PROPOSED NOURISHMENT CONTOURS
- PROPOSED BREAKWATERS
- WEST LIMIT OF SEAGRASS (MARCH 2017)



C2 TYPICAL PROPOSED BREAKWATER
SCALE: 1/4" = 1'-0"

SCALE: 1/4"=1'-0"

SCALE: 1"=240'

DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING

KEY BISCAYNE BEACH NOURISHMENT
VILLAGE OF KEY BISCAYNE, FL

OVERALL PLAN

moffatt & nichol

Sheet Reference Number

Key Biscayne Beach Management 2018 Study

Key Biscayne Beach Management
Timeline

- Beach Management on the Key – current strategy not sustainable
- Evaluate options for Long Term Management
- Village retained team:
  - Akerman – environmental legal and local advocacy
  - Thorn Run – advocacy
  - Moffatt & Nichol – coastal engineering
- Village Council – beach management top infrastructure concern
- Outlined Concurrent Strategies:
    1. USACE - Section 111, 103 projects; attempt to repeat 1987 project
    2. Longer Term – Miami-Dade County Federal Shore Protection Project
    3. Continue with Village as Local Sponsor – ongoing beach management
- Need a “tool box”

MIAMI-DADE COUNTY, FL CSRM STUDY

U.S. ARMY CORPS OF ENGINEERS | JACKSONVILLE DISTRICT

COASTAL STORM RISK MANAGEMENT (CSRM)

ENVIRONMENTAL CONSIDERATIONS

THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

NEPA is a federal law enacted in 1969. As required by NEPA, the U.S. Army Corps of Engineers (USACE) will assess potential environmental effects of alternatives.

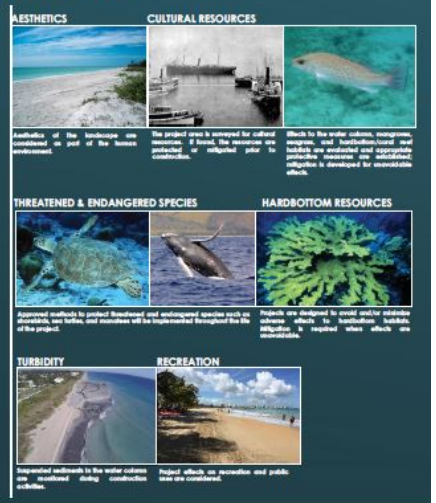
The findings will be explained in a NEPA document. The NEPA document will be available for public review and comment before any decisions are made or actions are taken. Your input at this meeting helps the Corps in identifying key environmental issues that may need to be evaluated.

EXAMINING POTENTIAL EFFECTS TO RESOURCES

The objective of this project is to contribute to National Economic Development consistent with environmental statutes.

The NEPA document will evaluate potential effects on resources such as:

- Aesthetics
- Air Quality
- Archaeological/Cultural Resources
- Essential Fish Habitat
- Contaminants
- Noise
- Recreation
- Benthic Resources
- Socioeconomics
- Threatened and Endangered Species
- Turbidity
- Wildlife Resources



USACE PLANNING PROCESS EVALUATING POTENTIAL EFFECTS

The USACE uses a six-step planning process for its studies. The steps, shown in the diagram below, are interlwined with risk management. The process is fluid, using a structured and iterative method. During each iteration, planners reduce the uncertainty that is inherent in the planning process.

PROJECT SCHEDULE/TIMELINE

MIAMI-DADE COUNTY, FL CSRM STUDY

U.S. ARMY CORPS OF ENGINEERS | JACKSONVILLE DISTRICT

COASTAL STORM RISK MANAGEMENT (CSRM)

PHYSICAL CONDITIONS & ENGINEERING CONSIDERATIONS

Study Authority

The Miami-Dade, Florida Coastal Storm Risk Management Study is authorized under Section 216 of the Flood Control Act of 1970, Public Law 91-611, and funding for the study was appropriated as part of the Bipartisan Budget Act of 2018 (PL 115-123). This study will evaluate alternatives to potentially reduce hurricane and storm damages to public infrastructure, residential and commercial buildings.

Beach Placement History

The Dade County Beach Erosion Control and Hurricane Protection Project (BEC&HP) included beach fill along 1.4 miles of Haulover Beach Park, and 9.3 miles from Bakers Haulover Inlet to Government Cut (Miami Main Segment). The 2.4-mile Sunny Isles segment was added in 1985. Federal participation ends for the Miami Main segment in 2025 and for the Sunny Isles segment in 2038.

Alternatives Formulation

Alternatives will be assessed and modeled to determine the one that best addresses the primary study objective to reduce coastal storm damages. Alternatives could include stand alone or combinations of soft structures (beach and dune), hard structures (breakwaters, groins, reefs, rock revetment), and non-structural alternatives (flood proofing).

* Lines depict shoreline lengths where sand was placed as part of both Federal and non-Federal projects.

ECONOMICS KEY FORMULAS

Plans recommending Federal action should represent an alternative that achieves the greatest net benefits consistent with protecting the environment

BENEFITS

Primary: Storm damage reduction

Incidental: Recreation

COSTS

Cost of alternatives over a 50-year period, including associated costs

CSRM BENEFITS = ESTIMATED $ DAMAGES WITHOUT PROJECT - ESTIMATED $ DAMAGES WITH PROJECT

$$\frac{\text{BENEFITS}}{\text{COSTS}} > 1$$

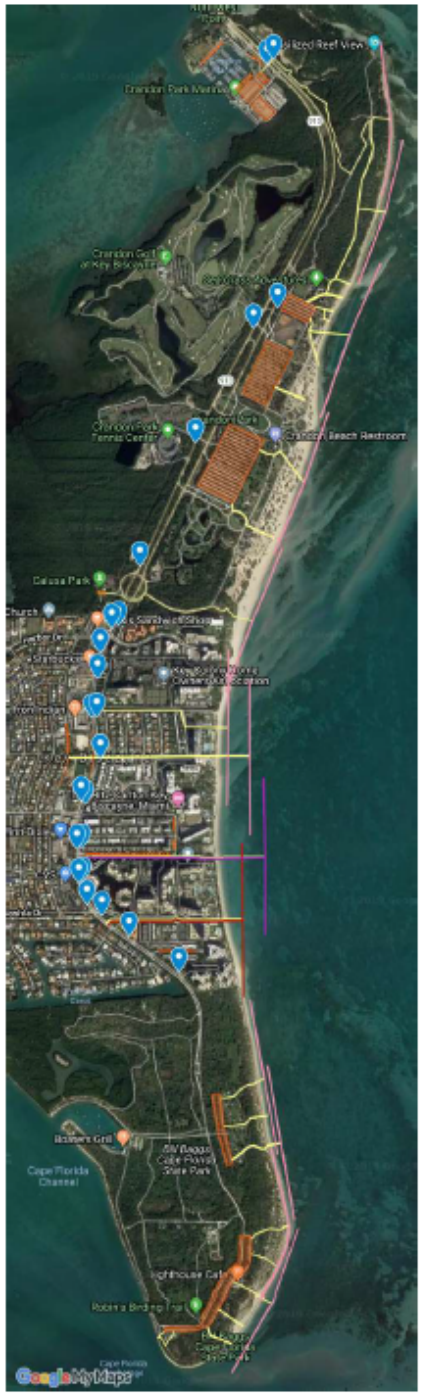
Plans must have a positive benefit to cost ratio.

For more information on this project, please visit:
https://www.saj.usace.army.mil/MiamiDadeCountyCSRMFeasibilityStudy/

2018 Federal Shore Protection Project CSRM

Key Biscayne
CSRM Inclusion Process

- Miami-Dade County CSRM – initiated in 2018
- Once in a lifetime opportunity to be considered for Federal Shore Protection Project (50-Year Project)
- CSRM already in full swing –Moffatt & Nichol completed initial GIS and file set up for BeachFx and coastal engineering on behalf of USACE
- September, 2019 - Request additional $1M to fund the full $3M CSRM study (to include Key Biscayne)
- March, 2020 – Corps internally processing waiver to extend an extra year
- Village Team – instrumental in securing extra $1M and getting Village added to the CSRM – *significant achievement*



Legend

	Existing Public Beach Access Path
	¼ mile distance measurement in either direction from a beach access point *with unrestricted public access*
	Existing Beach Access Path *for residents of Key Biscayne (potentially subject to change)*
	¼ mile distance measurement in either direction from a beach access point *with access for residents of Key Biscayne (potentially subject to change)*
	Existing Beach Access Path *with restricted public access (potentially subject to change)*
	¼ mile distance measurement in either direction from a beach access point *with restricted public access (potentially subject to change)*
	Public Parking
	Bus Stop

Key Biscayne Public Access

Key Biscayne Transportation Parking, and Beach Access Graphic (2018)

Graphics courtesy of USACE

CSRM Planning Reach 4

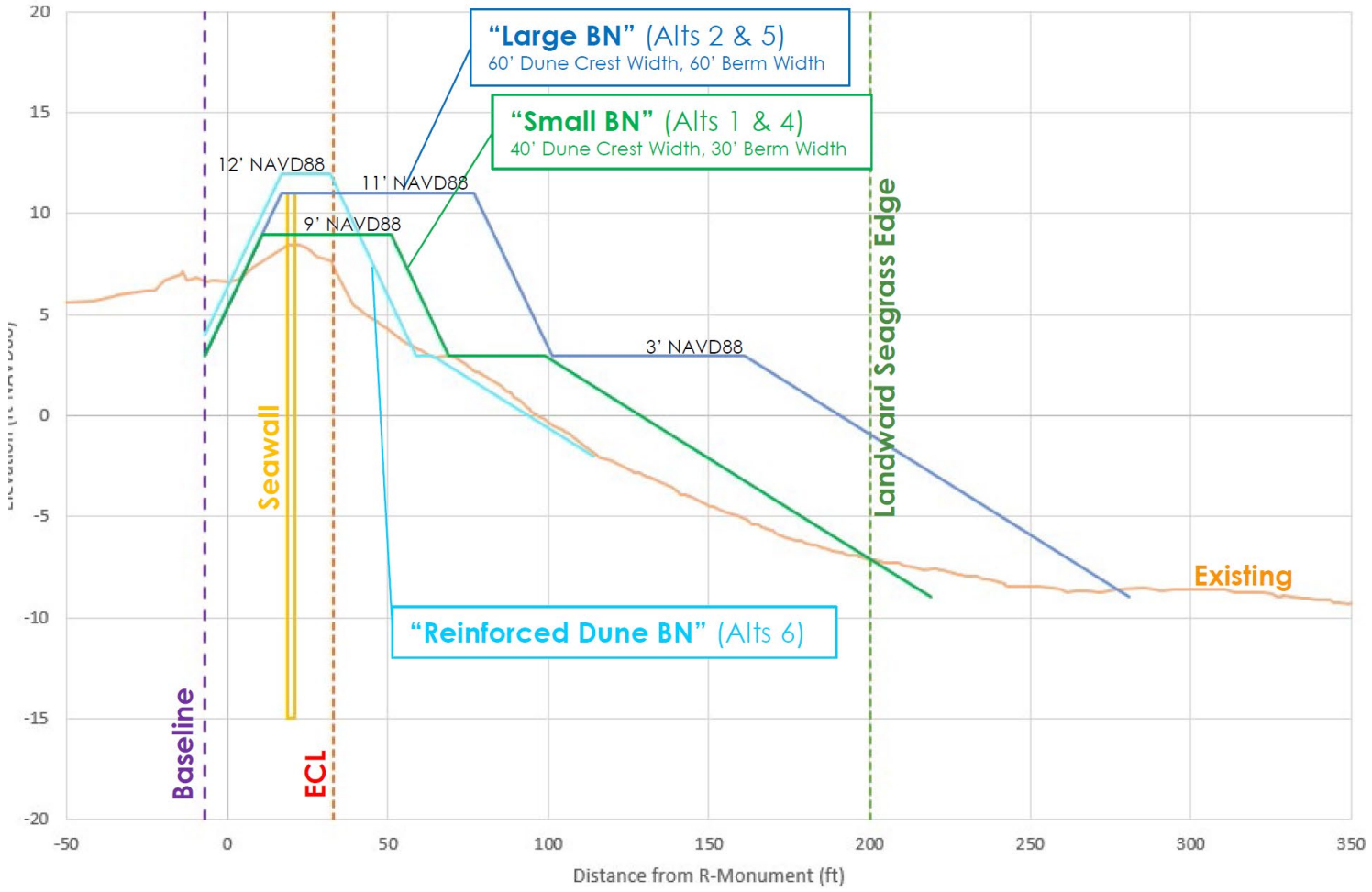
May, 2021

Planning Reach 1 Alternatives:

0. PR1 FWOP
1. Small Beach Nourishment
2. Medium Beach Nourishment
3. Erosion Control Structures only
4. Small Nourishment w/ Erosion Control Structures
5. Medium Nourishment w/ Erosion Control Structures
6. Seawall w/ Small Beach Nourishment

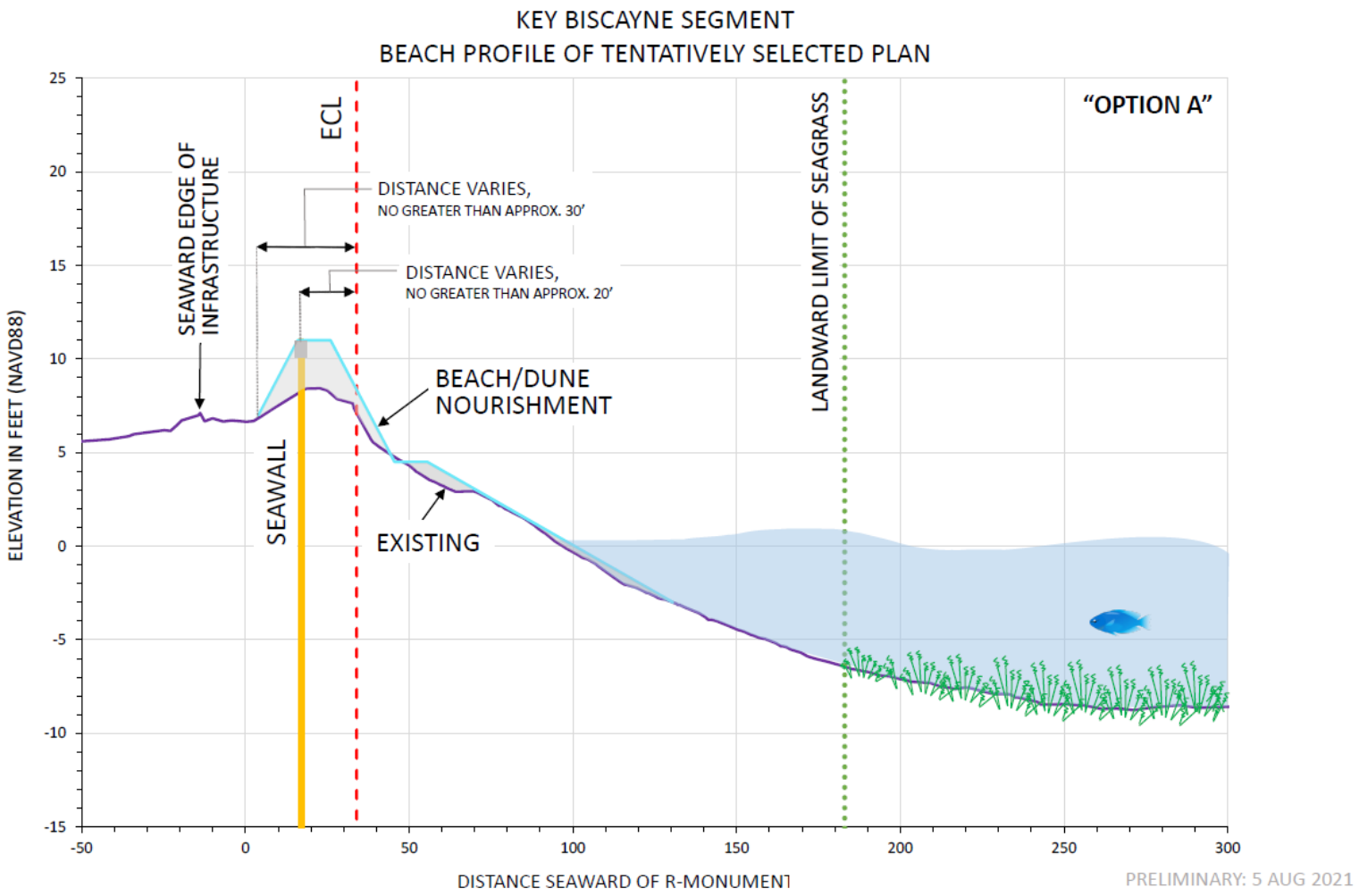
CSRM – Tentative Selected Plan (TSP)

Typical Alternative Cross Sections at R-105

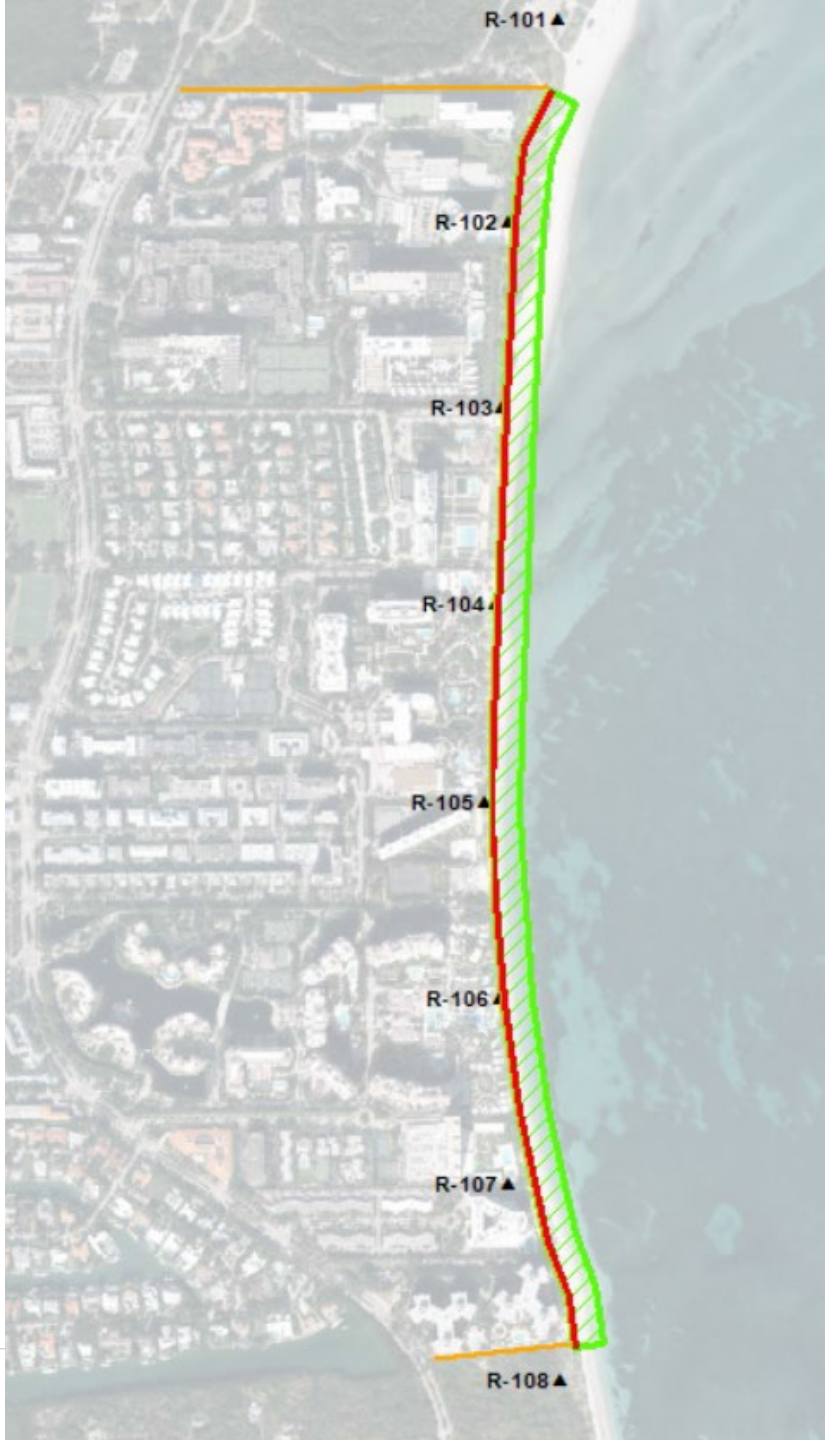


General Design for Alternative ECS

CSRM – TSP



PRELIMINARY: 5 AUG 2021



akerman

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CSRM Reach 4 – Summary

Physical Performance…

Alternative	Description	Nourishment Source	Nourishment Interval (years)	Initial Volume (CY)	Renourishment Volume (CY)	Total Volume (CY)
PR4_Alt0	PR4 FWOP					
PR4_Alt1	Small BN	Upland Truck Haul	5.44	135,156	131,892	1,190,295
PR4_Alt2	Large BN + Tieback Walls	Upland Truck Haul	7.00	435,220	232,164	1,828,206
PR4_Alt3	ECS				N/A	-
PR4_Alt4	ECS + Small BN	Upland Truck Haul	10.00	134,899	137,647	685,487
PR4_Alt5	ECS + Large BN + Tieback Walls	Upland Truck Haul	8.17	434,425	205,024	1,459,547
PR4_Alt6	Reinforced Dune + BN + Tieback Walls	Upland Truck Haul	1.68	26,172	24,460	686,601

Based on these results Alternative 6 is the NED plan and the TSP as it produces the greatest net benefits and avoids impacts to seagrass. An overview figure of this alternative is shown on the following page.

Economic Performance…

Alternative	Damages	Structure Costs	PV Total Cost	Benefits	Net Benefits	BCR	% of Damages Reduced
PR4_Alt0	$526,619,135						
PR4_Alt1	$490,453,382	$0	$60,023,916	$36,165,753	-$23,858,163	0.60	6.9%
PR4_Alt2	$334,822,853	$8,567,409	$107,796,271	$191,796,282	$84,000,010	1.78	36.4%
PR4_Alt3	$508,421,005	$19,675,880	$19,675,880	$18,198,129	-$1,477,751	0.92	3.5%
PR4_Alt4	$497,029,980	$19,675,880	$55,411,017	$29,589,154	-$25,821,863	0.53	5.6%
PR4_Alt5	$335,435,848	$28,243,289	$110,996,296	$191,183,287	$80,186,991	1.72	36.3%
PR4_Alt6	$309,757,734	$29,159,249	$60,364,560	$216,861,400	$156,496,840	3.59	41.2%

Notes:

- Costs do not include Mitigation or Real Estate costs.
- Results reflect only primary storm damage reduction benefits.
- Results are averages based on 50 iteration (life-cycle) simulations in Beach-fx.
- All alternatives are evaluated of the 50-year period from 2026-2075.
- The USACE High sea level change projection is assumed to occur.
- ER 1105-2-100 "For all project purposes except ecosystem restoration, the alternative plan that reasonably maximizes net economic benefits consistent with protecting the Nation's environment, the NED plan, shall be selected."

Task/Milestone	Start	Finish
TSP Milestone	**11-Aug-21**	**11-Aug-21**
Draft Report DQC & Legal Review	25-Aug-21	29-Sep-21
Draft Report Public, CZMA, ATR, & Policy Review	8-Oct-21	7-Nov-21
ADM Milestone	**18-Feb-22**	**18-Feb-22**
Final Report DQC, Legal Review, & Legal Cert	4-Mar-22	1-Apr-22
Final Report ATR & Cost Cert	1-Apr-22	29-Apr-22
Final Report Submittal to HQ	**6-May-22**	**10-May-22**
Chief's Report Signed	**7-Oct-22**	**7-Oct-22**

CSRM
Updated Schedule

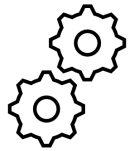
Conclusions

Team Effort

Municipal / legal / technical / advocacy

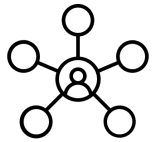
Village Council

Support long term strategy



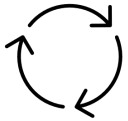
Experts

That understand USACE process



Advisory role

To municipal government



Dynamic process

Team needs to react quickly

Collaboration

local sponsor (County) and USACE

Desired results

long term strategy for beach management

Acknowledgements

- Village of Key Biscayne
- Miami-Dade County – local sponsor
- USACE

Thank you