Hurricane Michael Storm Recovery Plan for Florida's Beach and Dune System

Florida Department of Environmental Protection

Division of Water Resource Management

Beach Management Funding Assistance Program

May 2019

Table of Contents

I. Introduction

Purpose

During the 2018 hurricane season, the State of Florida was impacted by two tropical storm systems and one major hurricane. The most significant impact to coastal areas resulted from Hurricane Michael in the Florida panhandle. Michael made landfall on October 10, 2018, as a strong Category 5 hurricane on the Saffir-Simpson hurricane intensity scale. The Department developed this Hurricane Michael Storm Recovery Plan to address short and long-term beach recovery costs for the panhandle's most eroded beach and dune systems. This plan summarizes proposed management strategies and costs that incorporate ongoing federal, state, and local efforts to restore the beach and dune systems that are vital to the health, safety, and economic welfare of the State of Florida.

Summary of Impacts

Florida Department of Environmental Protection (DEP) damage assessment teams collected field data in Bay, Gulf, Franklin, and Wakulla counties. Post-storm aerial photography provided by the National Oceanic and Atmospheric Administration (NOAA) assisted in the assessment of coastal conditions in these counties. Over 125 miles of Florida's panhandle coastline were impacted by Michael. Many of the impacted areas will require varying levels of recovery activities, ranging from natural recovery to dune restoration to full-scale beach nourishment. Many structures were damaged or destroyed or are currently threatened due to the condition of the beach and dune systems in these counties.

Summary of Recovery Activities and Costs

This plan focuses only on the beach and dune systems in Bay, Gulf, and Franklin counties that had moderate to major beach erosion. This report does not include replacement cost estimates associated with any upland structures, roads, piers, bridges or coastal armoring. The recovery of the beach and dune system is vital for providing essential environmental habitat for threatened and endangered species, and protection of upland development and infrastructure. The plan takes into account the strategies of the DEP Strategic Beach Management Plan (SBMP), where appropriate, to maintain long-term planning objectives. In some cases, projects that were already

in the planning stages may be expedited as part of this recovery plan. In other cases, new projects and actions that were not part of a long-term plan will be required. Overall, the plan works to coordinate recovery efforts with long-term maintenance strategies, using both regular program appropriations and emergency funding assistance provided by federal, state, and local sources to achieve the most efficient recovery of impacted beaches and dunes.

In review of this recovery plan, it is important to understand that placing sand for emergency purposes may be a necessary beach management activity, but it is not the preferred strategy for managing and protecting Florida's critically eroded sandy beaches. A preferred strategy for management of an eroded beach system is to implement a long-term protection plan such as designing a beach restoration project and conducting routine periodic maintenance nourishments. This involves the initial dredging of sand from an offshore sand source or truck hauling sand from an upland mine for a restoration project followed by routine nourishments at specified multi-year intervals. In areas where this is not possible, the plan includes the construction of dune maintenance projects to expedite storm recovery and protection for upland development and infrastructure prior to the next hurricane season.

II. Storm Impacts

Damage to Beaches and Dunes

DEP staff conducted storm damage assessments on beaches impacted by Michael and summarized the results in the Hurricane Michael Post-Storm Beach Conditions and Coastal Impact Report. The counties that experienced moderate to major storm erosion to sandy beaches were in Bay, Gulf, and Franklin counties. A summary of project locations and erosion conditions from post-storm site visits can be found in Table 1. An illustration of erosional conditions is provided in Figure 1. DEP staff created storm damage maps depicting beach and dune erosion conditions for the coastal impact report. The maps for Bay County (Figure 2), Gulf County (Figure 3), and Franklin County (Figure 4) are provided for reference.

The storm surge moved some sand from the beach and dune into upland areas landward of the beach, as well as to the nearshore area below mean low water due to wave action and retreat.

Narrow beaches outside of restored project areas had significant erosion that, in some instances, undermined upland structures and roadways. It is expected there will be some natural recovery of these beaches as sand is gradually transported back to the beach from the nearshore areas. However, natural recovery will be slow and may not be sufficient to rebuild the dunes, subjecting upland structures and beach habitat to further risk. Some of these areas will require assisted recovery activities ranging from dune restoration to full-scale beach nourishment for protection of upland structures and infrastructure.

Table 1: Post-Storm Beach and Dune Erosion Summary

Bay County

Locations	Reference Monuments	Erosion Condition
Panama City Beaches	R0 – R91	I
St. Andrews State Park	R92 – R97	III-IV
Shell Island	R98 – V009	IV
Crooked Island	V009 – R127	IV
Mexico Beach	R127 – R144	IV

Gulf County

Locations	Reference Monuments	Erosion Condition
Beacon Hill	R1 – R13	IV
Windmark	R14 – R31	II
St. Joseph Peninsula, including State Park	R32 – R105	IV
Cape San Blas – west shore	R106 – R118	IV
Cape San Blas – east shore	R119 – R133	II
Indian Peninsula	R134 – R159	II
Indian Pass	R159 – R161	IV

Franklin County

Locations	Reference Monuments	Erosion Condition
St. Vincent Island	V301 – V345	IV
Cape St. George Island State Preserve	R1 – R51	IV
St. George Island Plantation	R52 – R73	IV
St. George Island, including State Park	R73 – R148	IV
Dog Island	R150 – R192	IV
Alligator Point	R195 – R209	II
Southwest Cape	R209 – R217	III
Lighthouse Point to Bald Point	R217 – R239	II

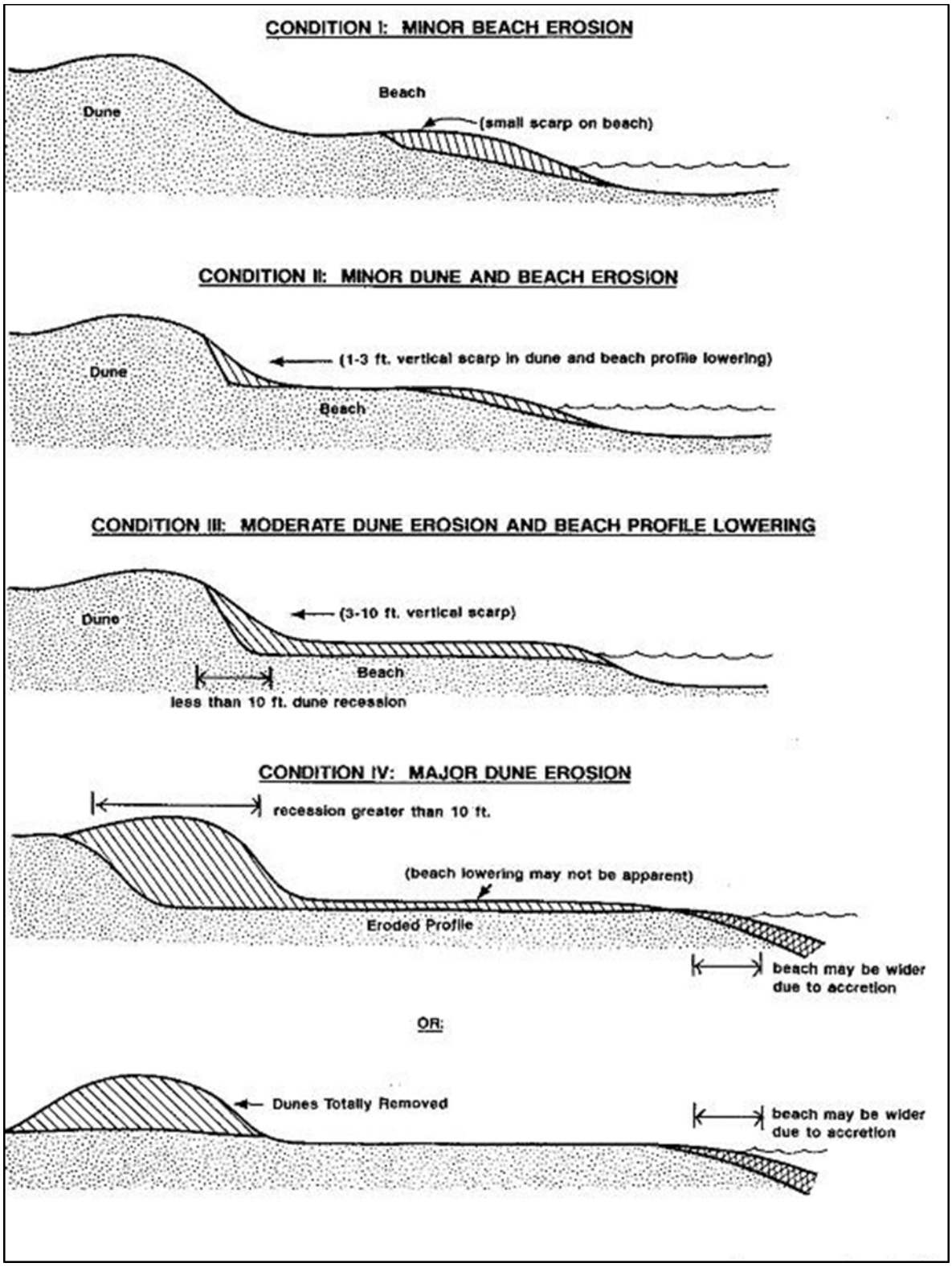

Figure 1. *Illustration of post-storm beach and dune erosion conditions.*

Storm Damage Maps

Bay County

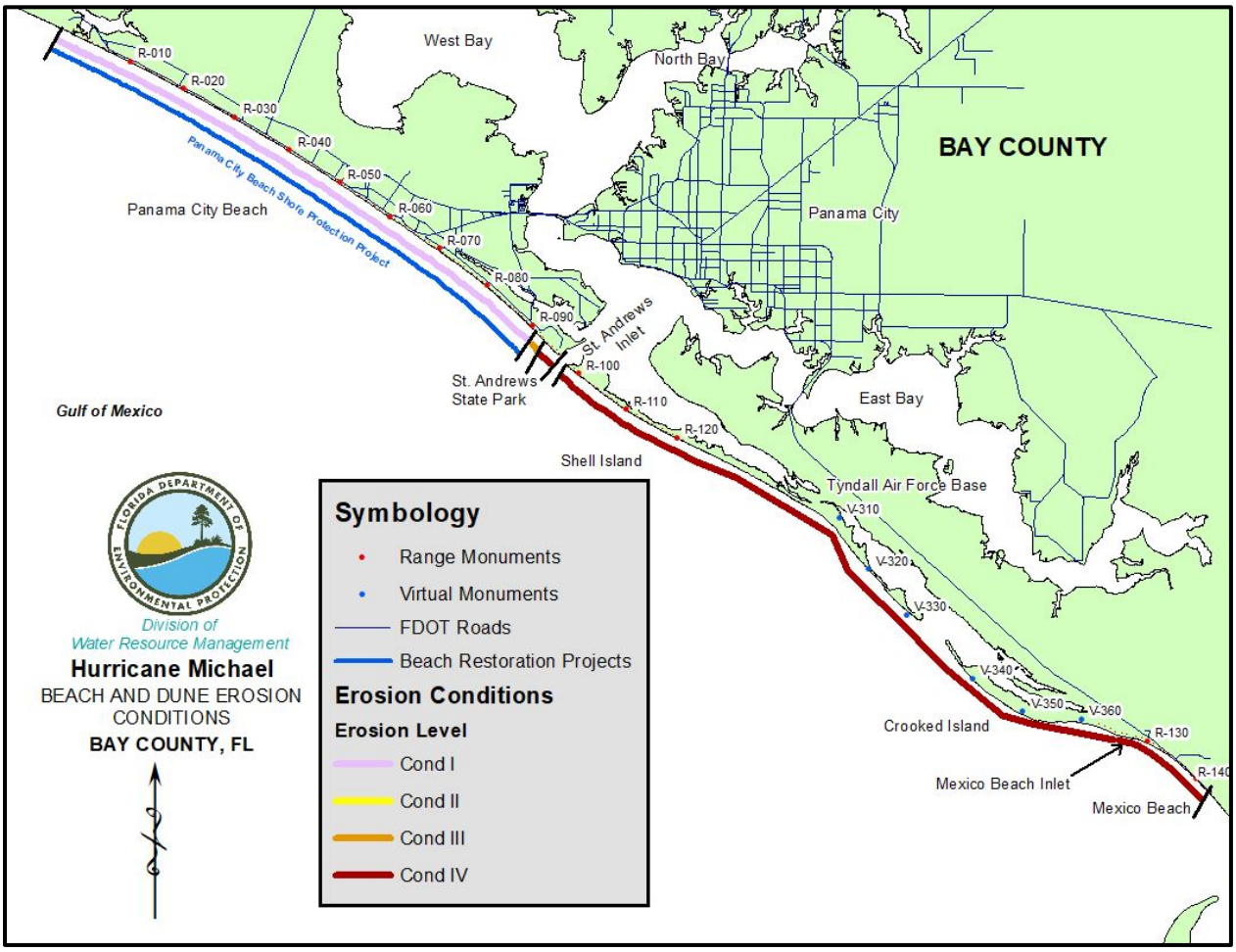

Figure 2: *Bay County Beach and Dune Erosion Conditions from Hurricane Michael.*

Gulf County

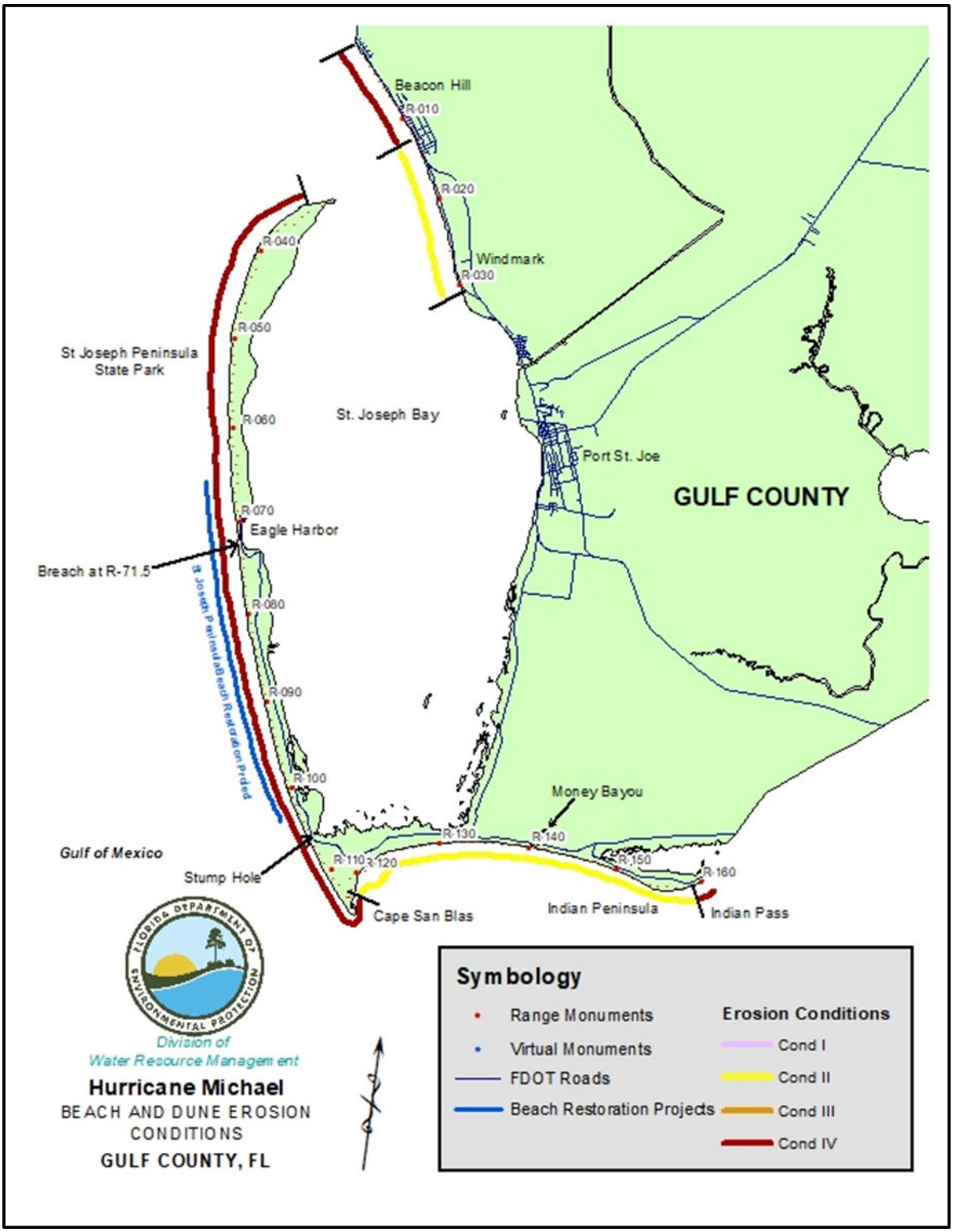

Figure 3: *Gulf County Beach and Dune Erosion Conditions from Hurricane Michael.*

Franklin County

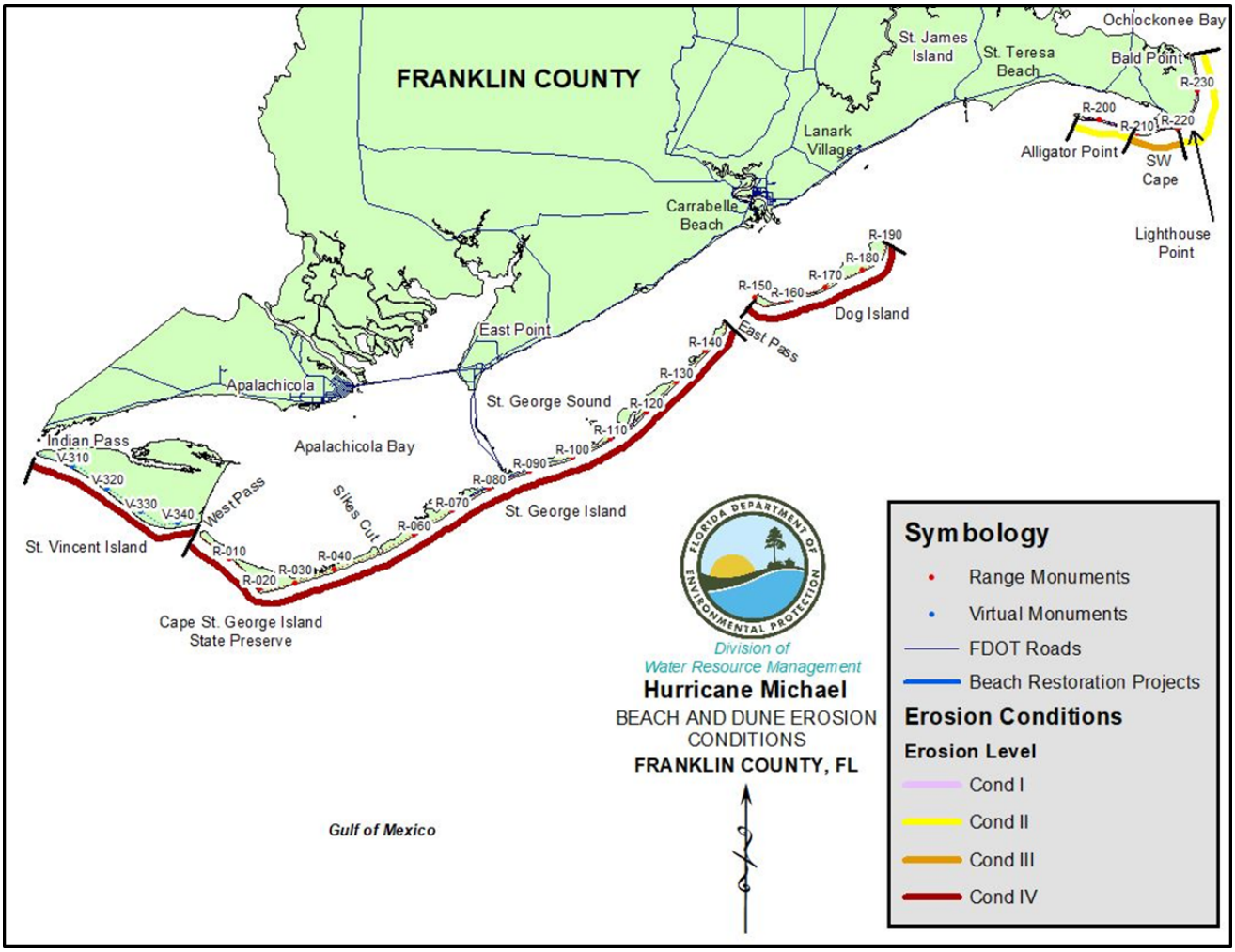

Figure 4: *Franklin County Beach and Dune Erosion Conditions from Hurricane Michael.*

III. Beach and Dune Recovery Strategy

The beach and dune recovery recommendations in this plan include volumetric loss determinations and replacement cost estimates that are based on the best available information and strategies. Some of the strategies may only include replacement of appropriate dune plants for stabilization of existing dunes or to conduct a sand search. DEP staff corresponded with federal, state, and local agencies involved with storm recovery activities. Cost estimates were developed with the assistance of local sponsors and through supporting documentation provided by engineering consultants. These recommendations were developed as a guide to implement a

recovery plan, and will, if implemented, accelerate the natural recovery of impacted beach and dune systems.

Each proposed activity is presented by county with a listing of DEP Reference (R) monuments, both in the text and on the associated maps, to identify project boundaries along the impacted shoreline. This recovery plan also identifies any known federal, state and local funds proposed to implement a project. The storm recovery funds indicated are required in addition to any funding currently appropriated for the Beach Management Funding Assistance Program or requested in the FY 2019-2020 Local Government Funding Request (LGFR). Detailed planning and engineering tasks will be needed for each project to formulate the most cost-effective design and construction. Any truck-haul projects in the below recommendations are estimated at $25 per cubic yard of sand. All properties where the State of Florida is the upland property owner are requested at 100 percent state cost. All other properties are requested at 50% state share. As of the drafting of this report, there are no known storm recovery projects included that qualify for public assistance funding provided by the Federal Emergency Management Agency (FEMA). This recovery plan is a supplemental planning document to the annual LGFR process and may require updates as additional information is received.

IV. Recommended Beach and Dune Recovery Plan

Bay County

Panama City Beaches Shore Protection Project, R1 – R92

Construct a full-scale beach nourishment project: The volume needed to nourish the full template including Michael losses is 1,161,200 cubic yards estimated at $25 per cubic yard. Construction is anticipated to begin in FY2020-2021. It is anticipated that the U.S. Army Corps of Engineers (USACE) will provide funding towards the scheduled federal nourishment.

Estimated Total Cost: $30,000,000 (Estimated State Cost: $2,500,000)

St. Andrews State Park Dune Project, R92 – R97

Construct a dune nourishment project: Storm losses are estimated at 26,700 cubic yards of sand within the park with an expected cost of $25 per cubic yard. State cost anticipates that the project could be constructed with the Panama City Beaches Shore Protection Project in FY 2020-2021.

Estimated State Cost: $480,600 (State property at 100% state share.)

St. Andrews State Park Beach Project, R92 – R97

Construct a beach restoration project: As an alternative to the dune project above, this proposal will allow the state park to be restored to the same full-scale template as the Panama City Beach project, to improve project performance. A volume of approximately 600,000 cubic yards of sand, estimated at $25 per cubic yard, is predicted for restoration of the park. State cost anticipates that the project could be constructed with the Panama City Beaches Shore Protection Project in FY 2020-2021.

Estimated State Cost: $14,500,000 (State property at 100% state share.)

Mexico Beach Inlet, R127 – R128

Conduct a sand bypassing project: Bypass sand from the canal entrance and updrift beach by dredging sand and pumping it to the eroded beach areas downdrift of the canal.

Estimated Cost: To Be Determined.

Mexico Beach Restoration, R128 – R144

Construct a full-scale beach restoration project: The volume needed to nourish the full template including Michael losses is approximately 1,350,000 cubic yards estimated at $18 per cubic yard. Design of the full restoration for Mexico Beach has been initiated. Construction is planned in FY2020-2021.

Estimated Total Cost: $24,300,000 (Estimate State Cost: $12,150,000)

Gulf County

St. Joseph Peninsula Beach Nourishment, R77.3 – R85.5 and R89.5 – R105

Construct a beach and dune nourishment project: The beach nourishment project contractor was mobilizing for the construction phase when Michael made landfall. A supplemental volume of 185,000 cubic yards of sand, estimated at $15 per cubic yard, is needed in addition to the planned nourishment for Michael storm recovery. Construction is planned in FY2019-2020.

Estimated Total Cost: $2,775,000 (Estimated State Cost: $1,387,500)

St. Joseph Peninsula Beach Nourishment – St. Joseph Peninsula State Park Extension, R67 – R71 and R72 – R77.3

Construct a beach and dune nourishment project: The project consists of an extension of the upcoming nourishment from the state park boundary into the state park to R67. The project includes placement of an additional 100,000 cubic yards of beach compatible sand and installation of sea oats to facilitate dune recovery. The estimated cost is based on $15 per cubic yard and $20,000 for sea oats.

Estimated State Cost: $1,520,000. (State property at 100% state share.)

St. Joseph Peninsula Beach Nourishment – William J. Rish Recreational Park Addition, R85.5 – R89.5

Conduct a beach nourishment project: The project is intended to mitigate for the extensive beach and dune losses and increase the performance of the planned nourishment project. The addition of the park will require 315,000 cubic yards estimated at $15 per cubic yard. The nourishment project is currently planned for areas north and south of Rish park in FY 2020-2021.

Estimated Cost: $4,725,000. (State property at 100% state share.)

Michael's Cut (Eagle Harbor), R71 – R72

Construct a beach project to fill the cut/breach and restore the dune: The project consists of placement of approximately 285,000 cubic yards of sand estimated at $15 per cubic yard.

Estimated State Cost: $4,500,000. (State property at 100% state share.)

St. Joseph Peninsula Beach Geotechnical Study, R67 – R105

Conduct a sand search study for the St. Joseph Peninsula Beach Nourishment: The current offshore borrow site may not produce the volume of sand needed for increased sand placement. The study will determine where other compatible sand sources are located.

Estimated Total Cost: $750,000 (Estimated State Cost: $375,000)

Beacon Hill/Windmark Dune Restoration, R1 – R31

Construct a dune restoration project: The project consists of the placement of approximately 200,000 cubic yards of beach compatible sand above the mean high water line. Estimated cost of $20 per cubic yard of sand is based on the assumption that the project will be constructed in conjunction with the Mexico Beach Restoration Project.

Estimated Total Cost: $4,000,000 (Estimated State Cost: $2,000,000)

Franklin County

St. George Island Plantation Dune, R52 – R73

Construct dune restoration: The project consists of truck haul and placement of 200,000 cubic yards of sand, estimated at $25 per cubic yard, above mean high water line to replace the estimated storm sand losses.

Estimated Total Cost: $5,000,000 (Estimate State Cost $2,500,000)

St. George Island Dune, R74 – R105

Construct dune restoration at St. George Island where needed: The placement of 200,000 cubic yards of sand, estimated at $25 per cubic yard, above mean high water line to replace the estimated storm sand losses.

Estimated Total Cost: $5,000,000 (Estimate State Cost $2,500,000)

St. George Island State Park, R105 – R128

Survey dunes for possible sand placement and plant dune vegetation.

Estimated Cost: To Be Determined. State property at 100% state share.

Alligator Point, R210 – R216

Construct dune restoration at Alligator Point in areas where feasible and of greatest need.

Estimated Cost: To Be Determined.

Summary of Recovery Activities

Currently, recovery activities consist of planning and coordination with federal, state, and local authorities. Sand volumes have been estimated for Bay, Gulf, and Franklin counties except for Mexico Beach Inlet, St. George Island State Park, and Alligator Point. Design and permitting activities will be the next step in the process to determine sand sources and construction plans. None of the projects listed in this report have constructed any post-storm beach or dune nourishment projects as of the published date of this report. This supplementary funding request coincides with the planning and coordination effort to assist DEP and local sponsors with the development of design and construction phases.

The total known storm recovery costs needed to implement the activities of this recovery plan are summarized in Table 2. Projects listed in this recovery plan are presented in Table 2, based on readiness to proceed in the upcoming fiscal years, with projects most ready to proceed listed first.

Table 2: Post-Hurricane Beach and Dune Recovery Plan Cost Summary

Table 2a: Post-Hurricane Beach and Dune Recovery Projects Ready to Proceed in FY2019-20

COUNTY	DEP REFERENCE MONUMENTS	PROJECT NAME	CONDITION	PROJECT ACTIVITY	CUBIC YARDS	ESTIMATED TOTAL COST	ESTIMATED STATE COST
Bay	R1 – R92	Panama City Beaches Shore Protection Project	I	Beach Nourishment	1,161,200	$30,000,000	$2,500,000
Bay*	R92 – R97	St. Andrews State Park Dune Project	III - IV	Dune Restoration	26,700	$480,600	$480,600
Bay*	R92 – R97	St. Andrews State Park Beach Project	III - IV	Beach Restoration	600,000	$14,500,000	$14,500,000
Gulf	R77.3 – R85.5 and R-89.5 – R105	St. Joseph Peninsula Beach Nourishment	IV	Additional Sand Required for Michael Storm Losses	185,000	$2,775,000	$1,387,500
Gulf	R67 – R71 and R72 – R77.3	St. Joseph Peninsula Beach Nourishment – St. Joseph Peninsula State Park Extension	IV	Beach Nourishment Extension	100,000	$1,520,000	$1,520,000
Gulf	R85.5 – R89.5	Rish Park addition to the St. Joseph Peninsula Beach Nourishment	IV	Beach Nourishment	315,000	$4,725,000	$4,725,000
Totals:						**$54,000,600**	**$25,113,100**

*** Subtract the St. Andrews Dune Project or St. Andrew Beach Project from total and state costs, based on which project is selected.**

Table 2b: Post-Hurricane Beach and Dune Recovery Projects Ready to Proceed in FY2020-21

COUNTY	DEP REFERENCE MONUMENTS	PROJECT NAME	CONDITION	PROJECT ACTIVITY	CUBIC YARDS	ESTIMATED TOTAL COST	ESTIMATED STATE COST
Bay	R128 – R144	Mexico Beach Restoration	IV	Beach Restoration	1,350,000	$24,300,000	$12,150,000
Gulf	R1 – R31	Beacon Hill/Windmark Dune Restoration	IV	Dune Restoration	200,000	$4,000,000	$2,000,000
Gulf	R67 – R105	St. Joseph Peninsula Beach Geotechnical Study	IV	Sand Search	---	$750,000	$375,000
Totals:						**$29,050,000**	**$14,525,000**

Table 2c: Post-Hurricane Beach and Dune Recovery Projects Ready to Proceed in FY2021-22

COUNTY	DEP REFERENCE MONUMENTS	PROJECT NAME	CONDITION	PROJECT ACTIVITY	CUBIC YARDS	ESTIMATED TOTAL COST	ESTIMATED STATE COST
Bay	R127 – R128	Mexico Beach Inlet	IV	Sand Bypassing	TBD	TBD	TBD
Gulf	R71 – R72	Michael's Cut (Eagle Harbor)	IV	Fill Cut and Construct Dune	285,000	$4,500,000	$4,500,000
Franklin	R52 – R73	St. George Island Plantation Dune	IV	Dune Restoration	200,000	$5,000,000	$2,500,000
Franklin	R74 – R105	St. George Island Dune	IV	Dune Restoration	200,000	$5,000,000	$2,500,000
Franklin	R105 – R128	St. George Island State Park	IV	Dune Restoration	TBD	TBD	TBD
Franklin	R210 – R225	Alligator Point	II	Dune Restoration	TBD	TBD	TBD
Totals:						**$14,500,000**	**$9,500,000**

	State Lands – 100% State Cost-Share
	Federal Shore Protection Project (USACE) with Federal cost share
TBD	Cost estimates are "To Be Determined" as more information is needed from the local government

V. Implementation of Recovery Plan

This hurricane recovery plan contains implementation strategies involving the need for state, federal and local agency cooperation. Successful implementation of the plan will require extensive coordination to address multiple funding sources, potential impacts to nesting marine turtles and shorebirds, potential impacts to environmental resources and cost-effective designs. While the plan contains several short-term measures such as dune restoration to address immediate threats, it should be recognized that long-term implementation activities will continue for several years as beach restoration and maintenance nourishment activities are completed.

Each of the implementation strategies recommended in the plan will require coordination with state and federal resource agencies, such as the Florida Fish and Wildlife Conservation Commission and the USACE. Many of the proposed measures will require state and/or federal permits. DEP has initiated meetings with the appropriate state and federal agencies to coordinate activities and will facilitate streamlined permitting, where feasible, to implement projects.