Big Hickory Pass Inlet Management Plan

Office of Resilience and Coastal Protection

Florida Department of Environmental Protection

June 2026

Final Order Adopting
New Pass Inlet Management Plan

WHEREAS, pursuant to section 161.161, Florida Statutes (F.S.), the Florida Department of Environmental Protection (department or DEP) shall "evaluate each improved, modified or altered inlet and determine whether the inlet is a significant cause of beach erosion. With respect to each inlet determined to be a significant cause of beach erosion, the plan shall include the extent to which such inlet causes beach erosion and recommendations to mitigate the erosive impact of the inlet, including, but not limited to, inlet sediment bypassing; improvement of infrastructure to facilitate sand bypassing; modifications to channel dredging, jetty design and disposal of spoil material; establishment of feeder beaches; and beach restoration and beach nourishment."

WHEREAS in 2008, the Florida Legislature amended section 161.142, F.S., finding, "The Legislature recognizes the need for maintaining navigation inlets to promote commercial and recreational uses of our coastal waters and their resources. The Legislature further recognizes that inlets interrupt or alter the natural drift of beach-quality sand resources, which often results in these sand resources being deposited in nearshore areas or in the inlet channel, or in the inland waterway adjacent to the inlet, instead of providing natural nourishment to the adjacent eroding beaches. Accordingly, the Legislature finds it is in the public interest to replicate the natural drift of sand which is interrupted or altered by inlets to be replaced and for each level of government to undertake all reasonable efforts to maximize inlet sand bypassing to ensure that beach-quality sand is placed on adjacent eroding beaches. Such activities cannot make up for the historical sand deficits caused by inlets but shall be designed to balance the sediment budget of the inlet and adjacent beaches and extend the life of proximate beach restoration projects so that periodic nourishment is needed less frequently;" and

WHEREAS in 2021-2023, the Lee County sponsored an inlet management study of Big Hickory Pass, which compiled new survey data and information regarding its coastal processes and inlet and shoreline dynamics and updated its sediment budget; and

WHEREAS, in June 2026, the department finalized the development of an inlet management plan that contains corrective measures to mitigate the identified inlet erosion impacts to adjacent beaches; and

WHEREAS, Lee County is responsible for nourishment on Bonita Beach and sand bypassing at Big Hickory Pass and, therefore, responsible for implementation of the inlet management plan; and

WHEREAS, this inlet management plan (attached) is consistent with the department's program objectives under Chapter 161, F.S.

THEREFORE:

The department does hereby adopt the following implementation strategies, as set forth in the attached **Big Hickory Pass Inlet Management Plan**. Future inlet management activities conducted by Lee County, shall be consistent with the following four strategies:

1) **A comprehensive beach and inlet hydrographic monitoring program** shall be conducted to evaluate the performance and impact of existing sand bypassing and nourishment projects and to periodically update the inlet sediment budget. Beach and nearshore surveys between DEP Range/Reference Monuments R223 to R235 shall be conducted for Big Hickory Pass. Periodic inlet hydrographic surveys to include the inlet channel and the ebb shoal shall also be conducted.

2) **Natural sand bypassing shall be continued for the Big Hickory Pass inlet system.**

3) **On an average annual basis, the target inlet sand bypassing quantity shall be 19,500 cubic yards per year with placement of 17,300 cubic yards per year to the south on Bonita Beach (R226-R239) that will be subject to natural bypassing northward across Big Hickory Pass to Big Hickory Island, and placement of 2,200 cubic yards per year to the north on Big Hickory Island (R222.7-R225.9) to account for sand loss into Broadway Channel.** This target quantity may be modified or updated based on a minimum of four years of additional monitoring data indicating a change in the sediment budget. However, the sediment budget should cover a time period of at least 10 years. Additional sediment volumes may be placed to enhance the beach volume of the adjacent beach restoration projects.

4) **The source of sediment for meeting the target sand bypassing quantities in Strategy #3 shall be acceptable offshore sources or inland sand mines, or as otherwise authorized by permit.**

5) **The two terminal groins on Bonita Beach on the south side of Big Hickory Pass that were damaged by Hurricane Ian, shall be repaired and maintained.**

Inlet management actions conducted by Lee County that implement the strategies contained in this plan are subject to further evaluation and subsequent authorization or denial, as part of the department's permitting process. Activities that implement these adopted strategies shall be eligible for state financial participation pursuant to section 161.143, F.S., subject to department approval of a funding request and an appropriation from the Legislature. The level of state funding shall be determined based on the activity being conducted and the department's rules. The department may choose not to participate financially if the proposed method of implementation is not cost effective or fails to meet the intent of section 161.142, F.S., and this final order. Activities ineligible for cost sharing includes but are not limited to navigational construction, operation, and maintenance activities, except those elements whose purpose is to place or keep sand on adjacent beaches. Nothing in this plan precludes the evaluation and potential adoption of other strategies for the effective management of Big Hickory Pass and the adjacent beaches.

Approval of Adoption

Alex Reed

Director of the Office of Resilience and Coastal Protection

Florida Department of Environmental Protection

Filing and Acknowledgement

FILED, on this date with the designated Deputy Clerk, pursuant to section 120.52, F.S., receipt of which is hereby acknowledged.

Deputy Clerk

6/30/2026

Date

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Notice of Rights

This action is final and effective on the date filed with the clerk of the department unless a petition for an administrative hearing is timely filed under sections 120.569 and 120.57, F.S., before the deadline for filing a petition. On the filing of a timely and sufficient petition, this action will not be final and effective until further order of the department. Because the administrative hearing process is designed to formulate final agency action, the hearing process may result in a modification of the agency action or even denial of the request for a variance or waiver.

Petition for Administrative Hearing

A person whose substantial interests are affected by the department's action may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57, F.S. Pursuant to Rule 28-106.201, Florida Administrative Code (F.A.C.), a petition for an administrative hearing must contain the following information:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name, address, telephone number and any e-mail address of the petitioner; the name, address, telephone number and any email address of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests are or will be affected by the agency determination;

(c) A statement of when and how the petitioner received notice of the agency decision;

(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;

(e) A concise statement of the ultimate facts alleged, including the specific facts that the petitioner contends warrant reversal or modification of the agency's proposed action;

(f) A statement of the specific rules or statutes that the petitioner contends require reversal or modification of the agency's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and

(g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wishes the agency to take with respect to the agency's proposed action.

The petition must be filed (received by the clerk) in the Office of General Counsel of the department at 3900 Commonwealth Blvd., Mail Station 35, Tallahassee, Florida 32399-3000. Also, a copy of the petition shall be mailed to the applicant at the address indicated above at the time of filing.

Time Period for Filing a Petition

In accordance with Rule 62-110.106(3), F.A.C., petitions for an administrative hearing must be filed within 21 days of receipt of this written notice. The failure to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

Extension of Time

Under Rule 62-110.106(4), F.A.C., a person whose substantial interests are affected by the department's action may also request an extension of time to file a petition for an administrative hearing. The department may, for good cause shown, grant the request for an extension of time. Requests for extension of time must be filed with the Office of General Counsel of the department at 3900 Commonwealth Blvd., Mail Station 35, Tallahassee, Florida 32399-3000, before the applicable deadline for filing a petition for an administrative hearing. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

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Introduction

Pursuant to Subsection 161.101(2), F.S., the Florida Department of Environmental Protection (department or DEP) is the beach and shore preservation authority for the state of Florida. As part of the department's statewide beach management plan adopted pursuant to section 161.161, F.S., the department is adopting this inlet management plan for Big Hickory Pass in Lee County, Florida.

"Big Hickory Pass Inlet Management Plan" updates strategies for Big Hickory Pass that were adopted in 2008 in the "Strategic Beach Management Plan" (DEP, 2008) to be consistent with current statutes and observed erosion[1] conditions. The 2023 "Strategic Beach Management Plan" (DEP, 2023) calls for "Monitor and complete inlet management study; develop a sediment budget for the adoption of an inlet management plan to guide the future dredging and beach placement of inlet material."

See the general location of Big Hickory Pass in **Figure 1**.

[1] As used in this document, the term "erosion" means wearing away of land or the removal of consolidated or unconsolidated material from the coastal system by wind or wave action, storm surge, tidal or littoral currents or surface water runoff. As used in this document, the term "accretion" means the buildup of land or accumulation of unconsolidated material within the coastal system caused by wind and wave action, storm surge, or tidal or littoral currents. The descriptions of coastal processes in this document are not intended to affect title to real property or real property boundaries.

Figure 1. 2023 aerial photograph showing the location of Big Hickory Pass in Lee County (Esri Basemap).

Program Objectives and Statutory Responsibilities for Inlet Management

In 2008, the Florida Legislature amended section 161.142, F.S., finding,

> "The Legislature recognizes the need for maintaining navigation inlets to promote commercial and recreational uses of our coastal waters and their resources. The Legislature further recognizes that inlets interrupt or alter the natural drift of beach-quality sand resources, which often results in these sand resources being deposited in nearshore areas or in the inlet channel, or in the inland waterway adjacent to the inlet, instead of providing natural nourishment to the adjacent eroding beaches. Accordingly, the Legislature finds it is in the public interest to replicate the natural drift of sand which is interrupted or altered by inlets to be replaced and for each level of government to undertake all reasonable efforts to maximize inlet sand bypassing to ensure that beach-quality sand is placed on adjacent eroding beaches. Such activities cannot make up for the historical sand deficits caused by inlets but shall be designed to balance the sediment budget of the inlet and adjacent beaches and extend the life of proximate beach restoration projects so that periodic nourishment is needed less frequently."

Pursuant to section 161.143, F.S.,

> "Studies, projects and activities for the purpose of mitigating the erosive effects of inlets and balancing the sediment budget of the inlet and adjacent beaches must be supported by separately approved inlet management plans or inlet components of the statewide comprehensive beach management plan."

Lee County has been the entity responsible for nourishment on Bonita Beach and sand bypassing at Big Hickory Pass and consequently, mitigating much of the beach erosion caused by the inlet, as specified in Subsection 161.142 (6), F.S.

History of Big Hickory Pass

Big Hickory Pass is in southern Lee County on the southwest Gulf coast of Florida between Big Hickory Island to the north and Bonita Beach to the south and is located between DEP range/reference monuments R225 and R226 (**Figure 2**). Big Hickory Pass along with Big Carlos Pass and New Pass to the north connect the Gulf of America with Estero Bay. Big Hickory Pass has a width of approximately 150 feet and depths reach 6.5 feet, (Moffatt & Nichol, 2023). Big Hickory Pass and the adjacent barrier islands have been dynamic over the last eighty years as shown in **Figure 3.**

It is important to understand the history of Big Hickory Pass, its evolution and prior inlet management activities, and beach erosion control activities along the adjacent beaches, to gain a perspective on the inlet's dynamics and the need to change inlet management strategies over time. The coastal area of southwest Florida has been inhabited by pre-Colombian tribes referred to as the Calusa for at least the past two thousand years. Early Spanish references and archeological investigations provide the current state of knowledge about these people who likely used the local inlets for small craft navigation. Mound Key lying east of Big Carlos Pass is one of the largest Calusa sites in the region and was reportedly the stronghold of Carlos, the Calusa chief, and its temple mound was used for religious activities. The Calusa were reportedly extinct by the early 19th century and had been displaced by the Seminoles who were gradually pushed southward during the Seminole wars.

Development in the area began in the late 19th century with scattered homesteads. Dr. Cyrus Teed received a deed to 300 acres on the south end of Estero Island and established the Koreshan Unity's College of Life (a communal pioneer society) (C.P. Jones, 1980). Many of the homesteaders around Estero Bay were Koreshans. In 1921, a road and bridge were initiated to connect the north end of Estero Island with the mainland. The 1921 hurricane that made landfall further north near Clearwater brushed the Lee County coast causing storm surge flooding across Estero Island. Another hurricane in 1926 caused severe flooding which was reportedly shoulder deep along Estero Island (USACE, 1970). The bridge at the north end of the island was severely damaged and the southern tip of the island was eroded away.

Figure 2. Florida Department of Transportation aerial image of Big Hickory Pass (Lee County) from January 2023.

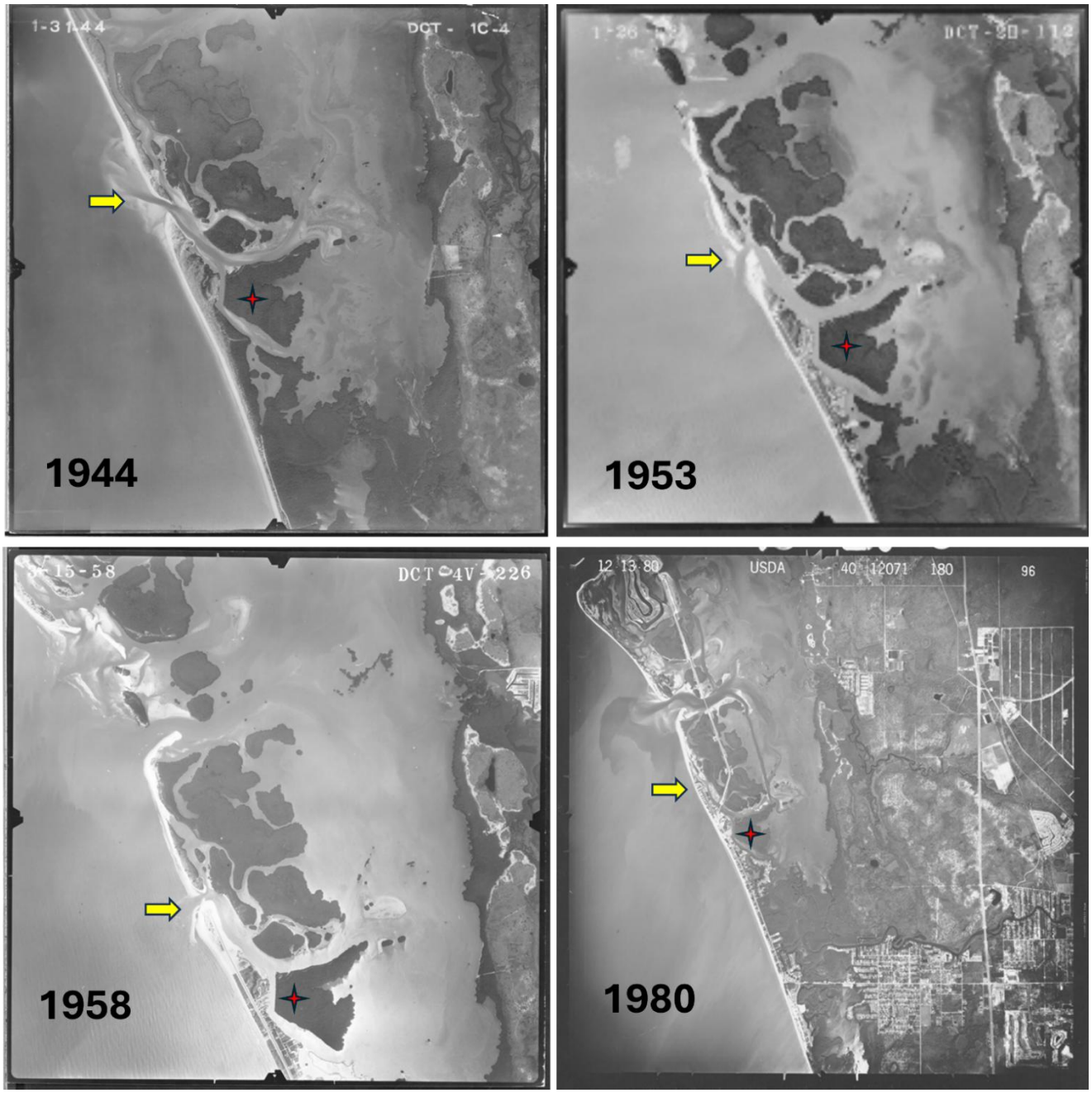

Figure 3. Big Hickory Pass configuration in 1944, 1953, 1958, and 1980. The 1980 aerial shows the pass closed. Each aerial has a yellow arrow pointing to the pass and a red star showing Battista Island that is south of the bridge along the Bonita Beach Causeway (SR865). Aerial imagery courtesy of the U.S. Department of Agriculture.

In 1945, the U.S. Congress authorized construction of the Gulf Intracoastal Waterway (GIWW) between the Caloosahatchee River (Lee County) and the Anclote River (Pinellas County). In June 1960, dredging for this project began and was completed in the late 1960's. Also in 1960,

Hurricane Donna made a direct impact on the area causing extensive damage and erosion at Big Hickory Pass. In 1961, a federal navigation project was completed north of Estero Island at Matanzas Pass for a length of 2.1 miles. Between 1963 and 1965, a 4.3-mile-long causeway with bridges was constructed from south Estero Island across Big Carlos Pass and New Pass southward to Bonita Beach. In 1976, Lee County used a drag line to reopen approximately 500 feet of the previously closed Big Hickory Pass to restore tidal flow to Estero Bay with sand side casting to the south. Big Hickory Pass had closed again by 1980 and remained closed until Tropical Storm Keith reopened it on November 22-23, 1988 (Ceilley et al, 1990).

In 1994 and 1995, two lime rock groins were constructed at the terminal north end of Bonita Beach to anchor a beach restoration project. The north groin was constructed to a length of 335 feet, and the south groin was constructed to a length of 208 feet (**Figure 4**). In 1995, there was 217,000 cubic yards of sand dredged from the ebb shoal of New Pass for the Bonita Beach restoration project to the south of Big Hickory Pass. In 2004 and 2014, approximately 150,000 and 140,220 cubic yards of sand respectively were dredged from Big Carlos Pass ebb shoal for the first and second Bonita Beach nourishment projects. In 2013, approximately 112,870 cubic yards of sand was dredged from the New Pass ebb shoal for a beach restoration project on Big Hickory Island to the north of Big Hickory Pass. Seven concrete, adjustable king-pile groins were installed on the northern half of Big Hickory Island in October 2013 to retain the placed sand and extend the life of the nourishment. Physical monitoring which includes the adjacent shorelines was conducted to detect and manage shoreline changes.

Figure 4. North end of Bonita Beach before construction of the terminal groins (left), after construction of the terminal groins (middle), and after placement of 217,000 cy of sand (right) (Olsen, 2023).

New Pass navigation channel maintenance dredging was also conducted in 2017 involving the excavation of 68,320 cubic yards of sand with placement on Big Hickory Island north of Big Hickory Pass.

In September 2022, category 4 Hurricane Ian inflicted catastrophic damage and erosion to Lee County (Clark et al, 2023). Major beach and dune erosion was sustained along Big Hickory Island and Bonita Beach adjacent to Big Hickory Pass (**Figure 5**). The terminal groins at the north end of Bonita Beach were substantially damaged by the surge, waves, and scour, which scattered many of the groins' lime rock boulders (Olsen, 2023). Overwash, erosion and a breach occurred at Big Hickory Island. The beach berm was restored, and the breach was closed with 71, 356 tons of upland sand that was pumped onto the entire beach in June 2023.

In 2024, Big Hickory Pass and the adjacent beaches were impacted again by Hurricanes Debby, Helene, and Milton (Weeks et al, 2025). Much of the storm induced erosion was mitigated through placement of approximately 350,000 cubic yards of offshore sand along Bonita Beach in 2025 with a modified fill template that extended south to the county line.

Figure 5. Big Hickory Pass and adjacent beaches in October 2022 following Hurricane Ian's impact.

Olsen (1994) provided an inlet management study for New Pass and Big Hickory Pass showing the interrelationship of the adjacent beaches and inlets. This study justified the excavation of sand from the New Pass ebb shoal and placement on Bonita Beach where northerly longshore transport across Big Hickory Pass and Big Hickory Island would return the material to the New Pass ebb shoal. In 2008, the department adopted inlet management strategies for Big Hickory Pass in the "Strategic Beach Management Plan," which were to "Monitor and complete inlet management study; develop

a sediment budget for the adoption of an inlet management plan to guide the future dredging and beach placement of inlet material" (FDEP, 2008).

Olsen (2023) investigated the functionality of the two terminal groins that anchor the Bonita Beach restoration project adjacent to Big Hickory Pass following their hurricane damage in 2022 and recommended major repairs to include raising the crest elevations by 2 feet and increasing their lengths by 18 to 20 feet. Also recommended was increasing the armor stone size to 3 to 4 feet in diameter to maximize the groins' stability during future storm events.

Estero Barriers Regional Inlet Management Study

A regional inlet management study was initiated by Lee County in 2019 to study Big Carlos Pass, New Pass and Big Hickory Pass. The study was completed, and all documents and data were submitted to the department in April 2023 by the county's consultant, Moffatt & Nichol (M&N, 2021a, 2021b, 2022a, 2022b, 2023; OAI, 2022). During the study, six technical advisory committee meetings were held to track the study's progress and develop recommendations for continued study efforts to include developing modeling alternatives for inlet management strategies.

M&N conducted a data and literature review compiling available beach profiles, bathymetry, shoreline positions, aerial photos, sediment grain size data, resource surveys, wind and wave data, sediment transport computations and dredging records. A field data collection effort was conducted that updated bathymetry of the study area. Water levels, waves and currents were obtained through Acoustic Doppler Current Profiler (ADCP) transects across the inlet channels and through a 30-day deployment of five bottom-mounted ADCP's at each of the three inlets as well as one nearshore and one offshore location. Forty hours of current measurements were also obtained from Matanzas Pass north of Estero Island. ADCP data was obtained in both November 2020 and June-August 2021.

Shoreline change and volumetric analysis were conducted of the beaches, inlets and shoals. Beach volume changes were calculated for three periods between 2010 and 2020 using profile surveys from March 2010, June 2016 and June 2020. Hydrodynamic and wave transformation modeling along with a metocean analysis were conducted to describe the study area. Shoreline

change modeling was conducted for the four coastal barriers in the study area using the Danish Hydraulics Institute (DHI) shoreline evolution model — LITLINE. The four shoreline evaluation models were developed and calibrated utilizing the historical shoreline and volume changes along with an evaluation of the model simulated longshore sediment transport rates. M&N subsequently utilized the Delft3D numerical model using the wave and hydrodynamic model results as boundary conditions for the study area. The Delft3D model runs were calibrated to the field data and produced regional morphological conditions and sediment transport in the study area. The Delft3D model evaluated various study alternatives for the development of recommended inlet management strategies.

Sediment Budget of 2023

Pursuant to section 161.142, F.S., dredging within an inlet system, including its shoals, should result in the placement of all beach quality sand on adjacent eroding beaches to balance the sediment budget between the inlet and adjacent beaches. A sediment budget is a balance of the volumes (or volume rate of change) for sediments entering and leaving a tidal inlet system and its adjacent beaches. A sediment budget quantifies the natural longshore sediment transport by waves and tides to and from the inlet, the entrapment of longshore sediment by the inlet channel and the ebb and flood shoals, and the mechanical "bypassing" of sediment, typically by a hydraulic dredge, from the inlet to the adjacent eroded beaches or nearshore. Sediment transport volumes and pathways are unique to each inlet as influenced by regional geology, morphological characteristics, wave and tide conditions, and sediment characteristics and supply. A sediment budget is determined by comparing two or more surveys of an inlet system, including its channel, ebb and flood shoals, and the adjacent beaches.

In support of the Estero Barriers Regional Inlet Management Study, Olsen Associates, Inc. (OAI) developed a regional sediment budget for the three-inlet system of Big Carlos Pass, New Pass and Big Hickory Pass (OAI, 2022). The interconnectivity between the beaches and inlets was very complex and dominated by inlet shoals resulting in a comprehensive sediment budget with discreet sediment cells representing different dynamic and morphological features within the regional study area. The sediment budget's vectors and magnitudes represent net sediment transport and volume change rates. In describing the methodology used to develop the sediment

budget, OAI (2022) notes, "The approaches used to develop the sediment budget include assessing prior monitoring reports and their evaluations, and prior studies; accounting for the history of dredge and fill activities along the area; using the sediment transport rates and pathways predicted by the 3DCST and Mike21/LITLINE models by M&N along the study area; comparing inlet flow rates measured for the present study; parsing the study area into sub-regions by bathymetry and transport directions that were thence individually evaluated; computing historical volume changes assessed by multiple survey comparisons for each of the subregions; observing the physical changes of the islands and shoals through aerial photographs; and evaluating the shoreline changes along the system through survey data and aerial photographs. All of these techniques together make up the final result of the sediment budget, which cannot be understood considering any one of these techniques alone."

The sediment budget for solely Big Hickory Pass is best represented by the area from R235 on Bonita Beach northward to R219 on Lovers Key where there exists a longshore sediment transport reversal. **Figure 6** by OAI (2022) graphically presents the sediment budget affecting Big Hickory Pass. Noteworthy are the beach erosion conditions both north and south of Big Hickory Pass along Big Hickory Island and Bonita Beach, plus the sediment accretion in the interior flood shoal.

The bathymetric data used in the sediment budget analysis spanned the period between 2005 and 2020. For the entire regional sediment budget of the three-inlet system, 48 surveys from 14 different years made up 13 data sets that computed the volumes and shoreline changes. There was considerable variation in areal extent and density of coverage of survey data from year to year.

Tidal flow rates were measured at each of the three inlets over a 30-day period from Nov. 18 to Dec. 17, 2020. As seen in **Table 1**, Big Hickory Pass as well as the other two inlets were ebb tide dominant. This ebb dominance is visually observed through the existence of the large ebb shoals. The average flow velocities at Big Hickory Pass were 0.3 foot per second over the entire 6.5-hour duration of the ebb or flood tide reaching a maximum of 1.0 foot per second.

Table 1. Average Tidal Flow rates through Inlets (Cubic Meters per Tidal Day).

Inlet	Gross Flood	Gross Ebb	Net	Ebb/Flood
Big Carlos Pass	35,045,100	(36,172,200)	(1,127,100)	1.032
New Pass	15,559,900	(15,638,600)	(78,700)	1.005
Big Hickory Pass	1,818,300	(1,823,700)	(5,400)	1.003

Note: From approximately 30 calendar days (28.5 lunar days) of measured data, 11/18/2020 (01:15) to 12/17/2020 (14:54). One Lunar (Tidal) day = approximately 24.85 hours.

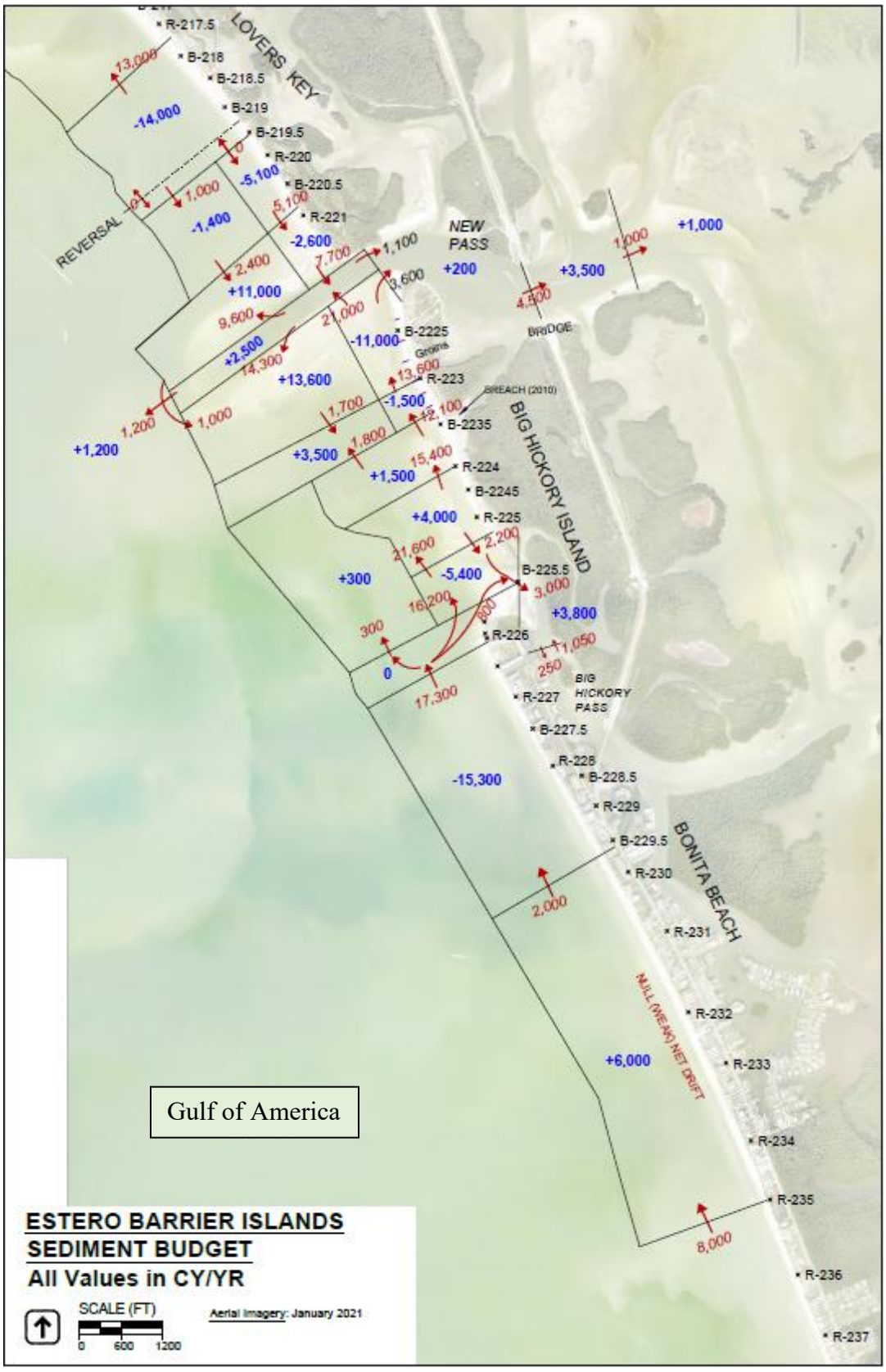

Figure 6. Big Hickory Pass sediment budget (Olsen and Associates, Inc., 2022).

Alternatives Analysis

The regional inlet management study evaluated several alternative management strategies (M&N, 2022b). Alternative 1 was a "no action" alternative that was used for comparison to other alternatives. Alternative 2 was the current beach nourishment maintenance schedule using the same beach fill placement templates as the 2014 project and the same borrow areas within the Big Carlos Pass ebb shoal as were used in the 2004 and 2014 nourishment projects. However, because the historic borrow area recovery rates were substantially less than the Lovers Key and Bonita Beach volumetric erosion rates, this alternative was determined not to be a sustainable solution and was not considered further.

Alternative 3 considered reduced project areas and templates for Lovers Key and Bonita Beach that may be considered sustainable using only the quantity of sediment that recovers in the ebb shoal borrow areas. Alternative 4 considered full beach restoration projects as conducted in 2014 but utilizing offshore sand sources. Two sub-alternatives were considered; one that used the available sediment from the Big Carlos ebb shoal with supplemental offshore material and a second with solely offshore material used for nourishment.

A fifth alternative was to consider structures such as breakwaters, jetties or groins. Groins already exist along Big Hickory Island and at the terminal north end of Bonita Beach. It was determined that there were no "hot spot" areas of inlet induced erosion that may typically justify the construction of shore-protection structures beyond those that currently exist. The study consultants and the technical advisory committee agreed not to consider additional structures as a management strategy any further at this time.

Not evaluated in the study but suggested for future analysis was the investigation and development of interior sand traps involving excavation within the flood shoals. Flood shoal dredging projects typically involve greater environmental resource scrutiny, and the volumes projected by the sediment budget are relatively small.

The study concluded that the historic borrow areas within the Big Carlos Pass ebb shoal are not sustainable for the historic large-scale nourishments of nearby beach restoration projects. The volumetric recovery rates are less than the beach erosion rates. Offshore borrow areas should be

utilized to bring additional sand into the system for these beach nourishment projects, and the previously dredged ebb shoal borrow areas should be allowed to recover.

Not discussed in the study is maintenance dredging of the existing navigation channel within New Pass. Maintenance of this channel is very infrequent and subject to major storm events. Based upon the sediment budget, placement of this material is recommended for southern Lovers Key. The quantity of channel maintenance is expected to be small but will supplement the bypassing requirements for these beaches.

Recommended Inlet Management Plan Strategies

The department staff recommends the following inlet management strategies be adopted to meet the requirements of Chapter 161, F.S.

1) **A comprehensive beach and inlet hydrographic monitoring program** shall be conducted to evaluate the performance and impact of existing sand bypassing and nourishment projects and to periodically update the inlet sediment budget. Beach and nearshore surveys between DEP Range/Reference Monuments R223 to R235 shall be conducted for Big Hickory Pass. Periodic inlet hydrographic surveys to include the inlet channel and the ebb shoal shall also be conducted.

Discussion – A comprehensive beach and inlet hydrographic monitoring program is the most important element to manage the sediment at Big Hickory Pass. Topographic and bathymetric surveys provide reliable data to estimate the volumetric impact of the inlet on adjacent beaches and to establish a sand placement protocol that complies with section 161.142, F.S.

2) **Natural sand bypassing shall be continued for the Big Hickory Pass inlet system.**

Discussion – The beaches north and south of Big Hickory Pass are the adjacent eroded beaches directly impacted by the inlet system. The beaches along Big Hickory Island north of Big Hickory Pass (R222.7-R225.9) and along Bonita Beach south of Big Hickory Pass (R226-R239) are designated critically eroded by the department (DEP, 2026).

3) **On an average annual basis, the target inlet sand bypassing quantity shall be 19,500 cubic yards per year with placement of 17,300 cubic yards per year to the south on Bonita Beach (R226-R239) that will be subject to natural bypassing northward across Big Hickory Pass to Big Hickory Island, and placement of 2,200 cubic yards per year to the north on Big Hickory Island (R222.7-R225.9) to account for sand loss into Broadway Channel.** This target quantity may be modified or updated based on a minimum of four years of additional monitoring data indicating a change in the sediment budget. However, the sediment budget should cover a time period of at least 10 years.

Additional sediment volumes may be placed to enhance the beach volumes of the adjacent beach restoration projects.

Discussion – The sediment budget indicates a need to place a total annual quantity of approximately 17,300 cubic yards of sand to the south on Bonita Beach resulting in the natural bypassing of 16,200 cubic yards northward across Big Hickory Pass to mitigate erosion on Big Hickory Island. The sediment budget also shows an annual loss of 2,200 cubic yards of sand southward off Big Hickory Island into Broadway Channel, which can be mitigated by direct placement of 2,200 cubic yards per year onto Big Hickory Island.

4) **The source of sediment for meeting the target sand bypassing quantities in Strategy #3 shall be acceptable offshore sources or inland sand mines, or as otherwise authorized by permit.**

Discussion – Natural bypassing is recommended to continue to occur, with a focus on allowing natural recirculation in the ebb shoal and beach system, supplemented by strategic nourishments using an offshore or upland sand source. The Broadway Channel is not precluded from consideration in the future following sufficient monitoring data and thorough evaluations to design an environmentally acceptable project.

5) **The two terminal groins on Bonita Beach on the south side of Big Hickory Pass that were damaged by Hurricane Ian, shall be repaired and maintained.**

Discussion – The terminal groins were designed to maintain the beach restoration project to the south allowing northward bypassing without causing excessive shoaling in the inlet. The north groin has a length of 335 feet and the south groin has a length of 208 feet.

References

Clark, R.R., Murshid, S., and Weeks, W.G., 2023. Hurricane Ian & Hurricane Nicole Post-Storm Beach Conditions and Coastal Impact Report, Office of Resilience and Coastal Protection, Florida Department of Environmental Protection, 121 p.

Ceilley, D.W. and Kibbey, K.A., 1990. "South Estero Bay – Big Hickory Pass, Report on Water Quality Monitoring, September 1990, 28 p. plus Appendices A-E

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