

## **FINAL ORDER ADOPTING**

### **EAST PASS INLET MANAGEMENT IMPLEMENTATION PLAN**

WHEREAS on June 8, 2000, the Florida Department of Environmental Protection (Department) adopted the East Pass Inlet Management Study Implementation Plan, which established inlet sand bypassing objectives and called for implementation of a comprehensive beach and offshore monitoring program that would be used to identify beach placement locations for future bypassing efforts and to revalidate or redefine the adopted sediment budget, and

WHEREAS in 2008, the Florida Legislature amended Section 161.142, Florida Statutes, finding, “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 the existing inlet protocol to place material only to the west of the inlet is not currently consistent with Section 161.142, Florida Statutes, because it does not ensure that the inlet dredge material “is placed on adjacent eroding beaches”, nor does the material placement protocol allow the inlet sediment budget to be balanced or extend the life of proximate beach restoration projects, and

WHEREAS in 2009, the Department and the City of Destin sponsored an update study of East Pass, to compile new and historical data and information regarding coastal processes and inlet and shoreline dynamics and to update the inlet sediment budget, as reported in *City of Destin, Florida, East Pass Inlet Study & Management Considerations* (CP&E, 2010), and

WHEREAS an updated sediment budget for the time period between 1996 and 2007 revealed a trend of west to east longshore sediment transport resulting in a net gain immediately west of the inlet and a significant loss along Holiday Isles to the east of the inlet, and wave data obtained by the Corps of Engineers suggested a drift nodal point existed at East Pass and that frequent drift reversals occurred leading to transport in both directions, and

WHEREAS the Department has developed a revised implementation plan that contains corrective measures to mitigate the identified impacts of the inlet and bases inlet dredge material placement east or west of the inlet on the latest monitoring data in order to effectively manage the inlet sediment budget, and

WHEREAS this revised inlet management plan is consistent with the Department's program objectives under Chapter 161, Florida Statutes,

**THEREFORE:**

The Department does hereby adopt the following implementation strategies, as set forth in attachment A, "East Pass 2013 Summary of Findings Report and Update Inlet Management Implementation Plan," hereby incorporated by reference. Future inlet management activities shall be consistent with the following four strategies:

**1) Implement a comprehensive beach and inlet hydrographic monitoring program** to evaluate performance and impact of existing projects and to update and define the inlet sediment budget. Beach profile monitoring data shall be used to determine erosion<sup>1</sup> quantities from the gulf beaches east and west of the inlet along the area of inlet influence (V611-V620 and R17-R26). Prior to any scheduled inlet channel maintenance dredging, the recent erosion of adjacent beaches observed over a minimum of five years shall define the placement need in terms of location and volume.

**2) Modify the current inlet sand transfer protocol to permit the placement of inlet dredge material along the gulf beaches both to the east and to the west of the inlet** within the area of inlet influence (V611-V622 and R17-R26). The quantity of allowable fill placement in each area shall be based upon observed erosion patterns and beach erosion quantities documented through the monitoring protocol. Dredge material placement shall not exceed the design template of any proximate beach restoration projects. Any dredge material placement shall be strategically sited to minimize the potential for any re-entry or re-entrainment back into the inlet or the federal navigation channel of East Pass.

**3) Complete the stabilization of Norriego Point.** The City of Destin proposes a Norriego Point Stabilization Project to include repair and reconstruction of the existing T-groins, the construction of an additional T-groin and a seawall or boulder mound structure at the northern end, and the placement of fill to reconstruct the tip of Norriego Point.

**4) Investigate availability and feasibility of supplemental inlet sediment excavation** outside the federal navigation channels, exclusive of areas with submerged natural resources. Should gulf beach erosion, as determined in the monitoring protocol, exceed the bypassing quantities obtained from maintenance of the federal navigation channels, additional inlet sediment may be obtained as determined from its availability, feasibility, and impacts.

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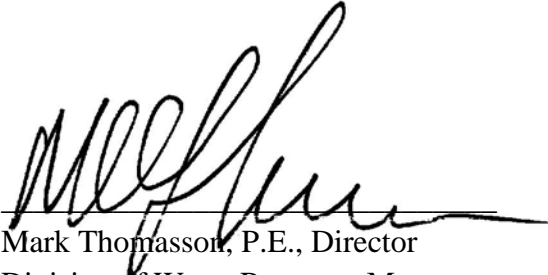
<sup>1</sup> As used in this document, the term "erosion" means wearing away of land or the removal of consolidated or unconsolidated material from the coastal system by wind or wave action, storm surge, tidal or littoral currents or surface water runoff. As used in this document, the term "accretion" 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 description of coastal processes in this document are not intended to affect title to real property or real property boundaries.

Inlet management actions 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, Florida Statutes, subject to Department approval and an appropriation from the Florida Legislature. The level of State funding shall be determined based upon the activity being conducted and the Department's applicable statutes and 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, Florida Statutes, and the adopted inlet management strategies. Nothing in this plan precludes the evaluation and potential adoption of other strategies for the effective management of East Pass and the adjacent beaches through further revision to that plan as may be properly adopted.

Execution of this Final Order constitutes agency action. Any Florida corporation not for profit which meets the requirements of Subsection 403.412(6), Florida Statutes, and any person whose substantial interests will be determined or affected by the Final Order may petition the Department for a formal administrative hearing pursuant to Section 120.569 or 120.57, Florida Statutes, as set forth in the attached Notice of Rights, to challenge the provisions of this Final Order.

If the Department proposes to issue a permit that implements the strategies in this Final Order, any Florida corporation not for profit which meets the requirements of Subsection 403.412(6), Florida Statutes, and any person whose substantial interests will be determined or affected by the proposed permit may petition the Department for a formal administrative hearing pursuant to Section 120.569 or 120.57, Florida Statutes, as set forth in the Notice of Rights attached to the permit. The scope of a challenge to a permit approval or denial is limited to whether the agency action complies with the permitting criteria. Agency action previously subject to challenge or administrative review will not be subject to challenge at the time of permit approval or denial.

**APPROVED FOR ADOPTION**

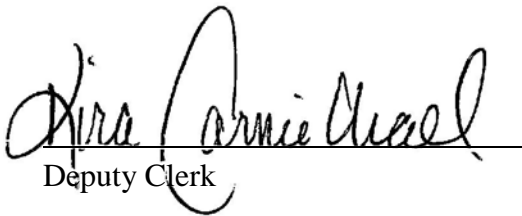


Mark Thomasson, P.E., Director  
Division of Water Resource Management  
Department of Environmental Protection

7/24/2013  
Date

**FILING AND ACKNOWLEDGEMENT**

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



Deputy Clerk

7-30-2013  
Date

## **NOTICE OF RIGHTS**

The Department's proposed agency action shall become final unless a timely petition for an administrative hearing is filed under Sections 120.569 and 120.57, Florida Statutes, before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below.

A person whose substantial interests are affected by the Department's proposed action decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received by the clerk) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000. Petitions must be filed within twenty-one days of receipt of this written notice.

Under Rule 62-110.106(4), Florida Administrative Code, a person whose substantial interests are affected by the Department's action may request an extension of time to file a petition for an administrative hearing. Requests for extension of time must be filed (received by the clerk) with the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, before the end of the time period for filing a petition for an administrative hearing. The Department may, for good cause shown, grant the request for an extension of time. 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.

Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), Florida Statutes, must be filed within twenty-one days of publication of the notice or within twenty-one days of receipt of the written notice, whichever occurs first. Under Section 120.60(3), Florida Statutes, however, any person who asked the Department for notice of agency action may file a petition within twenty-one days of receipt of such notice, regardless of the date of publication.

The failure of any person to file a petition or request for extension of time 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, Florida Statutes, 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, Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based 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, and telephone number of the petitioner; the name, address, and telephone number 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; 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.

A petition that does not dispute the material facts on which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, Florida Administrative Code.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation under Section 120.573, Florida Statutes, is not available.

Once this decision becomes final, any party to the final agency action has the right to seek judicial review of it under Section 120.68, Florida Statutes, by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department in the Office of General Counsel, Mail Station 35, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within thirty days after this decision is filed with the clerk of the Department.

# ATTACHMENT A

## EAST PASS

### 2013 SUMMARY OF FINDINGS REPORT

and

### UPDATE INLET MANAGEMENT IMPLEMENTATION PLAN

#### Introduction

Pursuant to Subsection 161.101(2), Florida Statutes, the Florida Department of Environmental Protection (Department) is the beach and shore preservation authority for the State of Florida. As part of the beach management plan adopted pursuant to Section 161.161, Florida Statutes, the Department is adopting this inlet management plan for East Pass in Okaloosa County, Florida. This plan updates an existing plan for East Pass due to statutory changes and to make the plan consistent with current statutes and observed erosion conditions.

On June 8, 2000, the Department adopted the East Pass Inlet Management Study Implementation Plan. This plan was based upon recommendations and supporting data compiled in the study report, *Inlet Management Plan for East Pass to Choctawhatchee Bay* (Taylor Engineering, Inc., 1999). The study was conducted under the provisions of Section 161.161, Florida Statutes, for the purposes of evaluating the erosive<sup>1</sup> impact of the inlet on adjacent beaches, and to recommend corrective measures to mitigate identified impacts.

The adopted plan (FDEP, 2000) established inlet sand bypassing objectives and called for implementation of a comprehensive beach and offshore monitoring program that would be used to identify beach placement locations for future bypassing efforts and to revalidate the sediment budget (Figure 1).

In 2008, the Florida Legislature amended Section 161.142, Florida Statutes, finding, “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.”

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<sup>1</sup> 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 description of coastal processes in this document are not intended to affect title to real property or real property boundaries.

The current inlet protocol to place material only to the west of the inlet is not currently consistent with Section 161.142, Florida Statutes, because it does not ensure that the inlet dredge material “is placed on adjacent eroding beaches.” The material placement protocol does not allow the inlet sediment budget be balanced or extend the life of proximate beach restoration projects.

In 2009, the Department and the City of Destin sponsored an update study of East Pass, to compile new and historical data and information regarding coastal processes and inlet and shoreline dynamics, as reported in *City of Destin, Florida, East Pass Inlet Study & Management Considerations* (CP&E, 2010).

Okaloosa County is the local sponsor of the federally-authorized East Pass Navigation Project. The U.S. Army Corps of Engineers is responsible for maintenance dredging the federal channel within East Pass.

**History of East Pass**

East Pass has historically been the natural tidal connection between the Gulf of Mexico and Choctawhatchee Bay in northwest Florida (Figure 2). The bay system is fed freshwater from the mouth of the Choctawhatchee River and a number of smaller streams around its perimeter. The earliest hydrographic survey at the inlet dates to 1871, and various historical accounts mention an open tidal inlet which provided navigable passage for native Americans and French pirates through the early 19<sup>th</sup> century. In 1845, a fishing village was founded by the Destin family at the entrance to Choctawhatchee Bay.

Figure 1 – East Pass vicinity with nearby beach restoration and dredge disposal projects.

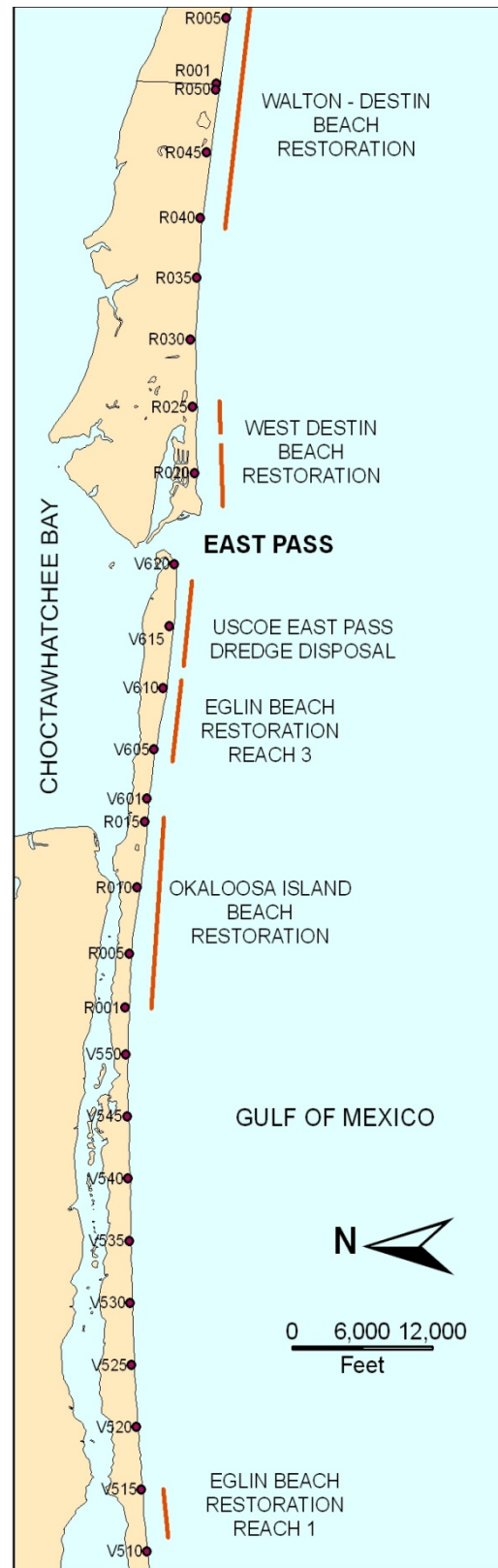






Figure 2 – Aerial photo of East Pass with Federal Navigation Channels shown (Labins, 2004).

Prior to 1928, the inlet had a northwest to southeast alignment running along the existing Old Pass Lagoon – Destin Harbor with its gulf entrance located about 1.5 miles east of the current entrance. The landmass referred today as Holiday Isles was historically the eastern end of Santa Rosa Island. In April 1928, the storm tide of a severe storm overtopped and caused a high tide breach at a narrow site on Santa Rosa Island near the present location of the inlet (Morang, 1992). In March 1929, record rainfall (about 16 inches in 48 hours) in the area caused record flooding on the Choctawhatchee River and the water level in the bay rose 5 feet. Local residents took advantage of the high water conditions and excavated a pilot channel along the 1928 breach. With the flood waters being released through the new cut, the channel quickly enlarged to become the prominent new inlet site. Norriego Point formed as an inlet spit carrying sand from off the beaches east of the inlet by flood currents and wave penetration into the inlet.

Following the opening of the new inlet in 1929, substantial quantities of sand from adjacent beaches entered the inlet and were entrained into the new developing ebb shoal. Beach sand was likewise lost from the beaches in the vicinity of the old entrance to form its closure; however, a large volume of material that made up the old ebb tidal shoal was transported onto the beaches of what is now know as Holiday Isles. This large infusion of sediment from the relic tidal shoal provided substantial growth to the beach east of the new inlet. The new inlet's ebb shoal developed in a manner characteristic to natural tidal inlets to have a sand bypassing bar connecting to the adjacent beaches. Periodic maintenance excavation of the navigation channel interrupted the east-west transport across the inlet, but the cut would quickly fill in to its natural state. The channel alignment also migrated eastward.

Due to extremely hazardous navigation conditions, a federal navigation project at East Pass was adopted by Congress in 1930 and provided for a channel 6 feet deep and 100 feet wide between the gulf and the bay (US Army Engineer Office, Mobile, 1939). Initial excavation occurred in 1931 with the removal of 20,000 cy of sand from the Old Pass channel. Excavation in the East Pass channel commenced in 1937 and was repeated every three to five years through the 1940's. Between 1937 and 1950, approximately 16,600 cy/yr was dredged from the East Pass channel. Due to increased commercial and military traffic following World War II, Congress in 1951 authorized a 12-foot deep and 180-foot wide channel. Starting in 1950 and continuing through the 1980's, maintenance dredging was conducted nearly every year. Between 1952 and 1984, approximately 68,670 cy/yr was dredged. Shoaling of the entrance was rapid. The federal project was expanded to include the construction of two boulder mound jetties between 1967 and 1969, and a jetty spur at the landward end of the east jetty in 1977. Because prior studies documented a west to east longshore transport of sand, the original jetty design included a weir section in the west jetty and a sedimentation basin inside the inlet. The east jetty interrupted the sand supply to Norriego Point and the spit commenced to erode by gulf waves propagating into the inlet between the jetties. The west jetty weir section was closed with a boulder mound section in 1985-86, resulting in today's alignment of federal navigation project structures.

Since 1986, 2.35 million cy of material has been excavated from the East Pass system including Destin Harbor, or approximately 98,027 cy/yr (USACE, 2008) (Table 1). Of this, approximately 89,309 cy/yr was excavated from the East Pass channel and outer bar. Between 2002 and 2010, approximately 577,254 cy (64,140 cy/yr over nine years) of inlet dredge material has been placed on the beaches of Santa Rosa Island west of the inlet (Table 2). Additionally, in 2006/7, 2.8 million cy of material was excavated from the outer portion of the inlet's ebb shoal and used as the fill source for the Walton County / Destin Beach Restoration Project (FDEP Joint Coastal Permit #0218419-002-JC) (Trammell and Trudnak, 2010). Monitoring of the beach project reveals a slow trend of filling of the borrow area with material from off the more active areas of the ebb shoal.

In the spring of 2010, beach restoration was conducted at two sites on Santa Rosa Island by Eglin Air Force Base (FDEP Joint Coastal Permit #0289154-001-JC). Approximately 729,570 cubic yards of beach fill was placed within Reach 3 roughly 10,000 feet west of East Pass between FDEP virtual monuments V604.5 and V611.5, and approximately 265,190 cubic yards of fill material was placed within Reach 1 to the west of the beach community of Okaloosa Island between FDEP virtual monuments V511 and V514.5 (Trammel et al, 2012). In the fall of 2010, an emergency beach nourishment project was conducted at Holiday Isles east of the inlet with 138,437 cy of sand from an offshore borrow site (FDEP Joint Coastal Permit #0158078-001-JC) (Trammell and Trudnak, 2011). A complete beach restoration project was constructed during the winter of 2012-13 for the beaches of western Destin east of the inlet with the placement of 600,000 cy of sand from an offshore borrow site (FDEP Joint Coastal Permit #0286575-001-JC).

Recent dredging quantities, East Pass, Destin, from CPE (2010). Data from USACE (2008).

Table 1: Excavated Material (cubic yards)

YEAR	TOTAL	USCG Channel	Old Pass (Destin Harbor)	East Pass	Outer Bar (Ebb Shoal)	East Pass + Outer Bar
1986	173,745		32,000		141,745	141,745
1987	241,914			241,914		241,914
1988	248,615		37,822	80,523	130,270	210,793
1991	150,935		11,500	98,760	40,675	139,435
1993	298,474		4,920	192,348	101,206	293,554
1995	161,485	11,509	41,222	45,295	63,459	108,754
1999	165,244			92,584	72,660	165,244
2002	123,427	11,002	8,642	88,475	15,308	103,783
2003	70,663				70,663	70,663
2005	240,385		33,385	160,088	46,912	207,000
2006	243,116		14,721	137,106	91,289	228,395
2008	53,500		2,500	51,000		51,000
2010	181,141			58,715	122,426	181,141
<b>TOTAL ANNUAL</b>	<b>2,352,644 98,027</b>	<b>22,511 938</b>	<b>186,712 7,780</b>	<b>1,246,808 51,950</b>	<b>896,613 37,359</b>	<b>2,143,421 89,309</b>
2006-2007 Walton Co./Destin Project	2,807,060				2,807,060	
1996/1998 to 2004	359,334	11,002	8,642	181,059	158,631	339,690
1996/1998 to 2005	599,719	11,002	42,027	341,147	205,543	546,690
1996/1998 to 2007 & 2006-2007 Walton Co./Destin Project	3,649,895	11,002	56,748	478,253	3,103,892	775,085
2000 to 2010	912,232	11,002	59,248	495,384	346,598	841,982

Table 2: Placed Material (cubic yards)

YEAR	TOTAL	Norriego Point	Sand Dikes (next to inlet on land)	Scour Hole (near spur jetty)	Nearshore (V619+435' to V622+357')	Beach (V611+480' to V619+435')
1986	173,745	32,000	60,149		81,596	
1987	241,914	90,591	151,323			
1988	248,615	63,750		54,595	130,270	
1991	150,935	35,590	30,980	43,690	40,675	
1993	298,474	45,526	59,943	91,799	101,206	
1995	161,485	121,485	40,000			
1999	165,244	165,244				
2002	123,427	42,083				81,344
2003	70,663					70,663
2005	240,385	33,385				207,000
2006	243,116	14,721	191,289			37,106
2008	53,500	2,500	51,000			
2010	181,141					181,141
<b>TOTAL ANNUAL</b>	<b>2,352,644 98,027</b>	<b>646,875 26,953</b>	<b>584,684 24,362</b>	<b>190,084 7,920</b>	<b>353,747 14,739</b>	<b>577,254 24,052</b>
2006-2007 Walton Co./Destin Project						
1996/1998 to 2004	359,334	207,327	0	0	0	152,007
1996/1998 to 2005	599,719	240,712	0	0	0	359,007
1996/1998 to 2007 & 2006-2007 Walton Co./Destin Project	842,835	(See Note 1)	(See Note 2)	0	0	396,113
2000 to 2010	912,232	92,689	242,289	0	0	577,254

NOTES:

1. Erosion and deposition rates on Norriego Point from 1996 to 2007 were based on Oct.-Nov. 1995 and Nov. 2009 surveys. Fill rates were based on the corresponding volume of 257,933 c.y. for the same time period.
2. Erosion and deposition rates in the Sand Dikes area from 1996 to 2007 were based on 1998 and 2005 surveys. Fill rates were based on the corresponding volume of 0 c.y. for the same time period.
3. 2010 dredge quantities in East Pass & the Outer Bar are approximate.

## **Implementation of the Adopted Inlet Management Plan – 2000**

The following implementation actions were adopted in the *East Pass Inlet Management Implementation Plan* (2000):

### **1) Continue to bypass sediment to the downdrift beaches.**

As a first priority, place sand on downdrift beaches, west of the inlet, in areas of greatest need as determined by the Department. As a minimum, bypassing of material shall meet the average annual placement objective of 82,000 cubic yards as determined by the sediment budget. The sediment budget contained in the study report is adopted as an interim measure and shall be formally validated or redefined in subsequent revisions of the plan based on a comprehensive monitoring plan by December 31, 2005.

### **2) Implement strategies for managing Norriego Point while meeting local government objectives for land use goals that enable more material to be available for bypassing to downdrift Gulf beaches.**

Stabilization of Norriego Point will allow material dredged from the inlet, currently being placed on the point, to be placed on downdrift beaches.

### **3) Implement a comprehensive beach, inlet, and offshore monitoring program subject to the approval of the Department.**

The program will be used to identify beach placement locations for future bypassing efforts and to revalidate the sediment budget.

The first implementation action called for bypassing 82,000 cy/yr to Santa Rosa Island. There has been beach placement of 577,254 cy or 64,140 cy/yr between 2002 and 2010. On its face, that would indicate that there was a shortfall of 17,860 cy/yr. However, to be discussed in the sediment budget, the area immediately west of the inlet has been accreting. The sediment budget was not updated by 2005, but has been updated with the 2010 study.

The second implementation action called for implementing strategies for managing Norriego Point, to include stabilization. In 2004, a seawall and two T-groins were constructed to stabilize the Norriego Point shoreline. An additional T-groin and a terminal groin were also proposed, but not constructed. The City of Destin is currently planning the completion of the shoreline stabilization with the addition of another T-groin and a terminal boulder mound structure.

The third implementation action was likewise only partially implemented. With the construction of the Walton County / Destin Beach Restoration Project in 2006, physical monitoring commenced along the beaches west of East Pass. Physical monitoring of the beaches east of the inlet commenced in 2010 with the emergency fill placed on the Holiday Isles beach. The monitoring of beaches east of the inlet continues with the Western Destin Beach Restoration Project. Complete beach data exists for 1996, 2004, 2005, and 2007. In 2009, the study conducted for this update plan obtained a complete bathymetric survey for the inlet. The US Army Corps of Engineers regularly surveys within the inlet; however, these surveys are typically limited to the federal channels. In addition, as part of the Walton/Destin project monitoring, ebb shoal surveys have been obtained commencing in 2006. Had a comprehensive monitoring program been implemented immediately after plan adoption, and had the survey data been systematically obtained, the 2005 update could have been conducted.

## **Sediment Budget**

The 2000 inlet management plan, based on the study by Taylor Engineering (1999), determined a net east to west longshore transport at the inlet. The 1999 sediment budget established the need to bypass 82,000 cy/yr to the west of East Pass to offset the impact of the inlet. This sediment budget was based upon a seven-year time period between 1990 and 1997, and without the benefit of beach profile data west of the inlet or bathymetric data north of the U.S. Highway 98 bridge. Due to the inherent problems with the development of the 1999 sediment budget, the adopted inlet management plan called for updating the sediment budget by the end of 2005. Previously, most researchers estimated an east to west net longshore transport in northwest Florida ranging generally between 52,000 and 91,000 cy/yr (Gorsline, 1966; Stone 1990; USAED, Mobile, 1963). However, Levin (1983) noted geological evidence of a localized eastward sediment transport at East Pass. Historically, the east end of Santa Rosa Island grew from west to east as seen by the southwest to northeast orientation of beach ridges and the eastward migration of the inlet. The 1871 survey showed the inlet migration was eastward two miles from its location today (refer to History section).

In the 1960's, the Corps of Engineers investigated conditions at the inlet and determined that sand transport was both to the west and to the east. Due to the predominant eastward inlet migration, the Corps designed a west jetty weir section to allow sand from off Santa Rosa Island beaches to be transported over the weir into the inlet where it would be captured in a dredged sediment basin. A study by the Corps of Engineers' Engineering Research and Development Center of the project's first 22 years of performance concluded that the weir was located on the correct side of the inlet and allowed eastward transported sand to enter the inlet across the weir and deposit in the settling basin (Hales and Richey, 2004). Following construction of the east jetty in 1969, which had no weir section and was a complete barrier to longshore transport, the Holiday Isles shoreline continued to advance seaward with westward longshore transport and the infusion of sand from the relic shoal to the old inlet entrance to the east. This seaward shoreline advance to the east of the now jettied inlet and the lack of any advance to the west of the inlet resulted in the large offset in the adjacent beach alignments seen today. Following closure of the weir in 1986, the beach to the west of the inlet accreted seaward revealing that the eastward longshore transport was substantial at the inlet (Hales and Richey, 2004).

Based upon wave data obtained by the Corps of Engineers, Morang (1992) suggested a drift nodal point existed at East Pass and that frequent drift reversals occurred leading to transport in both directions. The wave data collected between 1987 and 1990 revealed a predominant wave direction from the southwest. This wave direction would provide a net longshore transport to the east.

Okaloosa County and the Department cost-shared on the 1999 inlet management study, which developed a sediment budget for the seven-year period between 1990 and 1997. During the early 1990's, the predominant net direction of sediment transport along the beaches both east and west of the inlet was assumed to be from east to west (Taylor, 1999). Although beach profile data did not exist to the west of the inlet, beach profile data to the east had shown substantial stability of beaches to the east notwithstanding some erosion losses during Hurricane Opal. Lacking

apparent erosion to the east of the inlet at that time, the study recommended only bypassing of sand to the west of the inlet.

Major storms have significantly affected East Pass. Hurricane Opal (1995) caused the most extreme changes to the inlet's ebb tidal shoal. A significant lowering of the shoal occurred as well as changing from a pre-storm elliptical shape to a post-storm triangular shape. The longshore transport regime at the inlet since Opal has also changed. The lowering of the ebb shoal has permitted greater wave energy from the southwest to impact Holiday Isles, which in turn influenced an eastward longshore transport immediately east of the inlet.

Most recently, the City of Destin and the Department contracted a study by Coastal Planning and Engineering, Inc., to update the inlet sediment budget (CP&E, 2010). The study area included the entire 14-mile stretch of coast from FDEP reference monument R-1, at the west end of the beach community of Okaloosa Island, to FDEP reference monument R-50 at the east Okaloosa County line. The actual area of direct inlet impact was determined to be approximately 10,000 feet to the east and to the west of East Pass. For the time period between March 1996 and July 2007, CP&E developed the sediment budget set forth in Figure 3. This update sediment budget for this 11.3-year time period (1996-2007) reflects a change from the earlier 7-year period (1990-1997) determined in the 1999 study. Between 1996 and 2007, the trend of westward longshore transport to the west of the inlet generally continued; however, east of the inlet, the net direction of longshore transport was predominately eastward. This recent period of west to east longshore transport in the vicinity of the inlet has resulted in a small net gain immediately west of the inlet and a significant loss along Holiday Isles to the east of the inlet. As shown in Figure 3, the net accretion (not including fill placement) west of the inlet between V611 and the west jetty (approximately 10,000 feet) has been approximately +6,000 cy/yr [ $15,000 + 26,000 = 41,000$  cy/yr, less 35,000 cy/yr of fill placement]. The net erosion loss (not including fill placement) to the east of the inlet between the jetty and R27 (approximately 10,000 feet) has been approximately -54,000 cy/yr [ $-50,000$  cy/yr - 4,000 cy/yr of fill placement].

Certainly, the effects of Hurricanes Ivan (2004) and Dennis (2005) caused the greatest erosion impact east of the inlet over the 11.3-year time period; however, the FDEP survey data indicates that shoreline retreat and volumetric erosion occurred prior to these storms as well as during the post-storm recovery period. The tabulated shoreline change data and volumetric data clearly show consistent erosion loss for the study period to the east of the inlet, while the equivalent area immediately west of the inlet experienced accretion for the same 11.3-year study period (CP&E, 2010).

Table 3 discusses and presents a comparison of shoreline and volumetric changes immediately adjacent to the east and west of East Pass. Along with the March 1996 and July 2007 surveys, additional surveys were available for April 2004 (before Hurricane Ivan) and July 2005 (following Hurricane Dennis). Comparing all four data sets allows an evaluation of three distinct time periods – a pre-storm period (3/96 to 4/04), a 15-month storm period (4/04 to 7/05), and a post-storm period (7/05 to 7/07).

**Table 3. Shoreline and Volumetric Comparisons Immediately East and West of East Pass**

***Shoreline Change – East of Inlet – 1996-2007***

Looking at the seven monuments east of the inlet (R17-R23) between the 3/96 and 4/04 surveys, prior to the '04-'05 hurricanes when the beaches should have been recovering from the impact of Hurricane Opal, there was an average shoreline change of **-29.5 feet (-3.7 ft/yr)**. This represents a significant shoreline retreat over this entire segment. The storm impacts are seen between the 4/04 and 7/05 surveys, with an average shoreline change of **-62.9 ft (-50 ft/yr)**. Although these major storm effects from the '04-'05 hurricanes occurred between the 6/04 and 7/05 surveys, the erosion continued during the post-storm recovery period between the 7/05 and 7/07 surveys, even though 50,000 cy were placed in the spring of 2006. For the post-storm recovery period between the 7/05 and 7/07 surveys, the average shoreline change was **-29 ft (-14.5 ft/yr)**. For the entire period of study, 3/96 to 7/07, the average shoreline change was **-121.4 ft (-10.7 ft/yr)**.

***Shoreline Change – West of Inlet – 1996-2007***

Looking at the seven monuments west of the inlet (V616-V622) between the 3/96 and 4/04 surveys, there was an average shoreline change of **-9.8 feet (-1.2 ft/yr)**. The average shoreline change for the 15-month storm period (4/04 – 7/05) was **+16.9 ft (+13.5 ft/yr)**. For the post-storm recovery period between the 7/05 and 7/07 surveys, the average shoreline change was **+0.4 ft (+0.2 ft/yr)**. For the entire period of study, 3/96 to 7/07, the average shoreline change was **+7.5 ft (+0.66 ft/yr)**.

<b><i>Shoreline Change Comparison (ft/yr)</i></b>	<b>East</b>	<b>vs. West</b>
Pre-Storm Period (3/96-4/04)	-3.7	-1.2
Hurricane Period (4/04-7/05)	-50	+13.5
Post-Storm Recovery (7/05-7/07)	-14.5	+0.2
Entire Study Period (3/96-7/07)	-10.7	+0.66

***Volume Change – East and West of Inlet – 1996-2007***

Notwithstanding the impacts of the '04-'05 hurricanes, the volume changes have been very consistent east of the inlet throughout the study period. East of the inlet, for the segment between R17 and R23, the volume loss of -7.8 cy/ft/yr, is equivalent to **-49,900 cy/yr**. West of the inlet, between V616 and V622, the volume gain has been approximately **+33,800 cy/yr**.

<b><i>Volume Change Comparison (cy/ft/yr)</i></b>	<b>East</b>	<b>vs. West</b>
Pre-Storm Period (3/96-4/04)	-7.4	+0.7
Hurricane Period (4/04-7/05)	-9.7	+38.3
Post-Storm Recovery (7/05-7/07)	-8.5	+5.2
Entire Study Period (3/96-7/07)	-7.8	+5.65

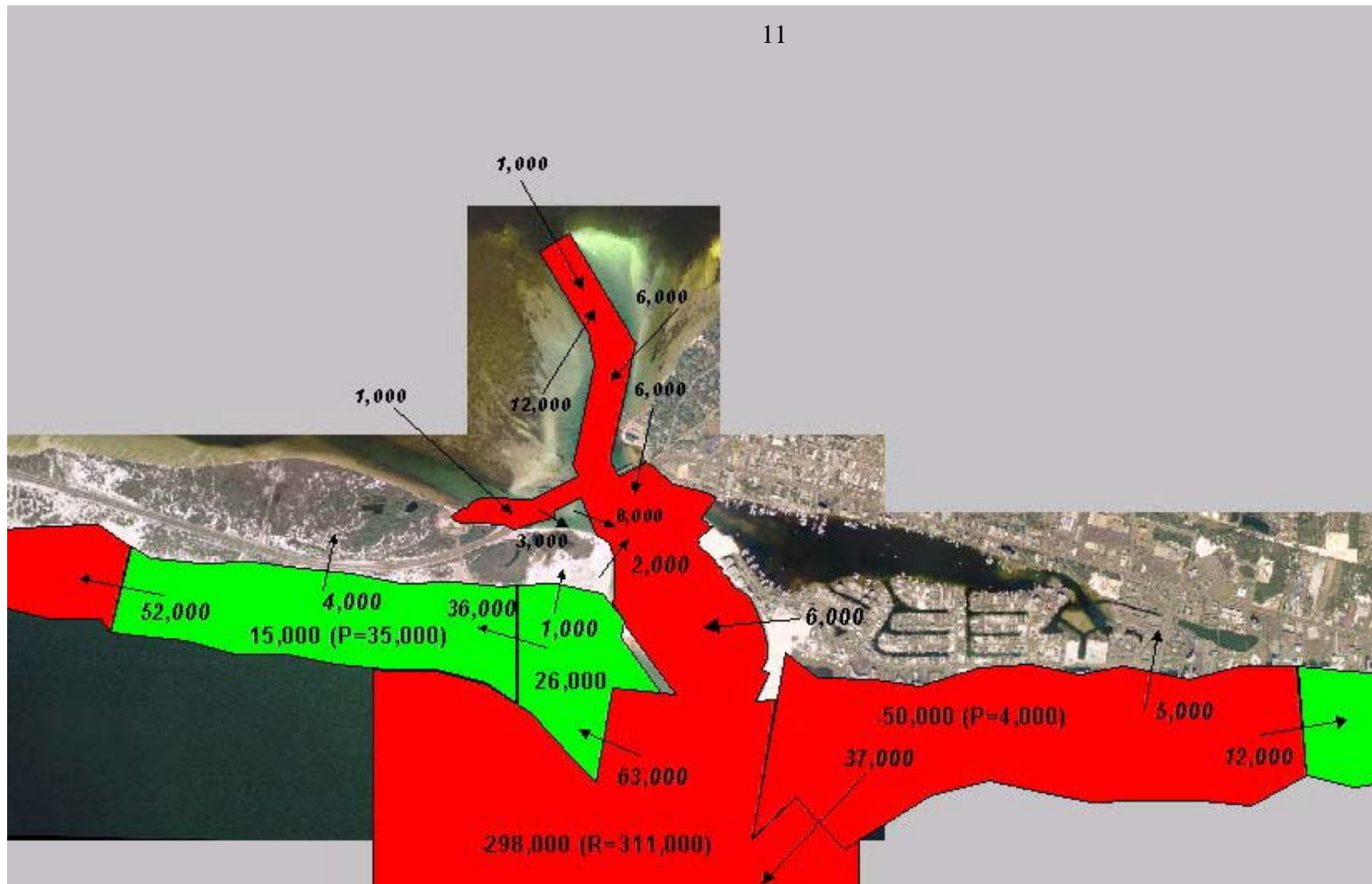
In the preparation of the sediment budget, CP&E developed a Delft3D numerical model of the inlet and adjacent waters and beaches. The model was used as a tool to evaluate the current inlet management strategies and to evaluate alternative strategies, to include dredge material placement on both sides of the inlet. This modeling, which represents the latest state-of-the-art, had major technological advantages over the modeling conducted in the 1999 study. The 1999 study did not have the capability to model the sediment transport, nor did it have available beach profile data along Eglin AFB west of the inlet or bathymetric data north of the US Highway 98 bridge across East Pass.

The sediment budget developed for the inlet during the period between 1996 and 2007 suggests that the net sediment transport within the inlet interior is from north to south, and therefore would be hydraulically indicative of an ebb dominant inlet. The sediment budget for this period also suggests that the net sediment transport direction at the entrance between the jetties is from south to north. These results depict the inlet interior as a sediment sink. This sediment budget differs from the one developed in the 1999 study, which concluded the sediment transport direction was both into the bay and into the gulf resulting in the inlet being described as a sediment source. The likely reasons for these differences are the 1999 study did not have the benefit of bathymetric data north of the bridge nor a sediment transport model that incorporated waves, tidal currents, and mechanical excavation.

In response to concerns regarding the accuracy of the Delft3D model at predicting the direction and magnitude of inlet currents and sediment transport, the City contracted an additional tidal hydraulics study of the inlet in 2011. The contractor installed tidal current gages and obtained tidal current data to permit further evaluation of the inlet's hydrodynamics and sediment transport (MRD, Associates, 2011). This field data was considered consistent with the data obtained in the Delft3D model study by CP&E.



Figure 3. 1996-2007 sediment budget, Holiday Isle to Santa Rosa Island beach disposal area for inlet dredge material (CPE, 2010).



## **Recommended Implementation Plan**

The Bureau recommends the following implementation plan be adopted to meet the requirements of Chapter 161, Florida Statutes. Future inlet management activities shall be consistent with the following four strategies.

**1) Implement a comprehensive beach and inlet hydrographic monitoring program** to evaluate performance and impact of existing projects and to update and define the inlet sediment budget. Beach profile monitoring data shall be used to determine erosion quantities from the gulf beaches east and west of the inlet along the area of inlet influence (V611-V620 and R17-R26). Prior to any scheduled inlet channel maintenance dredging, the recent erosion of adjacent beaches observed over a minimum of five years shall define the placement need in terms of location and volume.

**2) Modify the current inlet sand transfer protocol to permit the placement of inlet dredge material along the gulf beaches both to the east and to the west of the inlet** within the area of inlet influence (V611-V622 and R17-R26). The quantity of allowable fill placement in each area shall be based upon observed erosion patterns and beach erosion quantities documented through the monitoring protocol. Dredge material placement shall not exceed the design template of any proximate beach restoration projects. Any dredge material placement shall be strategically sited to minimize the potential for any re-entry or re-entrainment back into the inlet or the federal navigation channel of East Pass.

**3) Complete the stabilization of Norriego Point.** The City of Destin proposes a Norriego Point Stabilization Project to include repair and reconstruction of the existing T-groins, the construction of an additional T-groin and a seawall or boulder mound structure at the northern end, and the placement of fill to reconstruct the tip of Norriego Point.

**4) Investigate availability and feasibility of supplemental inlet sediment excavation** outside the federal navigation channels, exclusive of areas with submerged natural resources. Should gulf beach erosion, as determined in the monitoring protocol, exceed the bypassing quantities obtained from maintenance of the federal navigation channels, additional inlet sediment may be obtained as determined from its availability, feasibility, and impacts.

## **Implementation Discussion**

As previously stated, the 2000 inlet management plan protocol to place material only to the west of the inlet is not consistent with Section 161.142, Florida Statutes (adopted in 2008), because it does not ensure that the inlet dredge material “is placed on adjacent eroding beaches.” In addition, as now prescribed by the new law, the current material placement protocol is outdated because it does not allow the inlet sediment budget to be balanced or “extend the life of proximate beach restoration projects.”

The new sand placement protocol does not eliminate the continuance of sand placement to the west of the inlet. It does, however, allow sand placement to the east of the inlet given the beach to the east has clearly been adversely affected by the inlet.

There is, however, no certainty in predicting future erosion and transport. In this regard, the 2000 inlet management plan did not predict the effects of the ebb shoal changes initiated by

Hurricane Opal or the predominant southwesterly wave climate over the past decade. This is why basing inlet dredge material placement on the latest monitoring data is crucial to the effective management of the inlet's sediment budget.

#### *Implementation Strategy #1*

A future sediment budget is dependent upon meteorological conditions and the resulting wave climate, which cannot be predicted with any reasonable accuracy. The most practical means of determining a sand placement protocol is to utilize the most recent volumetric change data for the beaches adjacent to the inlet. Implementation Strategy #1, a comprehensive beach and inlet hydrographic monitoring program, is the most important element to managing the sediment budget at East Pass. Basing the sand placement protocol on the actual survey data eliminates the guesswork and specifically complies with the statutory mandate of Section 161.142, Florida Statutes.

The up-date inlet management plan will be implemented through a combined effort of the Florida Department of Environmental Protection and both Okaloosa County and the City of Destin with the cooperation of the U.S. Army Corps of Engineers, U.S. Coast Guard, and Eglin Air Force Base. The beach profile data east and west of East Pass is already being obtained through the regulatory requirements for the authorized beach restoration projects (FDEP Joint Coastal Permits – #0218419-002-JC, #0286575-001-JC, and #0289154-001-JC). This existing beach profile monitoring data will suffice for the determination of erosion quantities from the gulf beaches east and west of the inlet along the area of inlet influence (V611-V620 and R17-R26). Continuance of the periodic surveys of the East Pass Channel, the Destin Harbor Channel, and the U.S. Coast Guard Channel by the U.S. Army Corps of Engineers along with their dredge records will be essential to evaluate shoaling trends within the inlet. Inlet ebb shoal surveys are also being obtained by the City of Destin and Walton County to monitor the borrow site authorized by FDEP Joint Coastal Permit #0218419-002-JC.

#### *Implementation Strategy #2*

In the future, should dredge material placement be appropriate to the east of the inlet as determined by the hydrographic monitoring data, any placement would have to be strategically designed to minimize any potential for re-entrainment back into the inlet or federal navigation channel. This beach placement design has already been conducted for the authorized dredge material placement area to the west of the inlet (FDEP Joint Coastal Permit #0288799-001-JC). Any future placement project to the east of East Pass would have to be authorized and would require the cooperative effort between the city, the county, and the department to develop and provide such a placement design to the Corps of Engineers.

#### *Implementation Strategy #3*

Implementation Strategy #3 remains a necessary component to the management of East Pass. Historically, the erosion of Norriego Point has been mitigated by dredge material placement from the federal navigation project. Stabilizing Norriego Point with structures will make that dredge material available for placement on the eroding gulf beaches. Much of Norriego Point was stabilized by the seawall and T-groin project of 2004; however, the unarmored northern tip of the point has experienced accelerated erosion with severe shoaling into the Destin Harbor Channel. In recognition of the problem, the City of Destin funded a feasibility study and engineering

design to stabilize Norriego Point. The department needs to cooperatively work with the city to ensure the implementation of this important inlet management strategy.

#### *Implementation Strategy #4*

Implementation Strategy #4 initiates greater flexibility in the future management of East Pass. Continued Congressional appropriations for the maintenance of the federal navigation project are not guaranteed. Also, a planned channel maintenance dredging project might not even provide a sufficient quantity of sand to balance the sediment budget with adjacent eroding beaches. Additional inlet excavation outside the authorized channels may be warranted. A problem inherent with the existing natural channel alignment is the eastward migration of the channel against the east jetty spur. Between the channel and the west jetty is a developing shoal. The reduced depth and cross-sectional flow area of this shoal within the inlet inhibits tidal flow resulting in an increased flow within the channel. This increased flow has caused scour to depths in excess of 50 feet at the jetty spur. Removal of this interior shoal would improve the hydrodynamic conditions between the inlet jetties as well as make available sediment for the adjacent eroding beaches. The concept of dredging interior inlet sediment catch basins or sand traps has been successfully implemented at other inlets in Florida to improve inlet sand transfer. Implementation Strategy #4 would induce the cooperative effort between the department and a local sponsor to conduct the necessary feasibility study and engineering design to facilitate dredging interior inlet shoals.

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