

SHORELINE PRESERVATION WORKSHOP

VILLAGE OF BALD HEAD ISLAND

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Erik J. Olsen, P.E.

WHAT WE THOUGHT WE KNEW (CIRCA APRIL 1989)

(Ref: Feasibility Study of Beach Restoration at BHI, NC by Olsen Associates, Inc.)

- a) **Natural Inlet-Related Shoreline Fluctuations:** It is important to recognize that extreme shoreline fluctuation is often characteristic of wide, deep, natural inlets such as the Cape Fear River Entrance. Such inlets are thought to bypass sediment across their mouths through “channel switching”; that is, the cyclical growth, breaching, and downdrift migration of ebb tidal shoals. This phenomena, also identified by Cleary and Hosier (1988) for the Cape Fear River Entrance, results in episodic erosion and accretion to adjacent beaches during each channel-switching cycle.
- b) **Shoreline Fluctuations and Channel Establishment:** One effect of establishing a single (stabilized at one location) ebb channel across an inlet mouth is to eliminate episodic “channel switching”. This, in turn, eliminates the natural cycle of related (often significant) local shoreline fluctuations. However, these cyclical fluctuations may be replaced by long-term shoreline trends caused by the channel’s interruption of the ebb shoal field. This classic effect appears to have been the case for Bald Head Island.
- c) **Lack of Relationship between the Three Shorelines:** Cleary and Hosier (1988) concluded that there is no clear relationship between shoreline changes on East, South, and West Beaches. Re-examination of the data in the 1989 study affirmed that conclusion. This observation contrasted with the traditional thought that shoreline changes on South and West Beach were intimately related to processes at East Beach, Cape Fear Point, and Frying Pan Shoals. That is, the apparent

independence of the three beaches suggests that shoreline change along South and West Beach are strongly influenced by local Cape Fear River morphology; *i.e.*, the inlet and its ebb tidal shoals.

- d) **Early Accretion along Southwest Shoreline:** Cleary and Hosier (1988) and USACE (1990) both concluded that the significant accretion along the southwest shoreline of Bald Head Island between about 1878 and 1923 was attributable to the initial establishment of the Cape Fear River Federal Navigation Project. That is, dredging the entrance channel breached the ebb tidal shoal field – and in turn released Bald Head Shoals sediment (on the east side of the channel) to migrate shoreward. Similar phenomena are observed downdrift of other dredged inlet systems. The Olsen Associates, Inc. (OAI) 1989 study agreed with this conclusion.
- e) **“Natural” Westerly Channel Migration:** Both the channel gorge and Oak Island are reported to have migrated at about 4 to 5 ft/yr (on average) between about 1940 and 1970. The net result was inlet encroachment to Bald Head Island, and in turn, increased erosion stress to the island’s southwest shoreline. It is not clear whether this migration was natural or related to the navigation project. However, in the absence of the project, inlet migration towards and/or away from Bald Head Island – at magnitudes greater than 4 or 5 ft/yr – would certainly be expected.
- f) **“Sudden Onset” of Erosion along Southwest Shoreline:** The erosion of Bald Head Island’s southwest shoreline since 1974 is anecdotally referred to as “sudden”. This is in all probability somewhat misleading. While the *shoreline* was fairly stable to accretional prior to 1974, the *nearshore shoal field* was eroding (deflating). Specifically, volumetric losses to Bald Head Shoals (east of the channel) are noted from 1872 to 1923, and from 1923 to 1974. The nearshore shelf along the Bald Head Island’s southwest shoreline accreted during the 1872 to 1923 interval – but exhibited a significant net loss during the 1923 to 1974 interval (see Section 4.4). Therefore, it is probably not appropriate to tie the island’s recent chronic erosion to any single event closely related to the year 1974. While some event around 1974 might have helped “trigger” the recent erosion of the shoreline –

the *foundation* for chronic erosion appears to have been established over a period of perhaps fifty years prior to 1974.

- g) **Changes in Maintenance Dredging Quantities c. 1974:** In support of the finding that channel dredging was not linked to post-1974 shoreline erosion, USACE stated that dredging practices and quantities have been relatively constant since the mid 1940's and therefore any related impacts to Bald Head Island should have surfaced long before 1975. In accordance with the above paragraph, this may be an inappropriate observation. That is, it appears that impacts to the Island's southwest shoreline *had* begun prior to 1975 – although the impacts were in the form of nearshore shelf losses and were not immediately apparent as shoreline erosion.

Furthermore, there *was* an apparent significant change in channel maintenance activities six years prior to 1975. That is, in 1969, the channel was increased in depth from 35 ft to 40 ft, and in width from 400 ft to 500 ft. This required the excavation of over 2.3 Mcy in new work and represented a nominal increase in channel cross-sectional area of 43%. Average annual maintenance dredging increased from about 568,000 cy/yr to 737,500 cy/yr – or by 30% - over the 18-year period subsequent to the new work. While its direct impact to the island's shoreline is unclear, it seems likely that the increased project dimensions exacerbated the channel's impact to the local bathymetry (Note – as they probably have after the 2000 deepening/widening). It is also entirely possible (although difficult to prove) that there was a five- or six-year lag between the initial increase in project dimensions and the onset of local shoreline erosion. That is, while the project impacts between, say, the 1940's and 1969 were a net depletion of the nearshore shelf, the increased project dimensions after 1969 may have been sufficient to cause the shoreline to “unravel” in addition to continued deflation of the shelf.

- h) **Link Between Shoals on the West and East Sides of the Channel:** Bathymetric change data (USACE) suggest a fairly strong link between the shoals on the west and east sides of the channel – and the impact of the channel to these shoals. Prior to channel improvements, the volumetric change rates on each side of the channel were very similar; *i.e.*, the same trend and within 10% of one another. Subsequent

to improvements, the change rates on each side were very similar (within 6% to 20%) but were *opposite* in trend. That is, the shoals west of the channel *gained* in volume at about the same rate that the shoals east of the channel *lost* volume. Limited data suggest that the rate(s) at which this occurred are related to the rate of channel excavation. That is, between the 1872-1923 and 1923-1974 intervals, the average rate of channel maintenance increased by a factor of about 2.6 – and the average rate of west-shoal gains and east-shoal losses increased by about the same amount. This observation may be circumstantial – and represents only one data point – however, it supports the theory that the channel appeared to interrupt a net easterly drift of the shoal field across the inlet mouth.

- i) **Summary:** Simplistically, three important points were determined in 1989 in regard to the apparent relationship of the Cape Fear River Entrance channel and local shoreline processes: (1) Establishment and maintenance dredging of the channel has affected local inlet bathymetry – primarily by interrupting apparent easterly drift of the ebb shoal field. This has led to accretion of the western shoals and depletion of the eastern shoals. (2) Initial breaching of the shoal field by the channel is likely responsible for the significant accretion of the southwest shoreline of Bald Head Island at the turn of the century. (3) The channel's perceived interruption of the easterly drift (and subsequent depletion of the east side shoal platform) is likely responsible for the subsequent erosion of the southwest shoreline of Bald Head Island in the latter half of the century.

WHAT WE THOUGHT WE KNEW – CONCERNS WE HAD – AND WHAT WE HAD QUALITATIVELY PREDICTED (CIRCA 1999)

- a) **Background:** Prior to the most recent widening and deepening of the Wilmington Harbor Navigation Project, OAI was authorized by the Village of Bald Head Island to formulate a “Position Paper” suitable for submittal to the USACOE and the State of North Carolina. The Paper briefly reflected upon historical conditions at the entrance to Cape Fear River; prior federal actions associated with navigation improvements at that location; alluded to potential adverse effects of the proposed (2000) navigation project modifications; described considerations of importance to Bald Head Island, and made recommendations for future rationale/equitable mitigation or remediation to Bald Head Island by federal interests.
- b) The OAI Paper opined that long-term impacts of the existing navigation channel alignment and authorized dimensions were expected to be occurring at Bald Head Island as a result of:
- 1) the elimination of naturally occurring pre-project sand bypassing phenomena associated with shoal migration at the mouth of the Cape Fear River;
 - 2) the fixation of the navigation channel alignment at one location in extremely close proximity to the Bald Head Island shoreline;
 - 3) continuous and long-term impacts to the sediment budget of the local sand sharing system extending from the Cape Fear Shoals to portions of Oak Island;
 - 4) resultant significant long-term deflation of the ebb tidal shoal formation directly seaward of Bald Head Island;
 - 5) the accentuation of the hydraulic gradients of flood tidal flows along the South Beach and West Beach shorelines of Bald Head Island and the increase in magnitude and frequency of occurrence of a major nearshore marginal flood tidal channel at the western extremity of South Beach, and
 - 6) The directionality of ebb tidal flow directly toward (or on to) the West Beach shoreline resulting from the artificially maintained alignment of the Smith Island Range of the abutting channel.

- c) The Paper noted that all of these phenomena existed at that time (1999); and it was relatively clear that most (if not all) of these phenomena would be exacerbated by the implementation of a channel deepening, expansion and realignment within the corridor under consideration. It was submitted that it was therefore altogether reasonable to expect that the shoreline(s) of Bald Head Island would react both adversely and concurrently with both initial construction of a channel re-alignment – as well as its continuing biennial maintenance into the future at a new location within the existing, undisturbed portions of the ebb tidal shoal platform.
- d) For purposes of offsetting anticipated navigation project impacts associated with channel realignment and project deepening, it was opined that three (3) mitigation elements should be implemented as part of *both* project construction and future project maintenance. The work should be performed integrally with the federal navigation project at 100% federal cost. The mitigation elements were as follows:
- 1) **Beach Fill:** At a *mimum*, some 2-3 Mcy of beach quality sand should be placed along the South Beach shoreline on Bald Head Island as advance nourishment.
 - 2) **Fill Maintenance:** Continuing maintenance of both the South Beach and West Beach shorelines should be performed utilizing beach quality sand excavated during annual channel maintenance. The *minimum* initial equivalent annualized requirement was initially estimated at 350,000 cy/yr. (Note – This estimate assumed no increase in post-project rates of erosion due to impact which we now know occur.) An updated maintenance requirement should be continually computed in the future however based upon the best available data. The stipulated volume should be updated annually based upon a comprehensive monitoring program of both affected shorelines on Bald Head Island. All fill should be placed in such a manner that it results in the greatest spatial and temporal benefit to the affected shoreline(s), both developed and undeveloped, and,

- 3) **Nearshore Disposal:** Should beach quality sand in excess of initial or annual fill requirements for some reason become available, preference should be given to additional beach width enhancement. Conversely, should annualized beach filling be restricted due to permitting conditions, or other extenuating circumstances, nearshore disposal of “excess” material below the MLWL should be considered in the immediate vicinity of Bald Head Island. All such material placement should be strategically performed *only* in the more dynamic portions of the nearshore zone where direct benefit to the active littoral system could be assured via onshore transport by natural forces. Such material placement would also serve to offset predetermined and continuous shoal deflation.

- 4) **Damages:** In the event that mitigation via items 1 through 3 above proved insufficient to offset project related impacts to Bald Head Island, the District must commit to construction of additional structural or non-structural alternatives. Such mitigation should be provided at no expense to local interests, although the consent of local interests must be obtained in the selection of a “preferred” alternative.

**WHAT WE THINK WE KNOW AT PRESENT (THROUGH SEPTEMBER 2009)
BASED UPON OBSERVATION AND CONTINUING COMPREHENSIVE
BEACH MONITORING**

a) **Background:** Comprehensive beach monitoring at Bald Head Island began in 1999, approximately 1-year prior to the initiation of channel realignment, deepening and widening in the vicinity of Bald Head Island. Simultaneous monitoring programs are being carried out by Bald Head Island and the USACOE. The latter study likewise includes Oak Island and other various aspects of the Cape Fear River Entrance such as tides, currents, etc. A Village monitoring report is issued annually, usually 3-months after the last survey. It generally takes the District some 10-months to issue a report after their last survey. Hence, the Village report is typically made public a half-year ahead of the federal report. The Village provides all survey data and photography to the Wilmington District (as a courtesy) for their consideration.

b) **Monitoring Report No. 1 (November 1999 – May 2003)**

- 1) During the 3.5 year period of beach monitoring discussed herein, multiple dredging events were performed within the limits of the modified entrance channel in close proximity to Bald Head Island in order to achieve the authorized design configuration of the modified project. At the time of the initiation of work performed by the dredging firm Bean-Stuyvesant in accordance with USACOE contract DACW54-00-B-0019, the bathymetric contours associated with the Point shoreline extended well within the limits of excavation required for the federal channel. Accordingly, the plan of improvement necessitated that the contractor essentially dredge into the submerged base of the Point in order to facilitate the authorized channel design (*i.e.*, width and depth).
- 2) With the initiation of dredging by Bean-Stuyvesant within the channel reach extending from STA 17+00 to STA 34+00 (ref. COE Baseline), it became apparent to the USACOE (and their contractor) that excavation in the vicinity of the Point would be “problematic”. Simplistically, that section of channel cut

was prone to reshaling before the dredging contract began and became even more difficult to maintain after the initiation of beach disposal. Furthermore, since the contractor was required to dredge into the sand shoal feature which extended well into the channel limits, the destabilization of the adjacent bank associated with the Point by the dredge cut resulted in immediate reshaling. Redundant attempts by Bean-Stuyvesant to recut the channel section near the Point between March 2001 and October 2002 produced a similar occurrence, *i.e.* a rapid reshaling of the channel within several weeks of the work. The apparent source of sand associated with the measured reshaling phenomena was the beach along the westernmost third of South Beach.

- 3) Volumetrically, beach surveys typifying shoreline conditions between July 2002 and May 2003 (*i.e.*, the beach monitoring period following fill berm equilibration), indicated that sediment losses from the South Beach shoreline increased by over 92%. An annualization of the 9-month loss rate would imply at least a doubling of the pre-project erosion rate as documented by the November 1999 – November 2000 survey period.
- 4) The detailed documentation of the rapid regeneration of the submerged “shoal” (as defined by the USACOE) (*i.e.*, but “base” of island to the Village) within the newly configured channel fairway at the Point lends support to the long held premise of the Village that prior (typically annual) maintenance dredging events at that location have in all probability had similar impacts to the adjacent littoral system of Bald Head island.

Up until this point in time however, both the level and nature of the dredging impact phenomena had been undocumented – and pragmatically unexplained or well understood (by OAI) from an operational perspective – even as simple as the now apparent cause and effect relationship would appear to be. It should also be noted that a large portion (greater than 30%, mol) of the entrance channel sand removed biennially comes from the Bald Head Shoal formation seaward of Bald Head Island.

c) Monitoring Report No. 7 (May 2008 to May 2009/August 2009)

- 1) It is the opinion of OAI that the *magnitude of erosional stress* caused by channel dredging along the western end of South Beach between 2005 and the present have been largely “masked” by two (2) coincident beach disposal operations at that location totaling over 2.2 Mcy (*i.e.*, 1.217 Mcy in 2005 and .98 Mcy in 2007). In February – April 2009, approximately 1.12 Mcy of sand were contracted to be removed from the navigation project and placed on Oak Island/Caswell Beach. The actual net volume dredged in all probability well exceeded that amount (*i.e.*, the contract pay volume).
- 2) The spring of 2009 channel maintenance dredging operations were designed to excavate in excess of 600,000 cy from the base of the Point and the area immediately southward thereof along the perimeter of Bald Head Shoal. Re-establishment of the “shoal” dredged from the channel limits at the Point due to slope destabilization was expected (by OAI) to reoccur immediately thereafter. Observations of Dr. Paul Hearty of the Conservancy in the second week of March documented such losses along portions of the Point shoreline. The latter were occurring simultaneously with the dredging operation by the Corps’ contractor Great Lakes Dredge and Dock Co.
- 3) It is the opinion of OAI that it has now been relatively well documented (by monitoring surveys) that the source of sediment for the rapid reshaling westward of the Point occurs from the beach and nearshore environs of the most proximate segment of South Beach. At that location, the *presently* highly stressed shoreline extending from baseline STA 42+00 to approximately STA 65+00, mol. was predicted to continue to be heavily impacted by erosion. This phenomenon was predicted to expand principally in an easterly direction as available sand was diminished in that erosion zone. As the MHWL receded to the limits of a buried sand tube revetment and as the overall beach innertidal platform deflated, numerous sand tube groins were expected to eventually fail or be flanked, which they did – thereby exacerbating the destabilization

process. As a result, both residential structures and infrastructure became threatened.

- 4) The Year-8 Monitoring Results – The May 2008 to May 2009 Report, indicated that in sum, the monitored shoreline of Bald Head Island (not including East Beach) lost approximately -564,400 cy of sand (25 cy/ft) during the most recent monitoring year. Substantial sand losses occurred at the eastern and western limits of the 2007 disposal area. Within the approximate 2007 beach disposal area (STA 46+00 to 174+00), the shoreline lost roughly -409,400 cy above -16 ft-NGVD. An additional -177,400 cy was lost along the approximate 1,250 feet of shoreline at the Point, immediately adjacent to the western limit of disposal. Overall, West Beach lost -3,400 cy (1.2 cy/ft), the Point lost -282,800 cy (76 cy/ft) and South Beach lost -278,200 cy (17.3 cy/ft) above -16 ft-NGVD.

Correspondingly, the shoreline as measured at the MHWL retreated by an average of -70.6 ft along the 22,635 feet of monitored shoreline. However, while erosion was generally pervasive the magnitude of the erosion varied greatly across sub-reaches. Along the West Beach and South Beach shoreline, the MHWL retreat averaged -6.4 ft and -36.1 ft, respectively. However, near the Point, the MHWL theoretically retreated by an average of -202.2 ft. The latter rapid unraveling of the shoreline adjacent to the navigation channel was the direct result of channel excavation in the months of February – April. Monitoring Report No. 7 captured shoreline changes only through May 2009.

- 5) The maintenance dredging of the Federal Navigation Channel in the spring of 2009, *without concurrent beach disposal at Bald Head Island*, has resulted in an evolving unmitigated level of physical impact not experienced to date. Surveys (through May 2009) documented that the shoreline at both the Point and the western end of South Beach are substantially *more eroded* when compared to pre-navigation project construction conditions (2000). This large-scale *net loss* exists even after the placement along South Beach of over 4 Mcy of sand from the navigation project since 2001.

d) Post-Monitoring Report Update – May 2009 – September 2009

- 1) The post-channel maintenance dredging beach losses on Bald Head Island which have occurred subsequent to the last monitoring survey in May on the western end of South Beach have accelerated at a dramatic rate. As a result OAI, performed an updated assessment of volumetric losses based upon a September 2009 survey acquired for purposes of beach fill construction (see Exhibit A. Interestingly, the net loss for *only* the 10-month period from November 2008 to September 2009 exceeded 1,050,000 cy. This cumulative loss was for both South Beach and the Point. Conversely, the net losses for the 12-month period preceding the last maintenance dredging (*i.e.*, November 2007 – November 2008) totaled approximately 260,000 cy for the same two (2) areas. It is important to note here that the proposed \$15M locally funded beach restoration project (under construction) only proposes to place about 1.5 Mcy of sand, total.
- 2) Erosion losses for the period May 2009 – September 2009, *i.e.*, this summer were about 700,000 cy mol. for that 5-month period alone (following channel maintenance). The very highest loss rates exceeded 150 cy/ft at the west end of South Beach where the observed dune erosion and recession was the highest. As a result of these losses, the beach fill design templates were revised substantially since the observed sediment losses in this locale were almost the same magnitude as the proposed fill volume. It is noted that the post-restoration groinfield replacement project may likewise require similar modifications which necessitate the landward movement of sand tubes to account for substantial land losses at this location which will not be recoverable.

WHAT WE BELIEVE WE NEED TO KNOW IN THE FUTURE FOR PURPOSES OF LEGAL ACTION REGARDING NAVIGATION PROJECT IMPACT ASSESSMENT AND VIABLE PROJECT MODIFICATION ALTERNATIVES

Although we believe we understand the *apparent* cause and effect relationship between dredging near the Point and the response of the South Beach shoreline and its nearshore environs, the Wilmington District has todate issued no apparent written similar opinion. Conversely, the format of their annual monitoring reports tend to stress the net benefits of beach disposal (only) to Bald Head Island, *i.e.*, the amount of material placed on Bald Head Island and the volume still remaining (somewhere) at the time of survey. To date, have they made no attempt to interpret or highlight areas of *net* volumetric *loss*, or *net* shoreline *recession*, since the construction of the last Harbor Deepening Project improvements – even though their data clearly reflect such effects.

Neither party (Village nor COE) has performed any level of in-depth numerical modeling investigation quantifying long-term impacts and in particular attempting to analytically evaluate the nexus between channel dredging pre-2000 and potential shoreline response. It is the opinion of OAI that a similar relationship in all probability existed at that time – albeit to a lesser degree.

Coincident with the design and permitting of the 2000 expanded and reconfigured entrance channel footprint, no analytical numerical modeling or other “normal” detailed design exercises were carried out by the USACOE. Instead, the District only evaluated wave energy, pre- and post-project conditions, and utilized those results to make a semi-quantitative conclusion on how to divide maintenance sand in the future via the terms of the Wilmington Harbor Sand Management Plan (*i.e.*, a 2:1 ratio between Bald Head and Oak Island). Since that time, it has been revealed that the wave statistics used as input to the associated wave refraction model for that purpose were defective. To date, the analysis has not been re-performed with the most current (*i.e.*, correct) wave statistics – for better or worse.

Essentially, most technical information upon which we base our understanding of the impact processes involved are based upon either inference, or a global understanding (training and similar experience) of inlet processes and morphology. That is to say, we

are interpreting observed changes principally documented by survey, but have no sophisticated analytics to explain or simulate processes. Such simulations would be meaningful on multiple time scales: present day; recent past (1970's) and historic (pre-project). Without better explanations of long-term changes associated with the navigation project initial construction – its routine maintenance over time – and more recent deepening and reconfiguration actions – most explanations as to associated physical dynamics (wave, currents, sediment transport) are to a large degree conjecture. As such, qualitative interpretations of inlet or island morphology over time are easily refuted or more likely interpreted differently – particularly in a Court of Law. As importantly, this disadvantage is further compounded when the opposition has performed some level of analytics – no matter how obviously incorrect or biased. It becomes a leveraged situation between the haves and have-nots (*i.e.*, analytics or models with associated interpretations versus none).

We have recently opined that the most relevant means by which OAI as the Village's coastal engineering consultant can evaluate historical, existing and expected or predicted inlet and shoreline sediment budget conditions it through the application of a state-of-art 3D/Morphological model. Future project related improvements which can be evaluated includes structures, channel reorientation (or movement), channel deepening/expansion, etc. An initial discussion of such an analytical modeling exercise is attached to this Paper as Exhibit B.

WHAT THE USACOE NEEDS TO KNOW (OR HAVE) TO MODIFY THE WILMINGTON HARBOR NAVIGATION CHANNEL

It would appear safe to assume that similar in-depth knowledge justifications of the Wilmington District are numerous: to assess alternative actions requested by local interests or the State; to defend the USACOE from potential lawsuit; to allow for a rational and safe design (from a vessel transit standpoint) of any future project modification; to allow for verification of project defects or impacts that are deemed to warrant remediation; and in the case of the Cape Fear River Entrance to assist in the justification (physical and fiscal) of any future channel modifications associated with new Port development and/or a general increase in channel capacity (*i.e.*, for larger vessels); the justification for the future use of structural measures, etc.

As such, the District would (or should) ultimately require the same fundamental understanding and ability to replicate modes of historical littoral process, sedimentation processes, river/inlet hydrodynamics, etc. – as does the Village of Bald Head Island. The District’s findings and recommendations could also however be significantly affected by ship simulation studies, environmental impact assessment, maintenance costs and operational feasibility evaluations, as well as overall economic justification in accordance with the Principles and Standards employed by the USACOE nationally for the evaluation of such civil works projects. Often times, the bureaucratic requirements and formulations of such large-scale projects (including harbor deepening projects) almost obfuscate the fundamental need to understand project post-construction dynamics and impacts to others. That was clearly the case with the 2000 Harbor Deepening Project where the need to expeditiously reorient and reconfigure the entrance channel went essentially unstudied at any meaningful level, due to the pending loss of Congressional Appropriations. That is to say, there was no time, budget or acknowledgment that potential impacts to Bald Head or Oak Island needed to be addressed. Instead, certain stipulations regarding post-construction monitoring were substituted for design knowledge or predictive tools. This is not an uncommon occurrence, but rather almost the standard for most east coast navigation project deepening projects. Simplistically, the sheer existence of a major navigation project at a location is deemed sufficient to justify future improvements that can be shown to be in the public interest. The latter

justification normally *only* addresses economic benefits derived and environmental acceptability as determined by State and Federal regulatory bodies. Again, recent experience with other similar deepening or reconfiguration of federal navigation projects – indicates that COE Districts only look at incremental changes of the project modification and *not* historic long-term global effects due to the presence or existence of the facility. As a result, often the most glaring, and what would appear to be obvious historical adverse effects of inlet stabilization, can be procedurally ignored or overlooked in the federal design and permitting process. Had the Village of Bald Head Island not postured politically and legally in 1999 in the permitting of the last Wilmington Harbor Deepening Project, it is reasonable to assume that there may not have even been an attempt by the Wilmington District to address *potential* project impacts via the Wilmington Harbor Sand Management Plan. Unfortunately, it is now relatively evident that even that relatively progressive measure by the District has been inadequate with respect to preventing large-scale and potentially irreversible impacts to Bald Head Island. Both the level and nature of destabilization phenomena to the Bald Head Island shoreline, without concurrent beach disposal, is painfully obvious. Having the Wilmington District to formally acknowledge same, will in our opinion, continue to be a major challenge.