

CHAPTER 8: ANTICIPATED LEVEL OF TAKE

Take of covered species can occur as the result of emergency shoreline protection measures and other beach activities managed and/or regulated by Walton County. Activities covered under this HCP can affect: sea turtle eggs, adults, and/or hatchlings; live stranded sea turtles, including post-hatchling washbacks; all life stages of CBM, as well as their burrows and foraging habitat; and adult piping plovers. Impacts can occur both during and after implementation of emergency shoreline protection measures and can be either direct or indirect, as discussed in detail in Chapter 7 of this HCP. This chapter provides a discussion of the anticipated level of take expected to occur over the life of the County's ITP.

Direct Impacts

Direct impacts are those that occur to the affected species at the time an activity is undertaken. Examples of potential direct impacts include, but are not limited to:

- Crushing or unearthing of sea turtle eggs during installation or removal of temporary armoring structures;
- Destruction of beach mice burrows during installation or removal of temporary armoring structures;
- Crushing of sea turtle eggs in unmarked nests by vehicles driving on the beach;
- Disturbances to resting or foraging wintering piping plovers during routine beach maintenance operations;
- Entrapment of adult or hatchling sea turtles in construction debris during installation or removal of temporary armoring structures; and
- Alteration or elimination of essential, nesting, foraging, and/or sheltering habitat.

Provided that the minimization measures described in Chapter 11 of this HCP are effective, direct take of covered species from proposed activities are expected to be relatively minor. Since 2000, there have been an average of 28.6 loggerhead nests per year on County-managed beaches and fewer than one nest per year for each of the other three sea turtle species. Most CBM habitat is located within or immediately adjacent to the three State parks and relatively few wintering piping plovers have been documented utilizing County beaches.

The principal source of direct take will likely be related to shoreline protection activities initiated under the County's emergency authorization. However, it is impossible to quantify this take with any certainty. The following factors, all of which are presently unknown, will influence the extent of take:

- The specific location where shoreline protection activities covered under this HCP will occur (the abundances of all covered species within the Plan Area vary with location);

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- The type of emergency protection that will be authorized (some types of construction have greater potential for impacting listed species than others);
- The time of year when emergency shoreline protection will occur (impacts to turtles will be greatest during the middle of summer while impacts to piping plovers will be greatest during the fall);
- The prevailing condition of the beach/dune system at the location where shoreline protection is authorized (areas with little intact dune habitat and eroded beaches have less potential for impacts to habitat than areas that previously supported a more robust beach/dune system);
- The siting of temporary and permanent structures relative to the active beach system (those structures sited farther landward will cause less harm to habitat than those immediately abutting the active beach); and
- The total length of shoreline armoring installed under the County's emergency authorization.

Because of the minimization measures described in Chapter 11 of this HCP, it is anticipated that direct impacts during construction will be relatively limited. All sea turtle nests within the County will be marked, and pre-construction surveys will ensure that there is no viable CBM habitat within the limits of construction activities. Of course, there is a chance that some sea turtle nests and CBM burrows will be missed during these survey efforts. However, any major storm affecting the coast to such an extent as to render beachfront structures vulnerable to erosion damage will most likely have washed out most nests or rendered them unviable due to prolonged and/or repeated tidal inundation. With the exception of habitat alteration, impacts during construction will be temporary and most can be effectively minimized through proper siting of structures and the monitoring and protective measures described in this HCP.

Behavioral changes during construction may include nesting turtles abandoning nesting attempts upon encountering obstacles on the beach. Unmarked sea turtle nests may be crushed by vehicles on the beach. Additionally, resting and/or foraging wintering piping plovers might be frightened away.

Collectively, direct impacts causally related to shoreline protection activities initiated under emergency authorization by Walton County are expected to be minimal over the life of the County's ITP. However, quantification of these impacts requires so many blind assumptions as to render an estimate highly imprecise.

Indirect Impacts

A substantially greater potential for take relates to changes in beach characteristics caused by the physical presence of shoreline protection structures as well as changes in nesting behavior in response to the structures. The USFWS considers that these structures diminish the functional value of available sea turtle nesting habitat and therefore cause take, as defined under the ESA. Armoring may accelerate erosion of adjacent beaches and diminish the ability of the beach/dune system to recover following a storm event. In

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areas where suitable CBM habitat is present, these structures may fragment the habitat and impede the movement of mice between adjacent areas.

Best available data indicate that on eroded beaches, such as those in Walton County, the primary effect of armoring structures is an overall reduction in sea turtle nesting seaward of the structures (Mosier 1998). Additionally, when structures are exposed, turtles tend to nest closer to the water, where their eggs are more susceptible to wave overwash and tidal inundation (Witherington *et al.* In Prep.). A reduction in nesting success presumably results from both the physical presence of the structure (turtles may contact the structure), as well as changes in beach characteristics (e.g., beach profile) over time. In those cases where sand accretes on the beach following placement of a structure, nesting success may improve to background levels. However, on other beaches, the presence of the structure may inhibit the natural beach building process, exacerbate erosion, and result in less or inferior nesting habitat.

It is assumed that a turtle deterred from nesting at an armored beach will leave the site and nest elsewhere. Thus, nests are not necessarily lost but, rather, are displaced to other locations. Nevertheless, time spent unsuccessfully searching for a suitable nesting site on armored beaches may exact some, as yet unquantified, cost to a turtle's total annual reproductive output. Additionally, in those cases where armoring structures result in degradation of nesting habitat, nest production in future years is diminished.

Mosier (1998) evaluated three sites in Brevard and Indian River Counties, Florida, and compared loggerhead nesting on various sections of beach with and without seawalls. On average, nesting success was 69 percent lower at sites fronted by seawalls than at sites without seawalls. This value was applied to nesting data for County-managed portions of the Plan Area to determine how many nests might be displaced (i.e., how much take would occur) as a result of shoreline protection measures initiated under the County's emergency authorization.

To estimate the total length of beach that may require future armoring, the length of critically eroded beach outside of the three State parks and outside of the currently permitted 5.0-mi (8.1-km) beach nourishment project was calculated. From that amount, the length of beach containing permanent armoring constructed to date under a CCCL permit issued by the FDEP was subtracted. This includes those structures permitted through the standard CCCL process as well as those installed under the County's emergency permitting authority and whose property owners subsequently applied for and received a CCCL permit. The remainder is potentially susceptible to future armoring. This latter category includes the following classes of beachfront property:

- Those containing existing temporary armoring installed after Hurricane Dennis with or without an emergency permit issued by the County and whose FDEP CCCL permits are pending;
- Those containing temporary armoring installed after Hurricane Dennis with or without the County's emergency authorization and for which either no application

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was made to the FDEP for a CCCL permit or the CCCL permit application was denied; and

- Those presently containing neither temporary nor permanent shoreline protection structures.

Based on the approach described above, approximately 15.0 mi (24.1 km) of County managed beaches (excludes the three State Parks) lie outside of the existing 5.0-mile (8.0-km) beach nourishment project area (Table 8). As of December 31, 2008, approximately 62 percent (9.3 mi; 15.0 km) of that stretch of beach had been designated by the State as critically eroded. Existing permanent structures installed under a CCCL permit issued by FDEP occupied approximately 0.5 mi (0.8 km) of those critically eroded beaches. The remaining 8.8 mi (14.2 km) of shoreline would be susceptible to future armoring under the County’s ITP. That includes 3.5 mi (5.6 km) of beach with existing “temporary” armoring constructed after Hurricane Dennis. Owners of many of those structures are likely to be issued CCCL permits by FDEP to permanently retain the structures once they obtain incidental take coverage either through participation in the County’s HCP or with an individual ITP issued by the USFWS (see Chapter 1, Distinctions Among Past, Present, and Future Shoreline Protection Actions). Other structures may have to be removed (see Chapter 10, Removal of Temporary Structures).

Table 8. Projected Armoring Within the Plan Area Over the Life of Walton County’s Incidental Take Permit.

Category	Length of Shoreline ¹		
	Feet	Miles	Kilometers
Plan Area	135,168	25.6	41.2
Beach Within State Parks	29,779	5.6	9.1
County-managed Beaches	105,389	20.0	32.1
County-managed Beaches Within Existing BNP ²	26,400	5.0	8.0
All County-managed Beaches Outside BNP	78,989	15.0	24.1
County-managed Beaches Outside BNP Designated as Critically Eroded	49,104	9.3	15.0
Critically Eroded County-managed Beaches Outside BNP With Existing Permanent Armoring ³	2,784	0.5	0.8
Critically Eroded County-managed Beaches Outside BNP Without Existing Permanent Armoring ⁴	46,320	8.8	14.2

¹As of December 31, 2008.
²BNP = Beach Nourishment Project.
³Includes 9 properties permitted by FDEP before (2) and after (7) Hurricane Dennis through the standard CCCL permitting process and 18 properties that obtained CCCL permits after first initiating shoreline protection measures under Walton County’s emergency authorization (see Table 1).
⁴Includes approximately 197 properties with existing “temporary” structures built after Hurricane Dennis, with or without Walton County’s emergency authorization, that had not been issued a FDEP CCCL permit for their permanent retention.

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A total of 359 loggerhead emergences (229 nests and 130 false crawls) were documented on County-managed beaches between 2000 and 2007 (Table 9). That is an average of 45 emergences per year. It was not possible to conduct a spatial analysis of these emergences, because no GPS data exists for the false crawls. Thus, an assumption must be made that those crawls were spread evenly along the coastline. Based on that assumption, 20 (44 percent) would occur on beaches fronted by seawalls installed under the County’s past and future emergency authorization (8.8 mi of 20.0 mi of County-managed beaches without permanent armoring X average of 45 crawls/yr).

Average annual nesting success of loggerhead turtles on County-managed beaches is 65.3% (Table 9). If this was reduced by 69 percent due to the presence of seawalls, it would fall to 20.2%. Thus, for the 20 crawls on beaches fronted by armoring, the number of nests would be reduced from 12.8 (20 x .638) to 4.0 (20 x .202). Under these broad assumptions, this would result in the annual displacement of 8.8 loggerhead nests (average of 31 percent of the total nests per year on County-managed beaches). Over the 25-year life of the County’s ITP, that would equate to 220 nests. Due to the very low nesting by the other three species, similar calculations are not reliable, but one nest per year per species could be considered.

Table 9. Annual Numbers of Loggerhead Turtle Nests and False Crawls, Nesting Success, and Incubation Periods Within the Plan Area, 2000 through 2007.

Year	Number of Nests	Number of False Crawls ¹	Nesting Success (%) ²	Incubation Period (Days)			
				N ³	Min	Max	Mean
2000	58	18	76.3	53	54	76	62.8
2001	28	9	75.7	18	56	79	66.7
2002	33	21	61.1	30	54	83	66.1
2003	35	22	61.4	29	55	74	63.9
2004	21	11	65.6	14	53	68	62.4
2005	19	32	37.3	9	47	59	53.9
2006	19	15	55.9	19	52	68	57.4
2007	16	2	88.9	15	50	64	56.7
TOTAL (All Years Combined)	229	130	63.8	187	47	83	62.4
Average Annual Value	28.6	16.3	65.3	23.4	52.6	71.4	61.2

¹False crawl = non-nesting crawl
²Nesting success = number of nests divided by the total number of crawls (nests + false crawls)
³Number of nests where hatchling emergence was documented

It should be noted that, on one hand, the above estimate represents the worst case scenario or maximum amount of indirect impacts likely to result from issuance of the ITP, as it assumes that: 1) all armoring authorized under the ITP is in place the first year

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that the ITP is in effect; and 2) no actions will be taken over the next 25 years to ameliorate the negative effects of erosion. First, it is highly improbable that all 8.8 mi (14.2 km) of future armoring authorized under the ITP will occur during the first year the HCP is in effect. Furthermore, the County plans to restore much or all of its eroded coastline over the life of the ITP. Beach restoration seaward of an armoring structure will generally serve to eliminate any reduction in nesting that might otherwise be attributable to the structure. Once a beach nourishment project is constructed, it will be maintained by placing additional sand on the beach at multi-year intervals. Thus, nesting should only be reduced in front of a permanent structure from the time the structure is constructed until the time a beach nourishment project is initiated at that location. Presumably, habitable structures located along a section of beach where an active beach nourishment project is in place may occasionally require emergency shoreline protection, but will only rarely require permanent shoreline protection. On the other hand, this estimate could underestimate the amount of indirect impacts likely to result from issuance of the ITP, because it assumes that annual average nesting activity will not increase over the life of the ITP.

Notwithstanding any direct loss of nesting habitat that may occur as the result of shoreline armoring initiated under the County's emergency authorization, the amount of indirect take that will occur as a result of any particular structure is related to the length of shoreline affected, its proximity to the surf zone, and the inclusive period during which the structure affects sea turtle nesting behavior and/or reproductive success. Presumably, impacts related solely to a structure's presence will cease once the affected beach/dune system is restored and maintained through beach nourishment or another type of habitat restoration project undertaken by the County.

For the purpose of the analysis that follows, it is assumed that all shoreline protection activities initiated under the County's emergency authorization will ultimately result in the construction of a permanent seawall or other type of State-approved armoring structure. As discussed in previous sections of this HCP, changes in beach conditions seaward of armoring structures may result in increased nest loss due to washout and decreased reproductive success. However, no data are currently available to quantify the extent of this type of take. It is assumed that take associated with decreased productivity of nests deposited seaward of armoring structures are adequately accommodated in the conservative approach used to estimate take caused by nest displacement.

In addition to the take associated with shoreline protection activities, indirect take may result from hatchlings that have to traverse vehicle ruts in their migration from the nest to the Gulf. A small amount of sea turtle nesting habitat may be eliminated by the placement of vendor storage boxes on the beach. These and other impacts associated with County-managed and/or regulated activities are expected to be minor in relation to shoreline protection measures initiated under the County's emergency authority.

Cumulative Impacts

Cumulative impacts must be assessed separately for permanent alterations to beach and dune habitats, such as those resulting from shoreline protection measures and ADA-compliant beach access structures, as opposed to spatially and temporally limited impacts resulting from beach driving, beach vendor operations, and emergency response activities.

Cumulative impacts related to permanent alterations to the beach/dune system for the protection of upland habitable structures and public infrastructure will vary directly with the amount and siting of such structures across and along the beach profile. Mosier (1998) developed a simple simulation model to predict the effects of armoring structures on sea turtle nesting as the linear feet of armored shoreline increases. She found that the cumulative impacts of beachfront armoring may be substantially greater than the sum of impacts from individual structures. Thus, as the linear extent of armored shoreline increases, proportionately fewer nests are deposited. On some beaches, nesting could be reduced to zero if the entire shoreline was armored with structures that were close to the surf zone.

It is estimated that 8.8 mi (14.2 km) of shoreline could be armored as a result of issuance of the ITP. Coupled with the 0.5 mi (0.8 km) of existing permanent armoring permitted by the FDEP, a total of 9.3 mi (15.0 km) of beach could be armored. Furthermore, FDEP could permit additional armoring outside of the designated critically eroded areas should tropical storms impact the coastline. Insofar as the likelihood of future storms is unpredictable, a reliable estimate of future cumulative impacts is not feasible.

Insofar as the County manages all activities within the Plan Area for which take authorization is being requested, the cumulative impacts for other covered activities such as beach driving, vendor operations, and emergency response activities are the same as those estimated for the proposed action. There are no municipalities along the coastline that regulate these activities. The State parks are undeveloped and do not allow public driving or vendor operations.