Colonel Robert H. Reardon, Jr.
U.S. Army Corps of Engineers
Norfolk District
803 Front Street
Norfolk, Virginia 23510-1096

Attn: Gerry Tracy
Regulatory Branch

Re: Kathleen Spachmann *et al*. and Virginia Faye Deering, Permit Application No. 96-1763-30 and 96-1613-30, Northampton County, Virginia

Dear Colonel Reardon:

The U.S. Fish and Wildlife Service has reviewed the Department of the Army permit applications, 96-1763-30 and 96-1613-30, submitted by Kathleen A. Spachmann *et al*. and Virginia Faye Deering, respectively, to construct shoreline stabilization structures in Northampton County, Virginia. Your March 12, 1997 requests for formal consultation on both of these permit applications were received on March 18, 1997. This document represents the Service's biological opinion on the effects of those actions on the northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*) in accordance with Section 7 of the Endangered Species Act of 1973, as amended, (16 U.S.C. 1531 et seq.). A complete administrative record of this consultation is on file in this office.

I. CONSULTATION HISTORY

01-21-97 The Service received requests from the Corps to review the proposed projects for federally listed species.

12-20-96 The Service recommended to the Corps that a survey for the northeastern beach tiger beetle be conducted at the proposed project sites.

03-18-97 The Service received the Corps' requests to initiate formal consultation.

04-02-97 The Service contacted the Corps and received their approval to write one biological opinion for both proposed projects.

II. BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

Kathleen A. Spachmann *et al*.: The applicant proposes to construct two 50-foot long low-profile timber groins 80 feet apart and a 163 linear foot bulkhead with two 10-foot long return walls on Smith Beach on the Chesapeake Bay in Northampton County, Virginia (Figure 1). The bulkhead is landward of mean high water (MHW) and is therefore out of the Corps' jurisdiction. The stated purpose of the proposal is shoreline protection and beach preservation/creation.

Virginia Faye Deering: The applicant proposes to construct a 55-foot long low-profile timber groin connected to and extending channelward of an existing bulkhead on Smith Beach on the Chesapeake Bay in Northampton County, Virginia (Figure 1). The stated purpose of the proposal is shoreline protection and beach preservation/creation.

RANGEWIDE STATUS OF THE SPECIES

Life History

The northeastern beach tiger beetle is a beach-dwelling insect measuring 0.5 to 0.6 inches in length. It has white to light tan wing covers, often with several fine grayish-green lines, and a bronze-green head and thorax (Knisley 1991, U.S. Fish and Wildlife Service 1993, U.S. Fish and Wildlife Service 1994). Adult tiger beetles are active, diurnal, surface predators. They forage along the water's edge on small amphipods, flies, and other beach arthropods or scavenge on dead amphipods, crabs, and fish (Knisley *et al*. 1987, U.S. Fish and Wildlife Service 1993, U.S. Fish and Wildlife Service 1994). Most foraging occurs in the damp sand of the intertidal zone and scavenging has been observed to occur more often than predation (Knisley *et al*. 1987). Larval northeastern beach tiger beetles are sedentary predators that live in well-formed burrows on the beach from which they extend to capture passing prey. Adult tiger beetles are present on beaches from mid-June through August, where they spend most of the day along the water's edge (Knisley *et al*. 1987). Adults are active on warm, sunny days where they can be seen feeding, mating, or basking (U.S. Fish and Wildlife Service 1994). They are less active on rainy, cool, or cloudy days because they cannot maintain their own body temperature. They must rely on a variety a behaviors, such as foraging and basking, to maintain their high body temperatures (Knisley *et al*. 1987).

Adult beetles lay eggs on the beach during the summer. Larvae pass through three developmental stages and emerge as adults two years following egg-laying (Knisley *et al*. 1987, U.S. Fish and Wildlife Service 1993). However, some larvae that hatch early and catch an abundance of food may develop

and emerge after only one year (U.S. Fish and Wildlife Service 1994). Development through three larval stages and pupation takes place in the burrow (Knisley *et al*. 1987). First instars occur from late August through September; second instars from September to late fall; and third instars from late fall to early spring and through the second year (Knisley *et al*. 1987). Knisley *et al*. (1987) found that the distribution of first and second instars was similar and that highest densities of third instars were in the mid- to upper-tidal zone. Therefore, most burrows were underwater during high tide. Larval burrow depths ranged from 9 - 24 cm and increased with distance from the water's edge, suggesting that burrow depth may be related to subsurface moisture (Knisley *et al*. 1987). Generally, larval burrows are plugged and not visible when the sand is dry and warm. Larvae lack a hard cuticle and are susceptible to desiccation, therefore, they tend to become inactive during hot, dry conditions (U.S. Fish and Wildlife Service 1994). Larvae are active primarily at night and plug their burrows during most of the day. Larvae typically occur in an 8 - 12 m width of beach within and above the intertidal zone. However, this area may be wider in areas of washover or where the upper beach is flat and is periodically inundated by high tides (U.S. Fish and Wildlife Service 1994). Larvae have been documented on beaches less than 8 m wide. Recent studies have shown that larvae can survive flooding from three to six days (U.S. Fish and Wildlife Service 1994). Larvae have been found crawling on the beach, apparently moving to dig a new burrow in a better location (U.S. Fish and Wildlife Service 1994). This behavior is likely a response to variations in tide levels, soil moisture, or sand accretion and erosion patterns. Larvae overwinter in their burrows and hibernate until mid-March. When sand is damp and cool in the spring, there are low levels of larval activity (C.B. Knisley, Randolph Macon College, pers. comm. 1994). Highest, most predictable periods of larval activity are from late August through early November. Larval activity is highly variable and greatly influenced by temperature, substrate moisture, tide levels, and seasons (U.S. Fish and Wildlife Service 1994).

Knisley *et al*. (1987) found that first emergence of adults ranged from 5 June to 13 June in Virginia. Rainfall appears to enhance emergence since numbers of adults usually increase after a rainfall. The number of adults increases rapidly in June, peaks in mid-July, begins to decline through August, and few adults can be found in September. There is a period of approximately two weeks after adults emerge when there is little to no dispersal (Hill and Knisley 1994a). Then a small, but significant number of beetles disperse to other sites. There is a regular dispersal phase after peak numbers emerge in early July (Knisley and Hill 1989, U.S. Fish and Wildlife Service 1993). Mark-recapture studies have determined that adults tiger beetles may travel five to twelve miles (Knisley and Hill 1989) from sites where they were marked, and some individuals may disperse up to 15 miles (Knisley 1996a). In Northumberland County, Virginia a total of 10,131 adults were marked and released; 91 beetles dispersed to new sites (mainly between two close, large sites 1.5 km apart) (Hill and Knisley 1994a). Large sites seem to serve as recruitment areas, while small sites serve as stop-overs during migration (Hill and Knisley 1994a). "It is probable that feeding or resting occur at these smaller sites and that without them, the larger sites may not experience as much migration" (Hill and Knisley 1994a). Migration serves to disperse genetic

material and allow for the colonization of new sites and the ability to leave eroding sites (Hill and

Knisley 1994a).

Populations of the northeastern beach tiger beetle are highly variable from year to year because they are subject to local population extinctions and capable of dispersal and recolonization (U.S. Fish and Wildlife Service 1994). Two- to three-fold or greater year-to-year variations in numbers at a given site are common (Knisley and Hill 1989, 1990). Many sites that have adults, especially small sites, are not suitable breeding sites, but may temporarily support adults that have dispersed from other sites (U.S. Fish and Wildlife Service 1994). Larvae are not found, or may not survive, at many sites where adults are found. Ideal tiger beetle beaches are greater than 5 - 8 m wide (C.B. Knisley, Randolph Macon College pers. comm. 1994). Adult and larval beetles are typically found on highly dynamic beaches with back beach vegetation and prefer long, wide beaches that have low human and vehicular activity, fine sand-particle size, and a high degree of exposure (Knisley *et al*. 1987). Occurrence of this subspecies has been statistically correlated with back beach vegetation, low human and vehicle activity, and wide, long, dynamic beaches (Knisley 1987a).

Status of the Species Within its Range

Historically, the northeastern beach tiger beetle was a common inhabitant of coastal beaches from Cape Cod, Massachusetts to central New Jersey, and along the Chesapeake Bay, from Calvert County, Maryland south through Virginia. The species is extirpated from Rhode Island, Connecticut, and New York (Long Island) (U.S. Fish and Wildlife Service 1994). Potential habitat for tiger beetles still exists at some of the historical sites along the Atlantic Coast (U.S. Fish and Wildlife Service 1994). The only known extant populations along the Atlantic Coast are in southeastern Massachusetts and New Jersey. The two Massachusetts populations are on Martha's Vineyard and near Westport. The highest number of adult beetles observed at Martha's Vineyard was 1,787 in 1990; in 1995, 1,009 adults were documented. The Westport population was discovered in 1994 (152 adults observed) and in 1995, 10 adults were documented.

The single known extant population in New Jersey is a result of reintroduction of larval beetles. During the fall of 1994, larvae collected from Virginia and larvae reared in a laboratory were released at two different sites on Sandy Hook in the National Park Service's Gateway National Recreation Area. In the summer of 1995, adults were documented at both sites, and mating and foraging were observed (A. Scherer, U.S. Fish and Wildlife Service, pers. comm. 1996). In the fall of 1995, first instar larvae were documented; a result of reproduction from the reintroduced beetles. During the fall of 1995, additional larvae were released. During the fall of 1995 and the subsequent winter of 1995/1996, severe erosion occurred and some tiger beetle sites were completely eroded. During 1996, little larval activity was documented and no further reintroductions took place. Additional reintroductions are planned for spring of 1997 and monitoring will continue (A. Scherer, U.S. Fish and Wildlife Service, pers. comm. 1997).

The stronghold of tiger beetle distribution is the Chesapeake Bay. The greater survival of this species in the Bay versus the Atlantic Coast may be due to historically lower levels of human activity in the Bay and less natural mortality from winter storms, erosion, etc. (U.S. Fish and Wildlife Service 1994). Between 1988 and 1993, the northeastern beach tiger beetle was documented at 13 sites in Calvert County, Maryland (U.S. Fish and Wildlife Service 1994). Between 1989 and 1990, a total of 55 tiger beetle sites was documented in Virginia: 32 sites on the western shore of the Bay and 23 sites on the eastern shore of the Bay (Buhlmann and Pague 1992). Surveys in these two states have resulted in documenting 16 occurrences with greater than 500 adults, 10 sites with 100 to 500 adults, and numerous sites with less than 100 adults. Since those surveys, several additional tiger beetle sites have been found in Virginia, resulting in 65 known locations. Because storms and other natural and man-made factors can rapidly alter beach habitat, it is difficult to determine exactly how many sites exist at a given time. Although most Virginia and Maryland sites have been identified, additional tiger beetle sites may exist within the Chesapeake Bay.

Northeastern beach tiger beetles in the Chesapeake Bay and Massachusetts are currently physically and genetically isolated from each other. Vogler *et al*. (1993) examined genetic variation in these populations. They found that the isolated Martha's Vineyard population and Chesapeake Bay populations had very low genetic variability which may indicate a history of frequent natural extinctions. "The Martha's Vineyard population can be further distinguished by the presence of an allozyme allele...that has not been observed in the Chesapeake Bay beetles" (U.S. Fish and Wildlife Service 1994). "Thus, although populations from these two areas represent the same subspecies, they should be considered as separate conservation units (Vogler and DeSalle 1994)" (U.S. Fish and Wildlife Service 1994).

Besides the work in New Jersey, limited northeastern beach tiger beetle reintroduction attempts have been made. An experimental reintroduction of adult tiger beetles was conducted in 1991 in the Chesapeake Bay to determine appropriate reintroduction methods for use in restoring beetles to their historical range along the Atlantic Coast. During the summer of 1992, adult beetles from Martha's Vineyard were transferred to Cape Cod National Seashore, Massachusetts (U.S. Fish and Wildlife Service 1994). The weather became unfavorable during the release and a reintroduction attempt was not successful (U.S. Fish and Wildlife Service 1994). During this attempt, it was observed that the beetles moved only short distances from the release site. It was hypothesized that non-dispersing beetles have very limited ranges and that the release of larvae should be investigated to better aid recolonization.

Since its listing, several non-jeopardy biological opinions anticipating take of both adult and larvae have been completed on the effects of shoreline stabilization activities on the tiger beetle in Mathews, Northampton, and Northumberland Counties in Virginia.

Threats to the Species

In 1990, the Service determined threatened status for this beetle because of its greatly reduced range and high susceptibility to natural and human threats (Federal Register, Vol. 55, No. 152, August 7, 1990). Natural limiting factors include winter storms, beach erosion, flood tides, hurricanes (Stamatov 1972), and natural enemies. Primary natural enemies of adult tiger beetles are wolf spiders (*Arctosa littoralis*), asilid flies (C.B. Knisley, pers. comm. 1994), and birds (U.S. Fish and Wildlife Service 1994). Larvae are probably more vulnerable to habitat disruption than adults (Knisley *et al*. 1987) and similar to other tiger beetles species, larval survivorship is low due to natural enemies and other limiting factors. "For example, only about 5% of the first instar larvae of several Arizona species reached adulthood" (Knisley 1987b). "Habitat disturbances could further reduce survivorship" (Knisley *et al*. 1987) and "... can eliminate suitable habitat, and when combined with natural mortality factors, could reduce populations to the point of extinction" (Knisley 1987b). The primary natural larval enemy is a small, parasitic wasp (*Methocha* species) that enters the larval burrow, paralyzes the larvae with a sting, and lays an egg on it. The egg hatches, and as it develops the larval wasp consumes the larval tiger beetle. Mites have also been found on larvae at Martha's Vineyard, but their effect, if any, is unknown (U.S. Fish and Wildlife Service 1994).

Anthropogenic threats to the northeastern beach tiger beetle include pollution, pesticides, high levels of recreational activity, off-road vehicular traffic, and shoreline alteration (Knisley *et al*. 1987, Knisley and Hill 1989, Knisley and Hill 1990, U.S. Fish and Wildlife Service 1993). The extirpation of the tiger beetle from most of its range has been attributed primarily to destruction and disturbance of natural beach habitat from shoreline development, beach stabilization, and high levels of recreational use (Hill and Knisley 1994b). Oil slicks and use of pesticides for mosquito control may have contributed to the decline of this species (Stamatov 1972). Most of the large northeastern beach tiger beetle populations in Maryland and many of those in Virginia are threatened by activities associated with the increasing human population and all are subject to oil spills and beach erosion (U.S. Fish and Wildlife Service 1994). Adult foraging, mating, and ovipositioning can be disrupted by human activity (Knisley *et al*. 1987). However, larvae are probably more affected because they spend most of their time at the tops of their burrows waiting for prey, and are disturbed by even the slightest activities such as vibrations, movement, and shadows (Knisley *et al*. 1987).

Knisley and Hill (1990) examined the effects of visitor use of Flag Ponds, a park in Maryland, on the tiger beetle. As human use continued to drastically increase, no reduction in the population of adult tiger beetles was found. However, human impact appeared to result in the lack of newly emerged adults on the public beach. Larval survivorship was significantly lower on the beach area with the greatest amount of human use. Areas that were firmly stomped, to simulate increased foot traffic, resulted in a 50 - 100% reduction in numbers of active larvae (Knisley and Hill 1989). In addition, 25% of the burrows did not reopen within 10 days of stomping, suggesting that larvae may have been dead (Knisley and Hill 1989). Negative effects of foot traffic apparently involve compaction or disruption of burrows or direct injury to larvae. Because larvae occur in the

intertidal zone, burrows can be easily compacted or dislodged by vehicles or high levels of human activity (Knisley *et al.* 1987).

Beach erosion, resulting from natural events or anthropogenic beach modifications, may also have serious effects on tiger beetles and their habitat. Erosion within the Chesapeake Bay is a natural phenomenon resulting from rising sea levels and prevailing currents. However, this process has been exacerbated by beach development activities which interfere with the natural beach dynamics. Beach stabilization structures such as groins, jetties, riprap, and bulkheads, which are designed to reduce erosion, may interrupt and capture sand from longshore movement and build up the beach around the structure, but rob sand from the down-drift shoreline. Bulkheads and riprap typically result in reflection of wave energy, which ultimately removes the beach and steepens the profile. Such changes in the beach profile can take from 1 to 30 years. These structures also prevent the back beach from supplying sand to the forebeach, and concentrate wave energy at the ends of the bulkhead, resulting in erosion at these points (Knisley and Hill 1994). Tiger beetle larvae are not usually found at sites that have narrow, eroded beaches. At sites with large adult populations, few or no larvae are found in areas with narrow beaches (1 - 3 m wide) (U.S. Fish and Wildlife Service 1994). Larvae seem to be limited to areas where beaches are at least 5 m wide, with some sand above the high tide zone (U.S. Fish and Wildlife
Service 1994). Although larvae are more sensitive to erosion and beach impacts than adults, adults are also less abundant in these narrow sections.

Knisley (1996a) conducted three years (1994 - 1996) of research on the effects of shoreline stabilization structures on the distribution and abundance of the tiger beetle, his findings are summarized below. A total of 24 sites (51 site sections) were surveyed for adult and larval beetles in Virginia. The sites were placed into one of the following categories: natural beach (14 sections), narrow beach (6 sections), groins (13 sections), groins/bulkheads (10 sections), and revetment (7 sections). The mean number of adults and larvae and beach width were greatest at natural beaches. The mean number of adults per 100 m (all sites, all 3 years) was 90 at natural beaches, 56 at sites with groins, 13.1 at narrow beaches, 13 at sites with groins/bulkheads, and 0.1 at sites with revetment. Larval densities (per 2 m transect) were 7.6 at natural beaches, 1.6 at narrow beaches and sites with groins, 1.0 at sites with groins/bulkheads, and 0 at sites with revetment. Mean fall beach width (measured in m from the most recent high tide to the end of the back beach) was 7.6 at natural beaches, 3.6 at sites with groins, 1.5 at narrow beaches, 1.4 at sites with groins/bulkheads, and 0.2 at sites with revetment. "Patterns of distribution among these types of sites were similar for both adults and larvae, but clearly larvae were more selective and limited in distribution than were adults." For example, "While the difference in adult numbers was less than 2-fold between natural and groin sites, the differences for larvae were more than 4-fold...." Natural beaches and those with sand deposition supported the greatest number of larval and adult tiger beetles. Bulkheads and revetments had the greatest negative impact on tiger beetles. "Even though larvae were found at some bulkhead sites and at other modified or narrow sites, they probably have higher winter mortality than those at natural beaches. Because of a two-year life cycle, larvae are more likely to survive two falls and winters of erosion and beach narrowing when more beach width is

available."

On August 3, 1995, a non-jeopardy biological opinion was issued to the Corps for Habitats, L.L.C. to construct riprap, groins, and spurs along the Chesapeake Bay, in Northampton County, Virginia. As part of the Corps' permit, a 5-year tiger beetle monitoring program was implemented at the project site. In October 1995, the first survey was conducted by Knisley (1995) and he determined that a moderate-sized tiger beetle population occurred at this site. After the 1995 survey, the riprap was installed. In 1996, Knisley (1996b) found that beach characteristics and beetle abundance and distribution were similar to that of 1995. The data collected during future surveys will provide information on any effects to the beach and tiger beetle from the shoreline alteration.

Beach nourishment is likely destructive to larvae and may render beach habitat unsuitable for subsequent larval recruitment and development (Knisley 1991). However, deposition of dredged material may create habitat (Knisley 1996a). Dredged sand was placed south of Cape Charles in Northampton County, Virginia in 1987, and in 1989 there was a good population of both adult and larval tiger beetles (Knisley undated proposal). Although the addition of sand may actually maintain the habitat in the long-term, it is likely that its immediate effects would result in larval mortality through crushing, smothering, or inability to dig out and resume normal activities (U.S. Fish and Wildlife Service 1994). Sand deposition could also have indirect negative effects on food (amphipod) availability (U.S. Fish and Wildlife Service 1994). The short- and long-term effects of beach nourishment on larvae need to be investigated. Since larvae seem to be very specific in their microhabitat distribution, sand particle size or other physical aspects of the microhabitat (e.g., slope, profile), may be critical (U.S. Fish and Wildlife Service 1994).

The Corps (Baltimore District) deposited sand in the Smith Point area, north of the Little Wicomico River, in Northumberland County, Virginia during the winter of 1994-1995. This resulted in a large quantity of sand pumped from the inlet channel of the Little Wicomico River to the north end of the beach, resulting in a sandbar jutting out in the Chesapeake Bay. In 1995, the mean number of tiger beetle larvae in the deposition area was 2.5, and the beach was 2 - 3 m wide and 1,400 m long (Hill and Knisley 1995). Hill and Knisley (1995) found that the sand deposited at the north end blocked sand flow to the south and increased erosion rates during 1995, resulting in decreased larval numbers during fall 1995. However, there was a 150 m section of deposition that was not occupied by larvae until after the deposition occurred (Hill and Knisley 1995). A natural beach with coarse sand occurred north of the channel inlet and had an average of 2.3 larvae/transect in 1994 and no larvae in 1995. High adult densities occurred along most of the beach both years except for approximately 150 m at the northern end and 400 m at the southern end (near the channel inlet). The middle portion of this site had greatly eroded by fall 1995 and had far fewer larvae than in 1994. This site had a very wide beach over most of its length and the back beach remained natural and relatively undisturbed by human activity.

"Along a given length of shoreline, the first structure installed often has an adverse impact on the

neighbor's shoreline (usually down-stream of a longshore current), thus forcing a sequence of other shoreline modifications. Eventually, as shoreline modifications increase in number and amount of shoreline modified, the sand 'bank' is further depleted as erosion is halted and sand moves offshore into deeper channels. The long-term (50+ years) impacts of this scenario are unknown, but may eventually lead to a collapse of the natural beach habitat..." (Hill and Knisley 1995). Roble (1994) stated that, "Further research on the impacts of beach stabilization structures on larval and adult tiger beetles, and correspondingly appropriate regulatory activities, are perhaps the two most important steps that can be taken to protect these sites." Hill and Knisley (1995), stated that "Before and after studies are the most powerful in obtaining better data...preferably with monitoring data several years before and after construction."

Recovery Goals and Accomplishments

Recovery for the tiger beetle will depend to a large extent on re-establishing the subspecies across its former range along the Atlantic Coast and protecting it within the Chesapeake Bay (U.S. Fish and Wildlife Service 1994). The best approach for achieving this is through landscape-scale conservation. The Service's recovery plan for this species defines several Geographic Recovery Areas (GRA) for conserving the northeastern beach tiger beetle and its ecosystem, providing a framework within which protection and population establishment efforts can be ranked and implemented (U.S. Fish and Wildlife Service, 1994). Recovery will hinge on maintaining the ecological integrity of essential tiger beetle habitat within each GRA, in order to achieve the population levels and structure needed for this species. Nine GRAs have been identified, four along the Atlantic Coast (Coastal Massachusetts and Islands; Rhode Island, Block Island, Long Island Sound; Long Island; Sandy Hook to Little Egg Inlet, New Jersey), two in Maryland (Calvert County, Tangier Sound), and three in Virginia (eastern shore of Chesapeake Bay, western shore of Chesapeake Bay north of the Rappahannock River, western shore of Chesapeake Bay south of the Rappahannock River). Full recovery will require the establishment of populations in each of the four Atlantic Coast GRAs as well as protection of existing populations in each of the five Bay GRAs (U.S. Fish and Wildlife Service 1994). Delisting will be considered when (U.S. Fish and Wildlife Service 1994):

1. At least three populations within each of the four Atlantic Coast GRAs have been established (defined at self-maintaining for at least five years, with no foreseeable threats) and permanently protected (defined as long-range protection from present and foreseeable anthropogenic and natural events that may interfere with their survival; adequate protection measures include land acquisition, conservation agreements and/or easements, and management measures to protect the species' habitat; this includes accounting for off-site impacts such as littoral sand drift).

2. Within the Chesapeake Bay, at least 26 populations are permanently protected at extant sites distributed among the five Bay GRAs as follows: Calvert County, Maryland (4 largest populations; Tangier Sound, Maryland (2 large [$\geq$ 500 adults] populations); Eastern Shore of Chesapeake Bay, Virginia (4 large populations, 4 others); Western shore of Chesapeake Bay

north of the Rappahannock River, Virginia (3 large populations, 3 others); and Western shore of Bay south of the Rappahannock River, Virginia (3 large populations, 3 others).

3. Life history parameters, human impacts, and factors causing decline are understood well enough to provide needed protection and management.

4. There exists an established, long-term management program in all states where the species occurs or is reintroduced.

For the most part, the four delisting goals have not been met. There is one protected population (Westport) in one of the Atlantic Coast GRAs, however recreational and foot traffic occurs at this site (Susi Von Oettingen, U.S. Fish and Wildlife Service, pers. comm. 1996.). In addition, this site does not meet the definition of "established" in the recovery plan since it has not been documented as self-maintaining for five years and there are foreseeable threats from recreational activities. Similarly, in the Bay 10 sites have some form of protection, but most do not meet the definitions of "established" or "permanently protected" as defined in the recovery plan. Goals three and four have not been met. While work is underway to meet goal three, no management programs have been initiated as required for goal four.

The recovery plan (U.S. Fish and Wildlife Service 1994) identifies the following "significant Chesapeake Bay sites, based on a consistent population size of >200 *C. d. dorsalis* and/or conservation potential:" Scarborough Neck, Hyslop Marsh, Parkers Marsh (Accomack County, Virginia); Grandview Beach (City of Hampton, Virginia); Bavon, Bethel Beach, Gwynn Island, New Point Comfort, Rigby Island, Sandy Point Island, Winter Harbor (Mathews County, Virginia); Cape Charles South, Kiptopeke State Park, Picketts Harbor, Silver Beach, Savage Neck Dunes (Northampton County, Virginia); Dameron Marsh, Haynie Point, Hughlett Point, Jarvis Point, Smith Point, Vir-Mar Beach, Taskmakers Creek (Northumberland County, Virginia); Cove Point, Flag Ponds, Scientists Cliffs, Western Shores Estates (Calvert County, Maryland); and Cedar Island, Janes Island (Somerset County, Maryland).

"Because the species seems very susceptible to frequent local extirpation of populations, either from human or natural causes, preservation measures will require protection of a series of adjacent or nearby sites in a given area" (Knisley 1991). A northeastern beach tiger beetle conservation strategy was prepared for Virginia (Donoff *et al.* 1994). Initially, 15 priority conservation sites were identified (Kiptopeke State Park, Picketts Harbor, Cape Charles, and Savage Neck in Northampton County; Scarborough Neck and Hyslops Marsh in Accomack County; Sandy Point Island, Rigby Island, Bethel Beach, Bethel Beach North, Winter Harbor, and New Point Comfort/Bavon Beach in Mathews County; Smith Point and Hughlett Point in Northumberland County; Grandview Beach in the City of Hampton). However, due to the large number of tiger beetle sites in Virginia, the conservation strategy focused on 12 priority conservation sites in Mathews (Sandy Point Island, Rigby Island, Bethel Beach, Bethel Beach North, Winter Harbor, and New Point Comfort/Bavon Beach), Northampton

(Kiptopeke State Park, Picketts Harbor, Cape Charles, and Savage Neck), and Accomack (Scarborough Neck and Hyslops Marsh) Counties (Donoff *et al*. 1994). The primary factors considered in developing the conservation plans were: (1) extent of occupied and potential habitat, (2) maintenance of dynamic beach strand habitat, (3) provision of buffer lands, and (4) provision for species movement corridors. "Several of the priority conservation sites are best treated as components of larger macrosites [several significant populations linked together]" (Donoff *et al*. 1994). The Bethel Beach macrosite would include Sandy Point Island, Rigby Island, Bethel Beach, Bethel Beach North, and Winter Harbor. Another macrosite includes Cape Charles, Picketts Harbor, and Kiptopeke State Park; three small sites, Elliotts Creek, Cape Charles-Old Plantation Creek, and Arlington-Old Plantation Creek, would also be included (Donoff *et al*. 1994).

Roble (1996) placed values on known tiger beetle sites in Virginia relative to each site's importance to future conservation efforts. Sites with a high site value included: Silver Beach, Savage Neck Dunes, Cape Charles, Cape Charles-Old Plantation Creek, Picketts Harbor, Grandview Beach, Bethel Beach, Winter Harbor Creek Beach, Smith Point North, Smith Point South, Taskmakers Creek, Dameron Marsh, and Hughlett Point. Except for the Cape Charles-Old Plantation Creek site, these high value sites were also noted as significant Chesapeake Bay sites in the species recovery plan (U.S. Fish and Wildlife Service 1994). Four of these sites have some form of protection. The remainder are privately owned (Grandview Beach is owned by the City of Hampton) and are in need of additional protection (Roble 1996).

ENVIRONMENTAL BASELINE

As defined in 50 CFR 402.02 "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies in the United States or upon the high seas. The "action area" is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. The direct and indirect effects of the actions and activities resulting from the federal actions must be considered in conjunction with the effects of other past and present federal, state, or private activities, as well as the cumulative effects of reasonably certain future State or private activities within the action area. The Service has determined the action area for this project to be the applicants' property between MLW and the landward edge of the beach.

Status of the Species in the Action Area - The projects are located along the Chesapeake Bay in the Smith Beach subdivision. The shoreline at both sites is experiencing erosion. The sites have a 12-foot high bank. The beach is approximately 20 feet wide at mean low water. There are existing bulkheads, riprap revetments, and groins all along the shoreline at Smith Beach. A lot of sand is moving in the offshore transport system at Smith Beach. Evidence of this is the fact that existing low profile groins do not have the typical build-up of sand on one side and erosion on the other. Additionally, the beach profile is relatively the same in sections of beach with or without groins. There are existing bulkheads on both sides of the Spachmann *et al*. proposed bulkhead. There is an existing bulkhead at the Deering property, and there is an existing groin 60 feet to the north of the proposed groin location.

To the south of the two project sites is the Wilkins Beach tiger beetle population. During a northeastern beach tiger beetle survey conducted between 1989 and 1991, Buhlmann and Pague (1992) documented 154 adult tiger beetles per 100 m on the undeveloped portion of the beach and 39 adults per 100 m on developed the beach. No tiger beetles surveys have been conducted at either project site. However, the Corps, on behalf of the applicants, has chosen to assume that the beetle is present in areas with appropriate habitat.

Effects of the Action - Direct impacts to the tiger beetle will result in the crushing of adult beetles, and subsequent injury or death, during construction from use/placement/stockpiling of equipment and materials on the beach and foot traffic within the construction area. Construction will also result in temporary loss of habitat for adults through disruption of their daily activity patterns (i.e., foraging, mating, basking, egg-laying). Larval tiger beetles will be directly affected through crushing, dislodging, and entombment, resulting in death or injury, during construction by use/placement/stockpiling of equipment and material on the beach and heavy foot traffic within the construction area. Larval beetles will also be prevented from feeding during that time due to their sensitivity to vibrations, movements, and shadows, resulting in injury and potentially death. Existing habitat, for both larval and adult beetles, will be permanently lost within the footprint of the groins between MLW and the landward edge of the beach.

Indirect effects are defined as those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02). The bulkhead will prevent larvae from being able to migrate landward as they mature, resulting in an inability to survive winter storms and erosion. In addition, the bulkhead will eliminate the natural sloughing and erosion of sand from the banks and, subsequently, the upland replenishment of sand to the beach. However, much of the sand supply for this beach is from offshore. Because this shoreline has already been significantly altered, it is not likely that construction of a bulkhead will result in loss of the existing beach. The groins are designed to capture sand from longshore movement. However, because this shoreline already has multiple groins which do not appear to be altering the distribution of sand, the addition of three groins is not likely to have a noticeable effect on the beach profile.

Future maintenance of the proposed shoreline stabilization structures may not require Corps' authorization. These activities may result in injury or death to adult and larval tiger beetles through heavy foot traffic on beach areas, use/stockpiling of heavy equipment, and stockpiling/placement of materials. Maintenance activities may also result in temporary or permanent habitat loss. These activities may result in further impacts to the tiger beetle population at this site.

Cumulative Effects - Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

Construction of shoreline stabilization structures (e.g., riprap, bulkhead) landward of MHW may occur within the action area in the future and such activities would not require Corps' authorization. This type of activity would adversely affect tiger beetles directly through death or injury during pre-construction and construction activities and temporary and permanent habitat loss. However, due to the existing beach stabilization structures, long-term impacts are expected to be minor.

CONCLUSION

After reviewing the current status of northeastern beach tiger beetle throughout its range and in the action area, the environmental baseline for the action area, the effects of the proposed bulkhead and groins, and the cumulative effects, it is the Service's biological opinion that the issuance of a DOA permit for this project, as proposed, is not likely to jeopardize the continued existence of the northeastern beach tiger beetle. No critical habitat has been designated for this species, therefore, none will be affected.

III. INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of the ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the federal agency or applicant. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

AMOUNT OR EXTENT OF TAKE

The Service anticipates that incidental take of the northeastern beach tiger beetle will be difficult to quantify and detect because the population density of the beetle within the project area has not been determined, and any beetles (adult or larvae) that are killed during project construction, stockpiling of equipment and materials, and habitat loss will be difficult to observe or locate due to their coloring, small body size, and tendency for larvae to remain beneath the surface. However, the level of take of this species can be anticipated by the areal extent of the potential habitat affected. This incidental take statement anticipates the taking of northeastern beach tiger beetles from 600 square feet along the groin alignments resulting from construction activities, stockpiling of materials and equipment, and temporary and permanent (within the footprint of the groins) habitat loss between the landward edge of the beach

and MLW within a 10-foot wide construction area for each groin..

REASONABLE AND PRUDENT MEASURES

The measures described below are nondiscretionary, and must be implemented by the Corps so that they become binding conditions of any permit issued to the applicant in order for the exemption in Section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of Section 7(o)(2) may lapse. The Service considers the
following reasonable and prudent measures to be necessary and appropriate to minimize take of the northeastern beach tiger beetle.

- Human activity, materials, and equipment on the beach must be minimized to reduce the impact to adult and larval tiger beetles.

- Construction activities must be conducted when adult beetles are not present.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of Section 9 of the ESA, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline the required reporting/monitoring requirements. Monitoring is not required for this project because only a small number of tiger beetles are likely to be affected by the proposed project, the anticipated take is minimal, and extensive shoreline alteration has already occurred. These terms and conditions are nondiscretionary.

1. No construction, earth-moving, placement of materials or equipment, or maintenance of structures will occur on the beach between June 1 and September 15 of any year.

2. Materials will be transported to the beach only on an as-needed basis.

3. No ground disturbance or use of vehicles or heavy equipment will occur on the beach outside of the applicants' property boundaries.

4. No refueling of equipment or vehicles will occur on the beach.

5. No use of pesticides on the beach.

6. The applicants are required to notify the Service before initiation of construction and upon completion of the project at the address given below. All additional information to be sent to the Service should be sent to the following address:

Virginia Field Office
U.S. Fish and Wildlife Service
P.O. Box 99
6669 Short Lane
Gloucester, VA 23061
Phone (804) 693-6694
Fax (804) 693-9032

7. Care must be taken in handling any dead specimens of proposed or listed species that are found in the project area to preserve biological material in the best possible state. In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. The finding of dead specimens does not imply enforcement proceedings pursuant to the ESA. The reporting of dead specimens is required to enable the Service to determine if take is reached or exceeded and to ensure that the terms and conditions are appropriate and effective. Upon locating a dead specimen, notify the Service at the address provided.

V. REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in the Corps' request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If this opinion does not contain national security or confidential business information, the Service will provide copies to the appropriate state natural resource agencies ten business days after the date of this opinion.

The Service appreciates this opportunity to work with the Corps in fulfilling our mutual responsibilities under the ESA. Please contact Cindy Schulz of this office at (804) 693-6694 if you require additional information.

Sincerely,

Karen L. Mayne
Supervisor
Virginia Field Office

Enclosure

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bcc: ARD-South, Region 5
Endangered Species Coordinator, Region 5
CBFO Reading File
Endangered Species Biologist, CBFO
Endangered Species Biologist, NEFO
Endangered Species Biologist, NJFO
Law Enforcement, Yorktown
(Attn: Dan Hurt)
Law Enforcement, Richmond
(Attn: Senior Resident Agent)

<u>10 business days after the date of this letter, mail copies to:</u>
DNH, Richmond
(Attn: Tom Smith)
VDACS, Richmond
(Attn: John Tate)