

# **Biological Assessment**

**U.S. Fish and Wildlife Service**

**Calvert Cliffs Unit 3 Nuclear Power Plant**

Calvert County, Maryland

**U.S. Nuclear Regulatory Commission Combined License Application**

Docket No. 52-016

**U. S. Army Corps of Engineers Permit Application**

Permit Application No. NAB-2007-08123-M05 (Calvert Cliffs 3 Nuclear  
Project, LLC/UniStar Nuclear Operating Services, LLC)

December 2010

U.S. Nuclear Regulatory Commission

Rockville, Maryland

U.S. Army Corps of Engineers

Baltimore District



# 1.0 Introduction

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application from Calvert Cliffs 3 Nuclear Project, LLC and UniStar Nuclear Operating Services, LLC (collectively referred to as UniStar or Applicant) for a combined license (COL) to construct and operate a new nuclear reactor with a design-rated gross electrical output of 1710 megawatts-electric (MW(e)) on the Calvert Cliffs site. The U.S. Army Corps of Engineers (Corps) is reviewing an application from UniStar for a Department of the Army (DA) Individual Permit pursuant to Section 10 of the Rivers and Harbors Appropriation Act of 1899 (Rivers and Harbors Act) and Section 404 of the Clean Water Act (33 U.S.C. 1344) to perform site preparation and construction activities for the proposed new unit at the Calvert Cliffs site. Currently, there are two operating nuclear reactors on the site, Calvert Cliffs Nuclear Power Plant (CCNPP) Units 1 and 2. The proposed new reactor – Unit 3 – would be located adjacent to the existing CCNPP Units 1 and 2. The site is located about 40 mi southeast of Washington, D.C., and 10.5 mi southeast of Prince Frederick, Maryland.

Pursuant to National Environmental Policy Act of 1969, as amended (NEPA), the NRC and the Corps are cooperating agencies with the NRC being the lead agency, and they prepared a draft environmental impact statement (EIS) as part of the agencies' reviews of the COL and DA Individual Permit applications. The Corps is cooperating with the NRC to ensure that the information presented in the EIS is adequate to fulfill the requirements of Corps regulations; the Clean Water Act Section 404(b)(1) Guidelines, which contain the substantive environmental criteria used by the Corps in evaluating discharges of dredged or fill material into waters of the U.S.; and the Corps public interest review process. As required by Title 10 of the Code of Federal Regulations (CFR) Part 51.26, the NRC published in the *Federal Register* a Notice of Intent (73 FR 8719) to prepare an EIS, to conduct scoping, and to publish a draft EIS for public comment. The NRC and Corps issued the draft EIS on April 16, 2010, and the NRC published a notice in the *Federal Register* on its availability (75 FR 20867). The draft EIS can be obtained on the NRC public website at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1936/> and through the NRC's Agencywide Document Management System (ADAMS) through the accession numbers ML101000012 and ML101000013. The final EIS will be published in February 2011. The impact analysis in the EIS includes an assessment of the potential environmental impacts of the construction and operation of a new nuclear power unit at the Calvert Cliffs site and along the associated transmission line corridors, including potential impacts to the threatened and endangered species. If issued, the COL would authorize UniStar to construct and operate the proposed unit. The Corps permit decision will be made following issuance of the final EIS.

The Corps and the NRC are conducting a joint consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to Section 7(c) of the Endangered Species Act of 1973, as amended (ESA), and have prepared this biological assessment (BA), which examines the potential impacts of construction and operation of the proposed Unit 3 at the Calvert Cliffs site on threatened or endangered species. This BA examines the potential impacts of the proposed actions on Federally listed species within FWS's jurisdiction and focuses on two threatened species: the Puritan tiger beetle (*Cicindela puritana*) and the northeastern beach tiger beetle

(*Cicindela dorsalis dorsalis*). There are no areas designated as critical habitat near the Calvert Cliffs site.

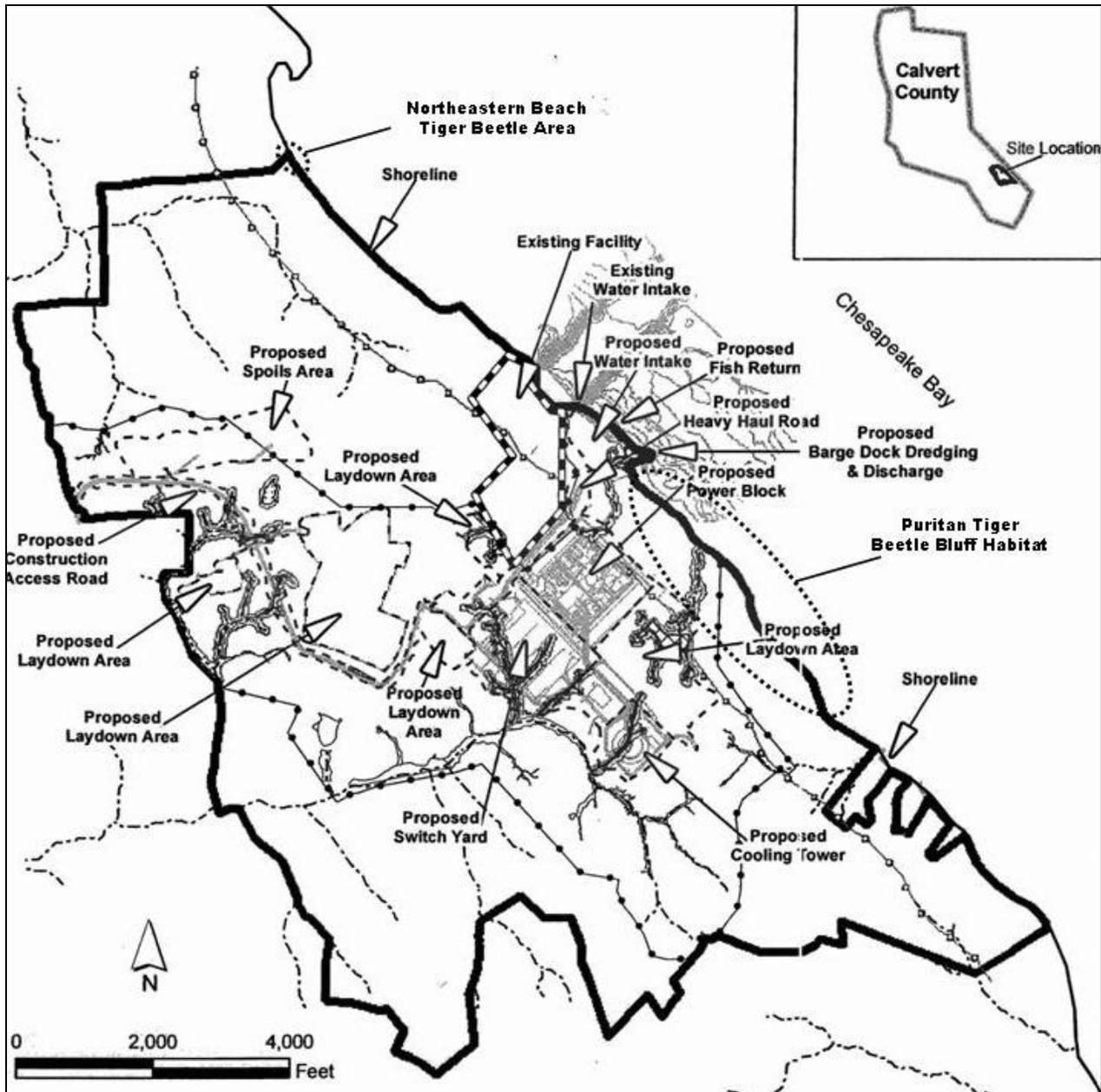
## 2.0 Calvert Cliffs Site Description

The Calvert Cliffs site is located on the Chesapeake Bay about 60 mi south of Baltimore; 40 mi southeast of Washington, D.C.; 10.5 mi southeast of Prince Frederick, Maryland; and 7.5 mi north of Solomons, Maryland (Figure 1). The site comprises approximately 2070 ac adjacent to Chesapeake Bay in an unincorporated area of Calvert County, Maryland. Two existing nuclear generating units, CCNPP Units 1 and 2, which are licensed by the NRC, have a combined net electric generating capacity of approximately 1685 MW(e). Unit 1 began commercial operation in 1974, and Unit 2 began commercial operation in 1976. Together, the two existing nuclear units, auxiliary facilities, and onsite transmission line corridors occupy approximately 331 ac of the Calvert Cliffs site. A barge slip, two water intake structures, a single warmwater discharge to the Bay, and a fish-return system are currently onsite, along with associated security, fuel storage, and administrative buildings. Both of the existing units would remain and continue to operate, and they would not be affected by the proposed action.

Per the Chesapeake Bay Critical Area Act of 1984 (Maryland Code Annotated Natural Resources 8-18 2010), the State of Maryland and its Critical Area Commission for the Chesapeake and Atlantic Coastal Bays (CAC) established the Chesapeake Bay Critical Area (CBCA). This includes all land in Maryland within 1000 ft of the mean high water line of tidal waters or the landward edge of tidal wetlands, as well as all waters of and lands under the Chesapeake Bay and its tributaries (CAC 2008a). In addition, regulations that are implemented through local CBCA commissions establish protections for a 100-ft-wide, naturally vegetated, forested buffer landward from the mean high water line of tidal waters or from the edge of tidal wetlands and tributary streams of the Chesapeake Bay regardless of whether they actually occur within the CBCA (CAC 2008b). Within the Calvert Cliffs site both aforementioned listed tiger beetle species (Puritan tiger beetle and northeastern beach tiger beetle) only occur within the CBCA. Thus, any activities with the potential to affect either tiger beetle species would automatically be subject to CBCA restrictions.

In addition to eight different upland cover types, sandy beach and sand cliff habitats are found on the Chesapeake Bay shoreline where previous development has not occurred. Moderately broad, sandy beaches exist on the northern part of the site and on the adjacent Flag Ponds Nature Park. The southern section is dominated by the high cliffs that continue on the adjacent Calvert Cliffs State Park. The cliff face is mostly unvegetated and is preserved this way by wave action and erosion. The mostly narrow beach at the foot of the cliffs can be sandy to rocky.





**Figure 2.** Locations of the Existing CCNPP Units 1 and 2 and the Proposed Location of Unit 3 Facilities (USACE 2008)

### 3.0 Proposed Federal Actions

This section provides information on the potential terrestrial impacts of construction activities and potential impacts related to the proposed Unit 3 at the Calvert Cliffs site. The proposed Federal actions are the issuance of a COL for the construction and operation of a new nuclear reactor at the Calvert Cliffs site pursuant to 10 CFR Part 52.97, and the decision regarding a DA Individual Permit application pursuant to Section 404 of the Clean Water Act and Section 10 of

the Rivers and Harbors Act. The Corps action is the decision whether to issue a permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for proposed structures in and under navigable waters and the discharge of dredged, excavated, and/or fill material into waters of the United States, including jurisdictional wetlands.

The NRC, in a final rule dated October 9, 2007 (72 FR 57416), limited the definition of “construction” to those activities that fall within its regulatory authority in 10 CFR 51.4. Many of the activities required to construct a nuclear power plant are not part of the NRC action to license the plant. Activities associated with building the plant that are not within the purview of the NRC action are grouped under the term “preconstruction.” Preconstruction activities include clearing and grading, excavating, erection of support buildings and transmission lines, and other associated activities. These preconstruction activities may take place before the application for a COL is submitted, during the NRC’s staff’s review of a COL application, or after a COL is granted. Although preconstruction activities are outside the NRC’s regulatory authority, many of them are within the regulatory authority of local, State, or other Federal agencies. The distinction between construction and preconstruction is not carried forward in this BA and are being discussed together as construction activities.

Prerequisites to construction activities include, but are not limited to, documentation of existing site conditions within the Calvert Cliffs site and acquisition of the necessary permits (e.g., COL, local building permits, a National Pollutant Discharge Elimination System permit, a Clean Water Act Section 404 permit, a General Stormwater Permit, and other State and local permits). After these prerequisites are completed, planned construction activities could proceed and would include all or some of the activities pursuant to 10 CFR 50.10(e)(1). Following construction, planned operation of the new reactor would proceed according to 10 CFR 50.57.

The construction footprint for the proposed Unit 3 and all associated facilities would cover approximately 460 ac, including about 175 ac of previously disturbed ground. UniStar has proposed to build and operate an AREVA U.S. EPR design pressurized water reactor steam electric system, which is rated at 4590 megawatts-thermal MW(t) with a net of 1562 MW(e). Unit 3 would require cooling water intake and fish-return facilities that are separate from Units 1 and 2 and would also have a separate plant access road and protected area. The existing transmission system for CCNPP Units 1 and 2, which consists of two circuits, would be used to service Unit 3, and no new transmission corridors outside the construction footprint are planned.

Below is a description of the construction, operation, and related activities that could potentially affect the two Federally threatened tiger beetle species. The determination of potential effects was based on habitat affinities, life history considerations, and the nature, spatial, and temporal considerations of the activities.

### **3.1 Construction Activities**

About 460 ac of terrestrial wildlife habitat would be disturbed during construction of proposed Unit 3. Approximately 265 ac of habitat, including 30 ac in the CBCA, would be affected. Activities that have the potential to affect tiger beetles include restoration and extension of an existing barge-unloading facility on the Chesapeake Bay shoreline, reconstruction of a culvert to restore a stream outfall near the barge dock, stream mitigation and stabilization at the mouth of

a stream that meets the Chesapeake Bay immediately south of the barge dock area, and modification of land cover above the Chesapeake Bay bluffs.

To accommodate heavy equipment and reactor components that would be barged up the Chesapeake Bay to the existing barge dock on the Calvert Cliffs site, the slip would be refurbished, and the existing heavy haul road from the barge dock would be modified and extended to the proposed Unit 3 construction site and laydown areas. A new sheet-pile wall about 90-ft long would be installed between the barge slip and an existing outfall culvert. A bulkhead would be restored, and a concrete and riprap apron would be installed at the end of the haul road to allow off-loading. Construction of the heavy haul road to the barge dock and barge slip alterations may affect approximately 200 ft of sandy beach located immediately south of the existing barge slip. This particular locale was described as a wide sandy beach without adjacent bluffs and classified as non-habitat for both tiger beetle species (Knisley 2006). However, adult Puritan tiger beetles have been observed in this area. The sandy beach narrows and becomes rocky approximately 150 ft from the barge dock. Work activities on the beach would be restricted to occurring outside the June 1 to August 31 timeframe (UniStar 2010) to avoid affecting adult Puritan tiger beetles that may be present in the barge dock vicinity.

Reconstruction of a culvert to restore a stream outfall would also occur at the barge dock location. Silt build-up has altered the flow from this outfall, and a 40-ft by 40-ft by 2-ft deep riprap apron would be placed directly in front of the existing outfall (UniStar 2009a). This would allow the stream to flow directly into the Bay and avoid siltation of the barge dock area. UniStar has committed to a time-of-year work restriction for barge slip refurbishment activities that would occur landward of mean low water and extend up to the sheet pile bulkhead. Work on the beach would also be restricted within the June 1 to August 31 window (UniStar 2010).

The primary stream enhancement element at the mouth of a stream that flows from Camp Conoy is a channel stabilization feature at the confluence with Chesapeake Bay to prevent the upstream migration of a headcut. Woody riffle/pool grade controls and headwater wetland creation would be used to dissipate energy flow and lift the existing channel. A series of stone step pools would provide grade stability and connection to the Bay (UniStar 2010). Grading proposed on the banks above the step pools coupled with herbicide treatment should eliminate *Phragmites* and allow natural deposition at the cliff base, mimicking processes that create and maintain larval Puritan tiger beetle habitat. Since bare bluffs and narrow, sandy beach exist at this location, both beetles and their habitats have the potential to be disturbed in this locale. Therefore, activities at this area are subject to the same time-of-year restrictions, June 1 to August 31, and are also restricted to a 100-ft-wide corridor at the confluence of the stream with the Chesapeake Bay centered on the run of the stream (UniStar 2009b, 2010).

In addition, a building would be demolished and impervious surfaces removed at the Eagle's Den located within 50 ft of the cliff face of the bluff that faces Chesapeake Bay and forest would be planted at this location. These bluffs below the Eagle's Den serve as habitat for larval Puritan tiger beetles and were classified as good habitat during beetle surveys (Knisley 2009). Potential impacts include destabilization of the bluff face and subsequent alteration of the face and the beach below.

## 3.2 Operation

This section describes potential impacts to the protected beetles related to the operation of proposed Unit 3 and associated facilities at Calvert Cliffs site.

### 3.2.1 Shoreline Alteration from Water Withdrawal

The cooling water source for the proposed Unit 3 is the Chesapeake Bay. Total water demand from the Bay during normal operations would be 41,095 gpm, although consumptive rates would vary with temperature and humidity. Approximately one-half of this water would be lost to evaporation in the cooling tower, and the rest would be returned to the Bay. The impact of withdrawal from the Chesapeake Bay would be small. Additional shoreline exposure would not be measurable, especially in light of the natural erosive conditions at that location.

### 3.2.2 Maintenance Dredging and Restoration of the Barge Slip

Beyond refurbishment and restoration of the existing barge slip, maintenance dredging may be needed to transport large equipment, such as replacement steam generators. Nearshore maintenance dredging would occur as needed at the same location that barge slip refurbishment would occur during construction to remove accumulated material. Maintenance dredging activities could affect adult Puritan tiger beetles that may occur occasionally on the beach adjacent to the work area. UniStar has requested a 10-yr maintenance dredging clause be added to the DA Individual Permit, if issued.

## 4.0 Terrestrial Species Descriptions

Management of listed tiger beetles on the Calvert Cliffs site began when the Baltimore Gas and Electric Company, the prior operator of CCNPP Units 1 and 2, entered a conservation agreement with the Nature Conservancy that designated a Tiger Beetle Habitat Protection Area in 1993 (NRC 1999). Tiger beetle populations have been monitored within Calvert County annually since 1997 and on the Calvert Cliffs site, with the exceptions of 2001 and 2005 (Knisley 2009). Annual pedestrian surveys are conducted along Chesapeake Bay from late June to mid July when adult beetle populations are at their peak seasonally. All adults are counted at the water's edge where the beach is narrow, while wider beach sections are canvassed using a circuitous route. Waypoints are recorded to divide the beach into sections about 328 ft in length, and habitat attributes are noted. The remainder of this section describes the life history and habitat use of the two tiger beetle species that occur on and in the vicinity of the Calvert Cliffs site.

### 4.1 Puritan Tiger Beetle (*Cicindela puritana*)

Tiger beetles are typically the dominant invertebrate predators in the open sandy dunes and beaches that they inhabit (FWS 1993). The Puritan tiger beetle, measuring 11.5-12.4 mm in length, occurred historically on beaches in Connecticut, New Hampshire, and Massachusetts and along the shore of the Chesapeake Bay in Maryland (55 FR 32088). Recently, the Puritan

tiger beetle's distribution has been drastically limited, with only three known locations: the Chesapeake Bay shoreline in Calvert County, around the mouth of the Sassafras River in eastern Maryland, and along the Connecticut River in Connecticut and Massachusetts (Figure 3) (FWS 1993). The largest of these populations, found in Calvert County, has declined in numbers since the early 1990s (Knisley 2006). There also appear to be wide fluctuations in numbers of adults observed at these sites from year to year.

The Puritan tiger beetle was Federally listed as threatened in 1990 due to its limited distribution coupled with threats from habitat loss and degradation, as well as vulnerability to natural and human threats (55 FR 32088). A more recent status review of this species recommended the Puritan tiger beetle be reclassified to endangered, but the listing has not changed to date (FWS 2007). It is also a State of Maryland endangered species (MDNR 2007).

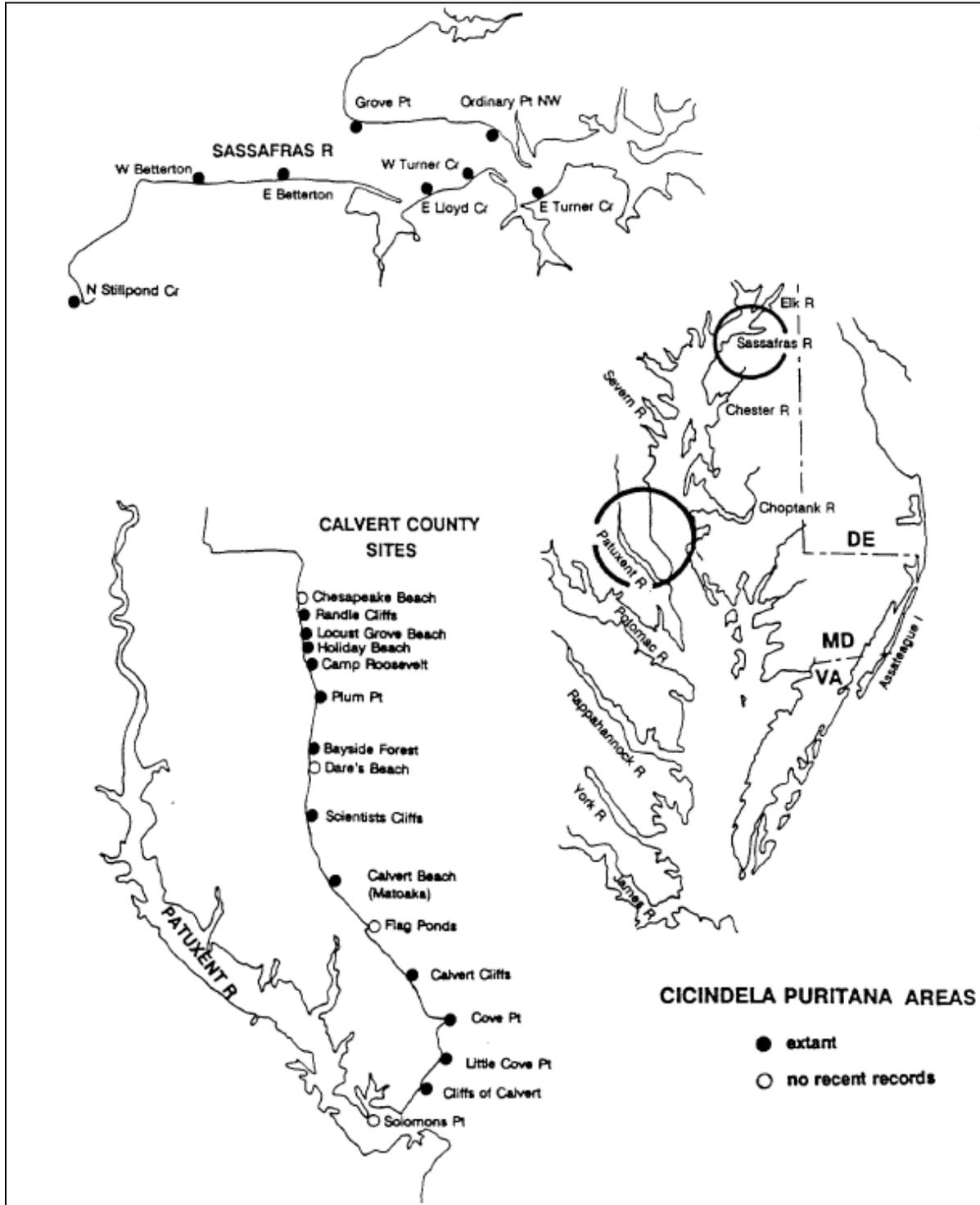
The life cycle of *Cicindela puritana* takes up to 2 years to complete during which they transition through three larval instar stages. The adults emerge in June, and their numbers peak in late June through early July (FWS 1993; 55 FR 32088). Mating activities typically occur in the late afternoon, then the females move up to the adjacent cliff face to deposit their eggs (55 FR 32088). The larvae hatch in late July or August and remain as first instars for 2 to 4 weeks, then overwinter as second instars (FWS 1993). The following spring they molt into third instars and spend the summer and following winter in that stage (FWS 1993).

Puritan tiger beetle larvae in the Chesapeake Bay populations construct and inhabit deep burrows in sparsely vegetated or non-vegetated, sandy clay bluffs adjacent to the beaches where adults are found (FWS 1993; 55 FR 32088). The larvae tend to be most active during cool weather and especially in the fall as evidenced by observed open burrows (FWS 1993). The larvae are carnivorous and feed on small invertebrates that pass within reach of their burrows. They attach themselves to the lip of their burrows with hooks on their abdomen (FWS 1993). Adults exhibit some flexibility in beach habitat preference from wide sandy beaches to narrow beaches below clay banks (FWS 1993). Thus, important habitat is where the larvae inhabit the sparsely vegetated or non-vegetated, sandy clay bluffs adjacent to beaches.

Adults are active day and night and are prey for other predators, including robber flies and spiders, and larvae are parasitized by a wasp (*Methoca* sp.) (FWS 1993). The larval burrows are also susceptible to erosion and destruction from winter storms. However, the largest threat to the survival of these beetles is from loss and destruction of habitat required for larval survival from shoreline stabilization and development (FWS 1993). Natural erosion of cliffs by wave action and rainfall creates newly exposed habitat, suitable for oviposition and larval development, which is being destroyed by cliff stabilization structures such as the construction of bulkheads (55 FR 32088). Development often requires bank stabilization, and as banks are stabilized plant cover becomes established, reducing or eliminating suitable habitat and, thus, occupation by this beetle species (FWS 1993).

Most Puritan tiger beetles that occur along the Chesapeake Bay occur within Calvert County (Figure 3). On the Calvert Cliffs site, this habitat is found on the southern portion of the site only (Figure 2). Calvert County populations have fluctuated from over 9000 in 1988 and 1998 to less

than 6000 in the past 3 years (Knisley 2006). Adult counts at the shoreline of the Calvert Cliffs site since 1997 have also fluctuated from a low of 49 in 1999 to a high of 616 in 1998, and the



**Figure 3.** Distribution of the Puritan Tiger Beetle in the Chesapeake Bay Region (FWS 1993)

count was 122 in 2008 (Knisley 2009). Adult beetles were observed where beach habitat was suitable, with most observations occurring south of the barge dock (Figure 4).

## **4.2 Northeastern Beach Tiger Beetle (*Cicindela dorsalis dorsalis*)**

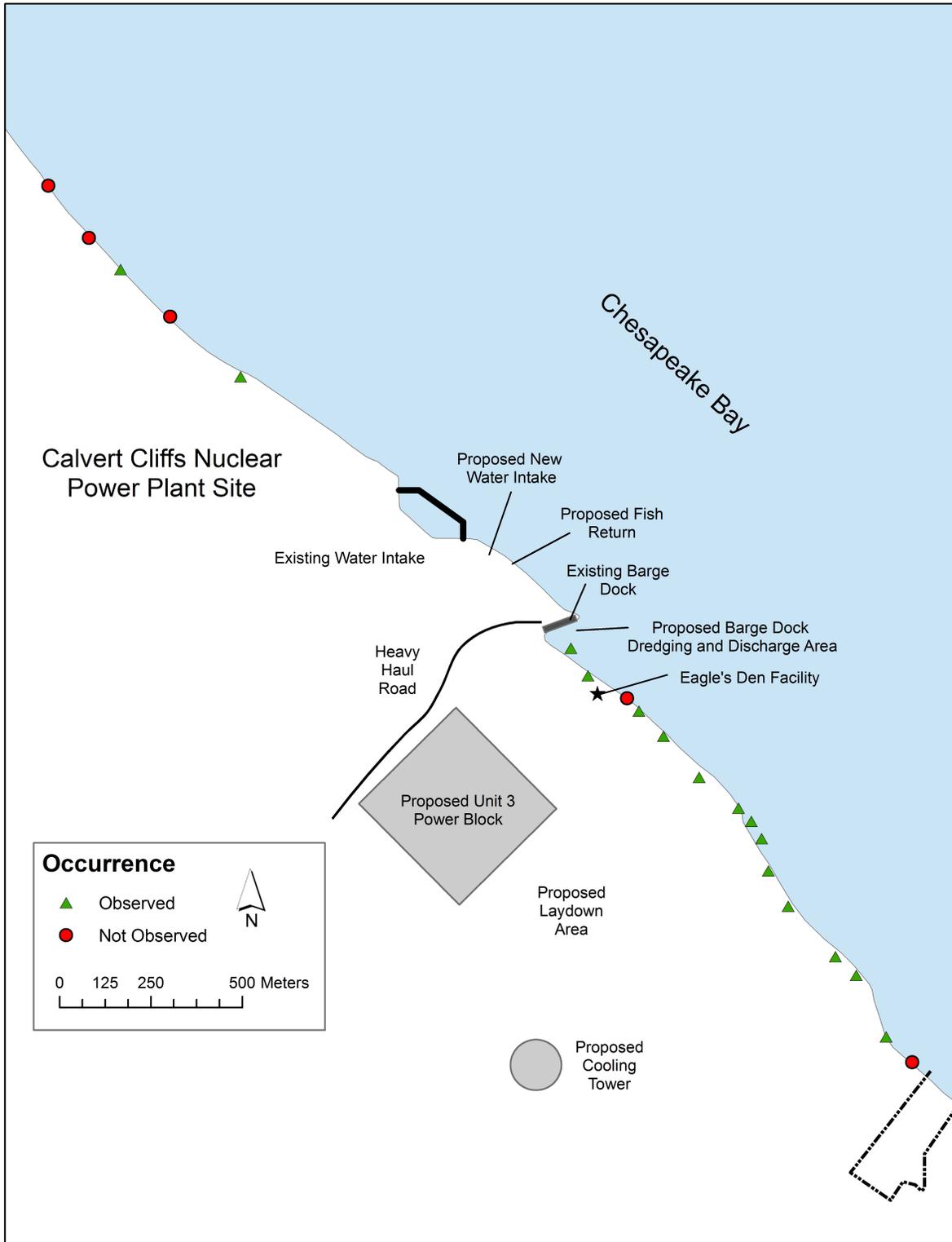
Like the Puritan tiger beetle, the northeastern beach tiger beetle is an important invertebrate predator. Its presence is an indication of a healthy beach community. Slightly larger than the Puritan tiger beetle at 13 to 15 mm in length (55 FR 32088), the northeastern beach tiger beetle inhabits dynamic beach environments closer to the water's edge (FWS 1994).

*C. dorsalis dorsalis* historically occurred from Cape Cod, Massachusetts, south to central New Jersey, and along the shores of the Chesapeake Bay in Virginia and Maryland (FWS 1994). Recently, the species has been extirpated from Rhode Island, Connecticut, Long Island, New York, and New Jersey. The current distribution is limited to two sites in coastal Massachusetts and throughout the Chesapeake shoreline (FWS 1994). Chesapeake Bay populations now constitute a significant portion of the known population of northeastern beach tiger beetles. The northeastern beach tiger beetle is a Federally threatened species and endangered in the State of Maryland (55 FR 32088; MDNR 2007), and a 5-year review of the status by the FWS is pending for this species (73 FR 3991).

Northeastern beach tiger beetles emerge as adults in early June through mid August, peaking in July (55 FR 32088). Adults are diurnally active on wider beach sections near the water's edge on warm, sunny days where they mate and lay their eggs from late June through August (FWS 1994). They preferably inhabit beaches at least 20 ft wide and move into new areas of deposition (Fenster et al. 2006). The adults feed mainly on small amphipods, arthropods, and flies, and have also been observed scavenging dead amphipods, crabs, and fish (FWS 1994).

The larval stages typically last through two winters with the first instar stage beginning in late July and August, and by September most of the larvae are second instars and remain active through November (FWS 1994; 55 FR 32088). Third instars from the previous summer's cohort are also active during the fall, and both cohorts then hibernate over the winter on the beach to around mid March (FWS 1994). The third instar larvae then emerge as adults while the newer cohort remains over the summer and following winter as third instars. However, if they hatch early and have an abundance of food, some can emerge as adults after only one winter (FWS 1994).

Northeastern beach tiger beetle larvae construct and inhabit burrows from which they ambush prey. Unlike Puritan tiger beetle larvae, northeastern beach tiger beetle larvae are found much lower on the beach in the upper intertidal to high-drift zone where prey is abundant (FWS 1994). Although burrows may be inundated at high tide, larvae have adapted by closing the burrow until water levels drop (FWS 1994). Unlike most other species of tiger beetles, the larvae of *C. dorsalis dorsalis* have been observed crawling on the beach, presumably relocating their burrows to more favorable area in response to changing conditions (FWS 1994). The larvae are susceptible to desiccation due to their lack of a hard cuticle and are, therefore, inactive during hot, dry periods (FWS 1994).



**Figure 4.** Proposed Facilities and Puritan Tiger Beetle Survey Results from 2006 (Adapted from USACE 2008; Knisley 2009)

Adults are preyed upon by birds, wolf spiders, and asilid flies (Fenster et al. 2006). The larvae are parasitized by an ant-like wasp (*Methocha* sp.) (FWS 1994), and they are also susceptible to erosion, flooding, and food availability. Larvae-to-adult survival may be as low as five percent. Causes for decline of this species have been attributed to beach habitat destruction and direct mortality from recreational use, alteration by stabilization structures, as well as natural phenomena (FWS 1994). The larvae are particularly vulnerable to compaction or destruction of their burrows by human use and vehicular traffic on the beaches where they develop (55 FR 32088).

Annual population levels of this species fluctuate widely, and local extinction and repopulation is likely a survival mechanism as adults are able to disperse widely. Marked individuals have been recovered 5-12 mi away, and some adults have been observed over 50 mi from known populations. Lack of undisturbed beaches and proximate populations are hampering recruitment despite the wide dispersal abilities of the adults (FWS 1994). Northeastern beach tiger beetles prefer large, wide, exposed beaches with fine grain size subject to natural erosion with little disturbance by humans (Fenster et al. 2006; 55 FR 32088).

Historically in Calvert County, northeastern beach tiger beetles have been confined to the northernmost 300-ft section of beach on the Calvert Cliffs site that borders Flag Ponds Natural Area. No known population of the northeastern beach tiger beetle is established within the Calvert Cliffs site, although individuals have been observed on the Calvert Cliffs site. In 2004, four adult northeastern beach tiger beetles were observed on the beach approximately 5000 ft northwest of the existing Calvert Cliffs water intake structure, but none were observed from 2006-2008 despite annual surveys (Knisley 2006; Knisley 2009). This location is the nearest known occurrence of this species to the proposed construction activity. No suitable breeding habitat, larvae, or burrows have been observed on the Calvert Cliffs site, and it is believed that this species does not have an established population on the site (Knisley 2006).

## **5.0 Adverse Environmental Impacts on Tiger Beetles**

This section describes the potential impacts to the two Federally listed tiger beetle species resulting from construction and operation of a proposed third unit at the Calvert Cliffs site.

### **5.1 Puritan Tiger Beetle**

Proposed construction activities with the potential to affect Puritan tiger beetles include refurbishment of the existing barge slip, restoration of a stream outfall immediately adjacent to the barge slip, stream enhancement at the mouth of a stream that flows from Camp Conoy, and removal of the Eagle's Den facilities.

Barge slip modification and construction of a heavy haul road to the barge dock would affect a small, sandy beach immediately south of the existing barge slip. The beach was described as wide and sandy without adjacent cliffs and classified as non-habitat for Puritan tiger beetles (Knisley 2006). However, this qualitative habitat grading scale is based on bluff suitability for

larvae. Adults can and do occasionally occur in beach segments classified as non-habitat or marginally suitable habitat. Approximately 150 ft south of the barge slip the beach narrows and becomes rocky, also not ideal habitat. Although habitat for larval Puritan tiger beetles does not exist at this location, adult Puritan tiger beetles have been observed on the beach during 2004, 2006, and 2007 within approximately 300-600 ft of the existing barge dock (Figure 4) (Knisley 2006; UniStar 2009a, 2010). The maximum number observed during a single visit was six individuals (Knisley 2006). Adult Puritan tiger beetles are active during the summer, and UniStar has committed to a time-of-year work restriction for barge slip refurbishment activities that would occur on the beach. No work activities would be allowed on the beach from June 1 to August 31, inclusive of any year (UniStar 2009b, 2010).

Stream stabilization at the mouth of a stream that flows from Camp Conoy that empties into Chesapeake Bay could also affect Puritan tiger beetles. Bluffs that are suitable for Puritan tiger beetle larvae are located within 25-50 ft of the stream outlet. Proposed construction activity would be strictly limited to a 100-ft section of beach centered on the stream outlet and is not expected to affect this habitat (UniStar 2009b, 2010). Vehicles and equipment staged on the beach adjacent to the stream outlet could also affect adult Puritan tiger beetles. No work is proposed below the approximate mean high water shoreline of the Chesapeake Bay. As with the barge slip refurbishment, no vehicle staging related to the headcut or other mitigation activities at this location would be conducted from June 1 to August 31 (UniStar 2009b, 2010; EA Engineering 2009). UniStar agreed to control and monitor all construction access, logistics, and staging to ensure strict adherence to all temporal and spatial work restrictions (UniStar 2010).

The other construction activities with the potential to affect the Puritan tiger beetle are the demolition of the building and removal of impervious surfaces at the Eagle's Den area and reforestation to be conducted at the immediate top of the bluff that faces Chesapeake Bay. The cliff face is where Puritan tiger beetle larvae live (Knisley 2006). The beach immediately below the Eagle's Den is mapped as optimal tiger beetle habitat but is also described as rocky and poorly suited (Knisley 2006). A geotechnical evaluation would be conducted to determine stability of the Eagle's Den area and used to determine appropriate construction loads and methods to avoid disturbance of the bluff (UniStar 2009c). Sediment and erosion control BMPs would also be used to minimize impacts to adjacent beetle habitat (UniStar 2009a).

Beach habitat would not be measurably altered by the proposed Unit 3 use of water from the Chesapeake Bay to operate the closed-cycle cooling system. Tiger beetles, as well as other fauna and flora residing along the Chesapeake Bay shoreline, would likely be unaffected. However, maintenance dredging during operation could reduce the amount of beach adjacent to the barge slip if conducted from land and could affect individual adult Puritan tiger beetles on the beach during work activities. However, only a few individuals have been occasionally observed nearby, and if the work is conducted outside the June 1 to August 31 period, tiger beetles should not be affected. Occasional use of the barge dock during operation is not expected to affect Puritan tiger beetles since the barge dock and the area in the immediate vicinity do not provide suitable habitat. Therefore, proposed Unit 3 construction and operation activities could affect a small number of Puritan tiger beetles.

## 5.2 Northeastern Beach Tiger Beetle

Proposed construction and mitigation activities would not take place within approximately one mile of where northeastern beach tiger beetle adults have been observed on the Calvert Cliffs site. Even though individuals of the northeastern beach tiger beetle have been found up to several miles from known populations, construction and mitigation activities are not expected to affect the population located at the northern tip of the CCNPP site (Figure 2). Operation of Unit 3 is also not expected to affect this species because there are no known activities that would occur near the known population during operation located at the CCNPP site. Therefore, adverse impacts to northeastern beach tiger beetles from the construction and operation of the proposed Unit 3 are not expected to occur.

## 6.0 Cumulative Impacts

The NRC and the Corps review team considered potential past, present, and reasonably foreseeable activities that could have cumulative effects on Federally protected species in conjunction with building and operating a new nuclear unit at the Calvert Cliffs site. For this analysis, cumulative effects include the effects of State, tribal, local, and private actions in the vicinity of the Calvert Cliffs site. Future Federal actions that are not related to the proposed action are not considered because they require separate consultation pursuant to Section 7 of the ESA (FWS and NMFS 1998). The future is defined as the start of construction of the proposed Unit 3 until the conclusion of decommissioning, and the area of interest is the Chesapeake Bay shoreline within Calvert County.

Projects and activities within the vicinity of the Calvert Cliffs site with the potential to affect either tiger beetle species include power upgrades and continued operation of CCNPP Units 1 and 2, the Dominion Cove Point pier reinforcement project, Mid-Atlantic Power Pathway (MAPP) transmission line project, continued existence of Flag Ponds Nature Park and Calvert Cliffs State Park, regional urban development, and global climate change.

Power upgrades and the continued operation of Units 1 and 2 would require periodic maintenance dredging of the existing barge dock. Currently Units 1 and 2 do not have a permit from the Corps to conduct maintenance dredging, but the current DA Individual Permit application requests the approval of maintenance dredging for a 10-yr period. Puritan tiger beetles have been observed nearby, and this activity could displace individual adults using the nearby beach if maintenance dredging occurs near the shore and during the season adult beetles are active.

Near the Cove Point Liquid Natural Gas (LNG) facility, Puritan tiger beetles historically occurred at four locations: the Calvert Cliffs site (3.5 mi from the LNG facility), Cove Point (1 mi), Little Cove Point (2.5 mi), and the Cliffs of Calvert (over 4 mi) (FWS 1993). Both small and large populations of the northeastern beach tiger beetle were also found at Cove Point as well as at Flag Ponds Nature Park just north of the Calvert Cliffs site (FWS 1994). Activities with the potential to affect either tiger beetle species include dredging and infrastructure installation and upgrades. The existing LNG facility consists of a dock for unloading LNG and storage and

distribution facilities. The dock is approximately 1 mi offshore. Pipelines that connect to the storage facility appear to be subsurface, with the nearest above-ground structure about 0.15 mi from any beach habitat that may be suitable for either beetle species. Pier reinforcement activities would occur at the offshore pier and are not expected to affect shoreline habitats, and any upgrades to the storage facility would occur inland at sufficient distances to preclude impacts to shoreline habitats. No Puritan tiger beetles have been observed in the Cove Point vicinity affected by this project, and the FWS concluded project activities would not affect this species. The conversion of nearshore and beach habitat to marsh from LNG pier reinforcement mitigation activities could affect northeastern beach tiger beetle habitat. However, Cove Point beach habitat where northeastern tiger beetles have been observed has degraded naturally, and the beetle population has declined. The FWS concluded that the absence of adult northeastern beach tiger beetles and suitable larval habitat would result in no adverse affect on this species (USACE 2010).

The MAPP project includes the installation of a submarine 500-kV transmission line from the Calvert Cliffs site to Indian River power plant near Millsboro, Delaware, and would cross the Chesapeake Bay from the Calvert Cliffs site. It is not known exactly where or how the transmission line would be installed at the shoreline. Neither beetle species is known to occur along much of the shoreline within the central part of the Calvert Cliffs site; therefore, if the MAPP project connects to the central portion of the site, no impacts to either species would be anticipated because suitable habitat is not present at that location.

Urban development along the Chesapeake Bay shoreline has occurred and is expected to continue. Beaches may provide ideal building sites, and recreational access to beaches may increase with the local population. Disturbance of these habitats may also allow the establishment of non-native plant species, possibly resulting in habitat loss or degradation. Listed beetle populations on lands already protected from development, such as Calvert Cliffs State Park and Flag Ponds Nature Park would not likely be threatened by urban development. The Chesapeake Bay Critical Area Commission could limit the extent, location, and potential adverse affects by managing future development within suitable Puritan and northeastern beach tiger beetle habitat. Although habitat may be somewhat secure from immediate development, public recreation that occurs on beaches of Chesapeake Bay, including the Flag Ponds Nature Park, could affect the northeastern beach tiger beetle and the Puritan tiger beetle.

Global warming and sea level rise are not likely to affect the Chesapeake Bay shoreline that provides both tiger beetle species with habitat. Puritan tiger beetle adults occupy narrow beaches below the steep bluffs. The bluffs and narrow beaches are maintained as suitable habitat by wave action, and a change in sea level is not expected to affect wave action and the maintenance of the Puritan tiger beetle habitat. Northeastern tiger beetles occupy broad, sandy beaches and are not expected to be affected as sea level rise would likely be accompanied by shifting beaches.

Habitat loss and degradation along the shores of the Chesapeake Bay threaten both the Puritan and the northeastern beach tiger beetles. Residential and industrial development and beach recreation are the main causes. Some habitats are afforded protection from development, and development could be managed by the CBCA Commission.

## 7.0 Conclusion

The potential impacts of the construction and operation of the proposed Unit 3 at the Calvert Cliffs site on Federally protected species near the site have been evaluated. The known distributions and records of those species and the potential ecological impacts of the construction and operation of Unit 3 to the species and their habitats have been considered in this BA.

Based on this review, the NRC and Corps review team concludes that the construction and operation of proposed Unit 3 at the Calvert Cliffs site may affect a small number of adult Puritan tiger beetles but are not likely to adversely affect or jeopardize the continued existence of the Puritan tiger beetle on the site. Also based on this review, the staff concludes that the construction and operation of Calvert Cliffs Unit 3 are not likely to adversely affect or jeopardize the continued existence of the northeastern beach tiger beetle because the project activities would not occur in close proximity to the nearest northeastern beach tiger beetle.

## 8.0 References

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