

CURRENT STATUS OF TWO FEDERALLY THREATENED TIGER BEETLES AT CALVERT CLIFFS NUCLEAR POWER PLANT, 2006

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INTRODUCTION:

Objective

The objective of this report is to provide a current assessment of the status of two Federally Threatened species of tiger beetles that occur along the shoreline at Calvert Cliffs Nuclear Power Plant (CCNPP; Fig. 1). This assessment is based on some results from field surveys conducted in years prior to 2006 (see Knisley 2005a,c), but primarily from surveys of adult numbers and a habitat evaluation of this site conducted in 2006.

Background

The Puritan Tiger Beetle (PTB) is currently known to exist as three metapopulations: the largest in Calvert County, Maryland, where there are eight populations. The second largest metapopulation consists of nine mostly small populations around the mouth of the Sassafra River in eastern Maryland, and the third metapopulation consists of three small populations along the Connecticut River in Connecticut and Massachusetts (USFWS 1995; Knisley 2005b). The Calvert and Sassafra metapopulations have declined dramatically and somewhat progressively since the late 1980's and early 1990's (Knisley 2005 a,b,c). Specific causes for this decline are unknown but it is hypothesized that encroachment of vegetation onto the bases and faces of the cliffs are reducing habitat quality at many sites. Adults oviposit on the cliff face and larvae develop there during a two-year development period. The Calvert County population has fluctuated greatly from

peak numbers of over 9,000 in 1998 and 1988 to less than 6000 in the past three years (Fig. 2). The Sassafras metapopulation has declined from a total of 2755 adults in 1992 to 630 or less from 1999 to 2005. A population of the Puritan Tiger Beetle has been known from the shoreline of the Calvert Cliffs Nuclear Power Plant since 1997. This site, like all others, has exhibited dramatic fluctuations in population size since that time. Counts of adults at this site have varied more than some other sites, with the following estimates of adult numbers: 1997, 119 adults; 1998, 616; 1999, 49; 2000, 367; 2002 80; 2003, 226; 2004, 121; and 2006, 111 adults. These variations are caused by year-to-year variations in climatic and other factors that affect survival and reproduction, and to a lesser extent on survey conditions.

The Northeastern Beach Tiger Beetle *C. d. dorsalis*, is also Federally Threatened with numerous populations in Virginia and currently two populations in Calvert County, Western Shores Estates and Flag Ponds Nature Park. Numbers of this species have also declined dramatically in Maryland, and two sites which once supported viable populations (Scientists Cliffs and Cove Point) no longer have beetles (Knisley 2005a). Causes of the decline and disappearance of this species are unknown, but shoreline changes are a likely factor. No populations are known from CCNPP although small numbers of adults have been found in some years at the northern border of the property, adjacent to Flag Ponds.

2006 SURVEY RESULTS AND DISCUSSION

Cicindela puritana -- Adult Survey and Habitat Evaluation, 2006

Adults of the PTB were surveyed on July 22, 2006, using the same visual search index count methods as in all previous years. This method has been widely used by many workers for many tiger beetle species. The survey method for *C. puritana* at CCNPP and at all other Calvert sites involved moving slowly along the water edge and searching the ground surface 10-20 meters ahead and counting all adults seen. A hand held GPS unit (Garman Legend) was used to record coordinates every 100-200 meters so that adult numbers could be recorded within each shoreline section. The quality of habitat at CCNPP was further evaluated during surveys on September 27 and October 25, 2006. The basis of the habitat evaluation was:

1. visual examination of the beach width and surface character (adult habitat) along with the presence and amount of suitable cliff strata (oviposition sites and larval habitat);
2. adult numbers present in the 2006 survey and in other recent years; and
3. examination of photographs of the site. From these sources of information, a letter grading system (A to E) was used to provide a qualitative indication of habitat quality, with A being the best *C. puritana* habitat in Calvert County and E being non-habitat.

The results of the 2006 surveys indicated a generally similar distribution of adults as in previous surveys. Adult numbers in 2006 (111 adults) were nearly the same as the 2004 counts (121), but much lower than the high annual counts in 1998 (616) and 2000 (367). The adults in all years were generally present along the whole length of the shoreline at CCNPP, but abundance and densities varied greatly. In 2006 and in previous years, greatest numbers of adults and highest densities were within the southern third of the site, the area of waypoints 356 -361 (see Fig. 1, map). Smaller concentrations of adults were in the northern half of the site, waypoints 338 to 349. These adult numbers proved to be a reliable indicator of overall habitat quality, as indicated in Table 1 which provides overall habitat grades for each section within adjacent waypoints. The best cliff habitat for larvae and beach habitat for adults is in the southern part of the site (Fig 3). The shoreline adjacent to the Camp Conoy area near waypoints 343-344 have little habitat because of low and vegetated cliffs. There is minimal habitat in the section north of waypoint 344 to waypoint 338, but a more extensive stretch of more suitable habitat south of this section, extending to the south end of the property at waypoint 366.

The section of shoreline north of waypoint 336 was checked several times in the early 1990's by USFWS or Maryland DNR personnel and determined to be non-habitat for the PTB (Judy Jacobs, personal communication). This area was re-affirmed as non-habitat on the basis of my October 2006 survey. The section of shoreline from waypoint 338 to 336 is armored with rip-rap and has no sandy beach habitat for adults. The area behind the beach includes a road bed and heavily vegetated areas along each side of the road. The cliffs in this section are recessed over 40 meters from the shoreline and very heavily vegetated with large trees and shrubs (Fig. 3). The absence of open, bare areas on the cliff face (Fig. 3) and the distance from the shoreline indicates this area has been non-habitat for 20 or more years, perhaps much longer, if ever. The shoreline section extending north from waypoint 336 to the north boundary of the property at Flag Ponds Nature Park is also non-habitat because of the powerplant facilities, low cliffs and/or narrow beach.

Cicindela dorsalis – Adult Survey and Habitat Evaluation, 2006

This species does not have an established population within the boundaries of the CCNPP, and consequently this site has not been one of the target sites that are annually surveyed for tiger beetles in Calvert County. However, in some years small numbers of adults (<25 individuals) have been observed at the far north end of CCNPP. These adults were found to be confined to an approximate 100 meter section bordering Flag Ponds Nature Park, having apparently moved south from that area where a breeding population exists. No larvae or other evidence of a breeding population of *C. dorsalis* has been known in this northern section of the site. No adults were found with the CCNPP boundaries in 2006, nor were there any in the bordering section of Flag Ponds. At Flag Ponds most of the adults and all larvae of *C. dorsalis* are restricted to the northern half of this site, and only occasionally are small numbers of adults found in the southern end near the CCNPP boundary.

Literature Cited:

- Knisley, C. B. 2005a. Monitoring *Cicindela puritana* and *C. dorsalis dorsalis* in Maryland, 2004 . Final report to: Maryland Department of Natural Resources, Annapolis, MD. 11 p.
- Knisley, C. B. 2005b. Biological studies of the Puritan Tiger Beetle: distribution and abundance, 1988 to 2005, habitat ecology, and status of the Grove Point population. Final report to: U. S. Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD. 17 p.
- Knisley, C. B. 2005c. Distribution and abundance of *Cicindela puritana* and *C. dorsalis dorsalis* in Maryland, 2005. Final report to: Maryland Department of Natural Resources, Annapolis, MD. 12 p.
- U. S. Fish and Wildlife Service. 1994. Puritan tiger beetle (*Cicindela puritana*) recovery plan. U. S. Fish and Wildlife Service, Hadley, MA. 39 P.

Figure 1. CCNPP

Numbered points indicate GPS waypoints associated with beetle counts in Table 1.

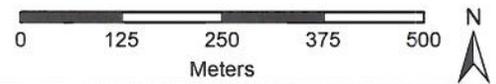


Fig. 2. Total numbers of *C. puritana* adults estimated at all Calvert County sites, 1988 to 2005

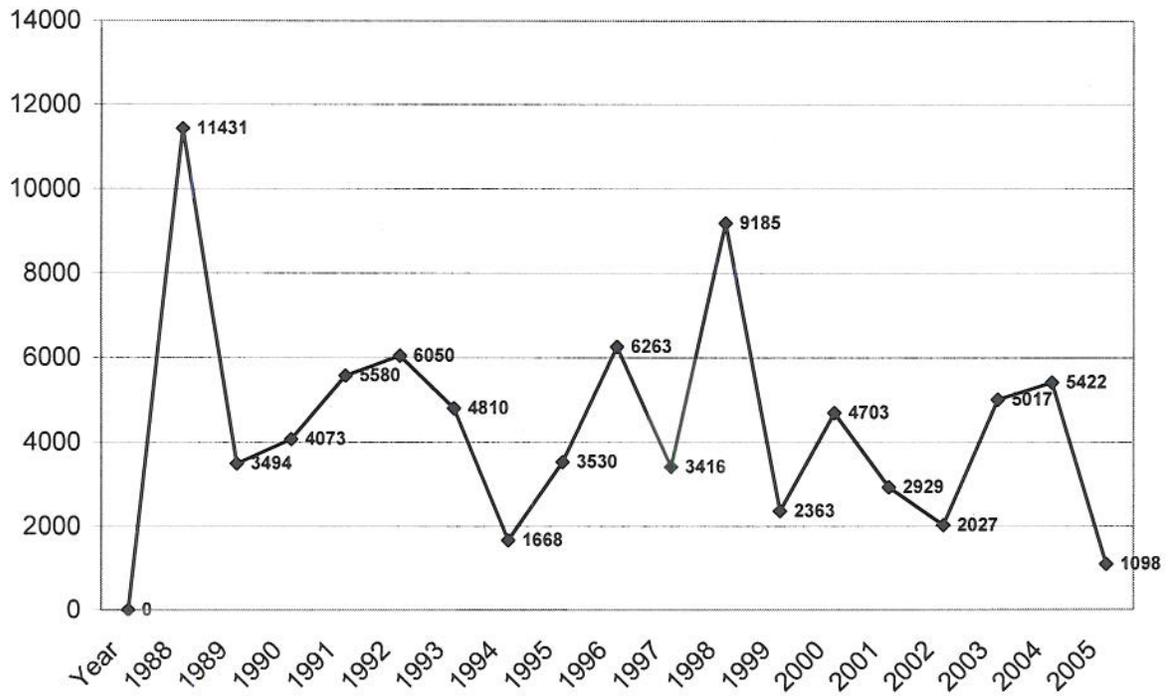


Fig. 3. Photographs of *C. puritana* (PTB) habitat at CCNPP. Top left: Cliff breakdown area south of Camp Conoy area showing rocky, unsuitable adult beach habitat (Fig. 1, waypoint 348). Top right: Close view of area near Camp Conoy showing low cliffs and poor habitat for PTB (Fig. 1, waypoint 343). Lower Left: High cliffs and beach providing good habitat for PTB (Fig. 1, waypoint 358; Lower right: Close view of upper cliff stata of fine sand and good PTB habitat (Fig. 1, waypoint 358).



Table 1. Results of adult *C. puritana* survey and habitat evaluation along shoreline sections at CCNPP.

Map Waypoints	Adults 2006	Overall Habitat Grade	Habitat Characteristics
North end with No Habitat			
N end	0	E	Flag Pond boundary south to 336; low or no cliffs, narrow beach
336	0	E	Low or recessed cliffs, powerplant facilities, no adult or larval habitat
337	0	E	Heavily vegetated, recessed cliffs, no adult or larval habitat
North Section with Little Habitat			
338	0	E	Area south of barge dock, no cliffs wide sandy beach
339	3	D	rocky more narrow beach, poor habitat
340	6	C	high cliffs, very rocky beach,
341	0	E	very rocky beach, unsuitable
342	4	E	less rocky, wider beach
343	3	D	Section of current intake; wider beach, low cliffs
344	2	C	Section of current intake; wider beach, low cliffs.stream cut
345	6	C	low cliffs, target area, good beach
346	5	C	gap in cliffs, stream bed
347	4	B	good beach and cliff habitat
348	6	C	start rocky, shelly beach at mini point
Middle Section with Little Habitat			
349	0	D	narrow rocky beach, with good high cliffs
350	2	D	as above
351	0	D	point area, poor rocky beach
352	0	D	mostly poor, rocky beach with good tall cliffs
353	3	C	wider, more sandy beach
354	3	D	poor shelly beach, low cliff area
355	0	D	heavy tree rubble, debris on beach, good cliffs
South Section with Best Habitat			
356	2	C	heavy shells on beach, good cliffs
357	6	C	start wide sandy beach with some shells, good cliff habitat
358	10	B	same
359	7	B	same
360	17	B	good beach and recessed cliff habitat
361	3	C	narrow rocky beach, with good high cliffs
362	0	D	same as above; very poor beach
363	0	D	same as above; very poor beach
364	0	C	start wide beach with low cliffs
365	13	B	same, higher cliffs
366	6	B	same
Total	111		

APPENDIX

Conclusions on Potential Impacts on Proposed Plans at CCNPP

Under current plans for development of new nuclear generating unit(s) at the CCNPP site, all associated plant facilities would be outside of the 1000-foot Chesapeake Bay Critical Area except for a new heavy haul road and cooling water intake and discharge facilities, which are water-dependent. The proposed heavy haul road is routed just north and west of a small tributary stream that outfalls to the bay south of the existing CCNPP barge slip, and joins the existing haul road from the barge slip northwest of survey waypoint 338 (Figure 1). The preferred location of the new cooling water intake and discharge structures is north of waypoint 338 in the area from the barge slip northward to the existing CCNPP cooling water intake structure, with associated pipelines roughly coincident with the proposed heavy haul road route and existing road north of the barge slip. An alternative location for cooling water intake and/or discharge structures considered by the project is on the Chesapeake Bay shoreline at survey waypoints 343-344, with associated pipelines routed westward through a topographic depression (swale) to the power block area (Figure 1).

The results of the 2006 survey support and extend the findings used in the initial site layout studies conducted in the first quarter of 2006, and indicated that the work being proposed at CCNPP will not have any effect on the Puritan or Northeastern Beach Tiger Beetles or their habitats. Larvae of the Puritan tiger beetle would be negatively affected by direct construction or other disturbance to the cliff where developing larvae are found. Adults of the PTB could be affected by heavy equipment or intense human activity on the beaches during their activity period, mid-June to early August. However, since no such activity is planned in the areas of suitable habitat, no negative effects would be expected. The Northeastern Beach Tiger Beetle would also not be negatively impacted because there is no breeding habitat for this species at CCNPP. Adults of this species are active from mid-June through late August at the Flag Pond site. Few, if any adults could potentially move onto the beach along the north edge of CCNPP, but would move away if there is beach activity occurring.