

Applicant Summary
Review Process for Projects Involving Puritan Tiger Beetles in
the Chesapeake Bay

Chesapeake Bay Field Office

U.S. Fish and Wildlife Service

In consultation with

Maryland Department of Natural Resources

April 2019

Purpose of this document

The Puritan tiger beetle (*Cicindela puritana*) is protected by both the federal Endangered Species Act (ESA) and the Maryland Nongame and Endangered Species Conservation Act (§10-2A-05.1), as amended in 2010. Similar to the federal ESA, Maryland State law requires projects that will take Puritan tiger beetles to obtain an Incidental Take Permit (COMAR 08.03.08.14). The permit application requires a conservation plan that describes how the project proponents will avoid, minimize and mitigate the impacts of the project for Puritan tiger beetles. In addition, a recent Population Viability Analysis (PVA) of this species (Gowan and Knisley 2010) indicates that some loss of carrying capacity with off-setting conservation is possible without jeopardizing the survival and recovery of this species.

The following document describes the U.S. Fish and Wildlife Service's approach to reviewing projects involving Puritan tiger beetles, using an approach that is consistent with State and Federal law while incorporating the most current information on this species. It is the intent of the Service and the Maryland Department of Natural Resources to make the Federal and State permit/consultation processes and requirements as similar as possible. This document has been created through the thought and discussion of State and Federal biologists and academic experts with this common goal.

Background

The Puritan tiger beetle inhabits the dynamic shorelines of the Chesapeake Bay where there are tall eroding cliffs and adjacent sandy beaches. Listed as a federally threatened

species in 1990, the entire range of this species includes two small populations along the Connecticut River, one in Massachusetts and another near Hartford, Connecticut, and two meta-populations in the Chesapeake Bay. The largest Maryland meta-population occurs on the western shore of the Chesapeake Bay in Calvert County, and the second and smaller metapopulation occurs along the eastern shore around the mouth of the Sassafras River in Cecil and Kent County.

In Maryland, these beetles spend their entire life cycle on or near eroding cliffs and adjacent sandy beaches. Adults emerge in mid to late June and are active into early August. Adults forage and mate along the narrow beaches, retreating to the cliff face at high tide. Females move up the cliff face adjacent to the beach and lay their eggs in unvegetated surfaces of the cliff, in strata of moderately compacted and sandy soils. Larvae pass through three instars or growth stages in permanent burrows in the cliff face, typically over two winters, then emerge as adults in June two years after eggs are laid. Bare, eroding cliff faces provide ideal habitat while stabilized cliffs with heavy vegetation cover are not suitable.

The high cliffs along the Chesapeake Bay where Puritan tiger beetles occur are rare geological features that represent less than 3% of the Bay's entire shoreline (approximately 11,600 miles) (VIMS 2006). The high cliffs must also have the sandy strata preferred by the Puritan Tiger Beetle females for ovipositing, thus appropriate habitat is rare (Knisley and Fenster 2009). Cliff erosion occurs at all Puritan tiger beetle sites on the Chesapeake Bay and is considered essential to maintain the unvegetated cliff faces that this species needs. The most famous of the high cliff areas are the cliffs of Calvert County which are noted for fossil shark teeth and other Miocene fossils that can be found along the beaches and are produced from the eroding tall cliffs. The erosion rates of cliffs vary but often are very high and this includes both erosion at the toe of the slope and upper cliff collapses (Leatherman 1986, Clark et al. 2004). The entire Bay has experienced relative sea-level rise, and erosion of islands and shorelines has been occurring for a long time (Leatherman 1986, USGS 1998, NOAA 2006, IPCC 2007). Thus, residential development along the shoreline is vulnerable and, as a result, a variety of shoreline erosion control measures have been implemented and a great deal of the Bay shoreline has already been hardened (VIMS 2006). Shoreline erosion control structures such as bulkheads and revetments replace the beach habitat used by adult tiger beetles and over time, the cliff habitat is also lost. Permitting these structures clearly reduces the total habitat available for this species.

Recovery Criteria for the Puritan Tiger Beetle

This review process must be consistent with the potential recovery of this species. The recovery plan for the Puritan tiger beetle (USFWS 1993) sets specific recovery criteria for the species and these focus on protection of at least six large (500-1000+ adults)

populations and their habitats at current sites along both shores of the Chesapeake Bay . In addition, there must be sufficient habitat protected between these larger populations to maintain connectivity. There are currently three large subpopulations that are protected and a few small ones in the Sassafra River metapopulation (Table 1). We will need at least two more large subpopulations protected, through public ownership or conservation easement, in Calvert County to meet recovery goals. We expect to move forward towards these goals through pro-active recovery work and the conservation measures implemented through this review process.

Threats

Residential development on the top of the cliffs where beetles occur is not a threat by itself; however, any subsequent shoreline erosion control measures destroys Puritan tiger beetle habitat by stabilizing the cliff face and altering or eliminating beach habitat. Residential areas planned in the 1950's frequently underestimated erosion and established lots too close to the edge of the cliff. While Calvert County regulations now require or recommend greater setbacks for future development, some of the existing lots are too close to the edge and some homes are already vulnerable to collapse at the top of the cliff. Erosion control measures desired by many landowners are the major immediate threat to the Puritan tiger beetle.

There are several types of erosion control measures, and while they vary in the severity of their impacts to Puritan tiger beetles, all of these measures cause some reduction in the overall suitability of the habitat because they decrease erosion rates, may eliminate beach habitat, stabilize the cliffs and increase vegetation growth. Table 2 provides a description of the main approaches to shoreline erosion control and the relative impacts to tiger beetle habitat. The goal of the following project review process is to balance the needs for some erosion control measures while maintaining enough of the best habitat for Puritan tiger beetle populations to prevent extinction of this species and further its recovery.

Preventing Extinction of Puritan tiger beetles

A Population Viability Analysis (PVA) conducted for this species in 2005 (Gowan and Knisley 2005) concluded that we could not maintain this species only on the State lands where it was already protected and that maintaining the populations on private lands was necessary to prevent extinction. The extinction probabilities calculated in that study also suggested fairly high risks of extinction even if all sites could be maintained, especially for the smaller eastern shore metapopulation. A second PVA was recently conducted (Gowan and Knisley 2010) to include more recent monitoring data and to address a different set of management strategies with a different approach based on new

information. The results of this model suggest that some small amount of habitat loss (10-20%), with comparable conservation measures, might still enable PTB to persist and recover. Thus this project review process was established to allow some losses of habitat with appropriate conservation to occur.

Streamlined Interagency Review Process

Proposed shoreline erosion control projects that occur in locations that have Federally threatened and State endangered Puritan tiger beetles require multiple State and Federal review and permit processes. This review process: 1) identifies each State and Federal review and/or permit process; 2) provides the timing associated with these review and permit processes; and 3) provides one checklist of information needed from the applicant for those review and permit processes. The goal is to have one multi-agency process that results in enhanced agency coordination, and a more transparent, and efficient process for the applicant.

1. Applicant completes Joint Federal/State Application for the Alteration of any Tidal Wetland in Maryland, found at:

http://textonly.mde.state.md.us/assets/document/permit/alter_sf.pdf

MDE screens application for presence of Puritan tiger beetles at the project site with GIS data provided by USFWS. If present, within 7 days after receipt of the application, MDE will determine if the applicant completed the required consultation and application with USFWS and MD DNR pursuant to the Maryland Puritan Tiger Beetle Habitat Conservation Program (see Appendix A and B). If the applicant has completed the required consultation process, including the notice of required mitigation pursuant to the Maryland Puritan Tiger Beetle Habitat Conservation Program, then the application will be sent to the Corps as a Category B for their review. If the required consultation was not initiated or completed then MDE will suspend review of the application and advise the applicant to contact DNR and FWS to initiate the consultation process. The application will be sent to the Corps as a Category B for their review.

2. MDE and/or the Corps will schedule and meet with applicant on site. Every effort will be made to coordinate the meeting to coincide with the required meeting with DNR and FWS if the consultation process has yet to occur.

3. If the application had the required consultation paperwork - MDE will have 45 days to determine if the application is complete. If MDE determines that the information they require in an application is not complete, a letter requesting the additional information will be sent to the applicant; copy sent to the Corps.

4. If the application did not have the required consultation paperwork - Once MDE receives the revised plans and notice of the required mitigation pursuant to the Maryland

Puritan Tiger Beetle Habitat Conservation Program, MDE will forward the revised information to the Corps. MDE will have 45 days to determine if the application is complete. If MDE determines that the information they require in an application is not complete, a letter requesting the additional information will be sent to the applicant; copy sent to the Corps.

5. Once the application is complete, MDE will notify the Corps. At that time, the Corps will initiate Section 7 ESA consultation with FWS and the Corps will put the project on agency notice. MDE will put the project on Public Notice if the proposed activity extents require a Public Notice for the State.

6. The Section 7 process allows up to 135 days after formal consultation is initiated for the FWS to issue a Biological Opinion to the Corps. FWS' goal for Corps' permits involving shoreline protection is to issue a Biological Opinion within thirty (30) days, with a copy to DNR.

7. The Corps receives the Biological Opinion, forwarding a copy to MDE, and issues the permit within 60 days for a General Permit and 120 days for an Individual Permit. The permit is conditioned that no work can be conducted until the State mitigation debt has been satisfied.

8. MDE will issue an authorization (General License/General Permit) within 60 days of receiving the FWS' Biological Opinion and MDE's determination of a complete application or a Report and Recommendation to the Board of Public Works within 120 days from the FWS' Biological Opinion and MDE's determination of a complete application. Note: This streamlined review process only applies to State and federal authorizations for the proposed project.

How the FWS and MDNR Evaluate a Shoreline Project with Puritan tiger beetle present

a) Quantifying the impacts of the project. The impacts of different projects depend on the size of the project (length of beach covered in revetment) and the quality of that beach in terms of the productivity of that habitat for beetles. We use the term carrying capacity to reflect this productivity. Overall we will assess the impacts of the project and evaluate whether they jeopardize the continued existence and survival of this species (Table 3).

b) Quantifying the losses of carrying capacity: The productivity of sections of shoreline are described in terms of *carrying capacity (also abbreviated as K)*. Carrying capacity is the ability of the habitat to produce and sustain Puritan tiger beetles. The average number of beetles counted in the last 6 years (2013-2018) per 100 m of shoreline is used to describe the % of the total carrying capacity that segment of beach provided to

the subpopulation. *The Service will quantify the % of carrying capacity lost as a result of the project.*

c) As described in the checklist, are there ways to minimize the loss of habitat? Are there any other options besides total losses of habitat such as occur from revetment projects? Alternatives to riprap and revetments include shoreline stabilization techniques such as near-shore or off-shore structures, reef-balls, etc. and these are much less damaging to Puritan tiger beetle habitat than placing rock on the shoreline (Table 2). However, if alternative measures are not possible, then revetment type structures should minimize impacts to beetles by excluding construction activities during the adult breeding season of June through August in order to minimize adult tiger beetle mortality. In addition, site design considerations should be made so that overall impacts are lessened to the greatest extent possible. Examples would be limiting overall length of the structures themselves and utilizing tapered ends on the revetment to minimize adjacent scouring effects.

d) Mitigation required to offset losses of Puritan tiger beetle habitat: The State of Maryland has established the Puritan Tiger Beetle Habitat Conservation Program (HCP) to receive mitigation funds for the incidental take of this species. The purpose of Maryland's HCP is to mitigate the impact of "incidental take" by acquiring or restoring similar habitat for permanent protection of the PTB. A landowner, group of landowners, or a community (collectively, "landowner") may participate in the Department's HCP by making a payment into the "Fund". The amount of payment depends on the mitigation debt of the proposed shoreline or cliff alteration project as determined by the interagency review process. See Appendix B for more information.

References

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Table 1. Population estimate (average 2013 to 2018) for subpopulations of the Calvert County and Sassafras River metapopulations. Bold indicates large (>500) populations; * indicates populations that are protected from development.

Subpopulations	Avg Population estimate for last 6 yrs (2013 to 2018)	% of Metapop
Calvert County Metapopulation		
Randle Cliff	64	1
Bayside Forest	195	3
Warrior Rest *	2,002	36
Scientists Cliffs	175	3
Western Shores/Calvert Beach	377	7
Calvert Cliffs Nuclear Power Plant	283	5
Rocky Point: <i>New Site</i> Between CCNPP and CCSP	296	5
Calvert Cliffs State Park*	1,301	23
Little Cove Point	796	14
Cliffs of Calvert	132	2
Total estimated population of Calvert County (avg last 6 years)	5,622	
Sassafras River Metapopulation		
Cabin John	0	0
North Grove Point	0	0
Grove Point*	1,667	36
Grove Farm WMA	15	0
Ordinary Point*	170	4
East Turner	403	9
West Turner*	632	14
East Lloyd	666	15
East Betterton	141	3
West Betterton*	752	16
North Still Pond	132	3
Total estimated population of Sassafras River (avg last 6 yrs)	4579	

Table 2. Comparison of potential alternatives for shoreline erosion control.

Alternative	Effectiveness For Erosion Control at toe of slope	Predicted Impacts on PTB Habitat (without adaptive mgt.)	Monitoring Requirements	Adaptive Management Requirements
No Action	None	Maintains habitat for adults and larvae	None	None
Reef-Ball Breakwater	Low to Moderate (Little empirical data available)	Probably Minor. Maintains or enhances adult habitat. May increase vegetation growth on larval habitat.	Intensive annual program	Probably minor (No empirical data available), but long-term
Offshore Segmented Breakwater	Moderate to High	Minor to Moderate. Maintains or enhances adult habitat. Probably increases vegetation growth on larval habitat.	Intensive annual program	Probably minor (No empirical data available), but long-term
* Tombolo – Offshore breakwater with sand back-fill	Moderate to High	Moderate. Maintains beach habitat – may enhance beach if sand size is correct for beetles. Probably will significantly increase vegetation growth on larval habitat.	Intensive annual program	Probably minor (No empirical data available), but long-term
Near-shore Breakwater	High	Moderate to Severe. Can trap logs and cause woody debris on beach. Has eliminated adult habitat and larval habitat at Grove – Will not work**	Intensive annual monitoring program.	Major long-term commitment to vegetation control program.
Revetment	Highest	Eliminates adult and larval habitat in project area	None	None

Appendix A. Checklist of Project Information

Instructions

Mark in the box each item that is included in the complete application. The application will be returned as incomplete if any information on these lists is not included in the application.

Checklist of information needed for evaluation of potential impacts to the Federally Threatened Puritan Tiger Beetle (*Cicindela puritana*) for the U.S. Fish and Wildlife Service and Maryland Department of Natural Resources:

The purpose of this document is to enable a project proponent to describe their project providing the most important aspects that are relevant to its potential impacts to the Federally threatened (and state endangered) Puritan tiger beetle (*Cicindela puritana*). This information will enable a more efficient review by the U.S. Fish and Wildlife Service and the Maryland Department of Natural Resources.

- Date
- Project Name
- Landowner(s)
- Addresses
- Project Location – County & State
- Site Map, including aerial photography if possible
- Project Point Location: Tax Map and Parcel Number
- Contact Name and phone number
- Project Description (Include a plan view and cross-section of the project showing the proposed project in relation to the Mean higher high water line (MHHW) and mean lower low water line (MLLW) showing property boundaries and the proposed structures and any areas to be filled or graded).
- Proposed Action type (*e. g. revetment, breakwaters, groins, geofabric placement, etc.*)
- Length of Shoreline affected
- Length of Cliff affected
- A description of proposed habitat alteration, including physical alteration of beach or cliff habitat.
- Community Property affected (Describe any community property [Homeowners Association, etc.] included within the project area. Written approval or grant of authority by the homeowner's association, etc., to construct on community property must be provided before permit can be issued).
- Adjacent land use(s)
- Will your project be permitted, funded, or carried out by a federal or state agency (for example, joint permit from Corps of Engineers and Maryland Dept. of the Environment)?
 - Agency name(s), if applicable.

- Describe alternatives considered and reasons why these alternatives were not used. Alternatives include off-shore breakwaters and other structures that do not impact the beach.
- Describe measures to be employed to avoid, eliminate, and minimize adverse effects:
 - [e.g.: 1) Avoiding construction activities during the adult breeding season of June through August to minimize adult tiger beetle mortality; 2) Limiting construction activities so as to minimize impacts to the beach habitat and to the cliff habitat; 3) Limiting other actions that harm adult Puritan tiger beetles, larvae, or habitat.
- Describe conservation measures to be employed to compensate for habitat alteration. This includes mitigation to meet state incidental take permit requirements. Note: state regulations require that mitigation shall be implemented whenever the habitat alteration will render a significant portion of the project site unsuitable for Puritan tiger beetles either in their adult or larval life forms. This could include, but is not limited to, revetment projects alone, revetment projects with geotextile material on the cliff, geotextile projects on the cliff alone, and most other types of shoreline erosion control. Applicants should be aware that revetments on the beach render the area of the project unsuitable in the long-term and will require mitigation. It shall occur at a ratio of at least 1:1 based on the loss of carrying capacity at the project site following project construction.
- Identify the parcels to be conserved through a conservation easement.
- Provide letter of willingness of landowner to sell easement or completed easement. Conservation easements must prevent shoreline erosion control measures and new construction within 200 feet of the shoreline. Construction can occur further back on the property. Names of land trusts or other organizations that can potentially hold the easement can be provided.

Please include the following attachments:

- Location map of project site
- Most recent plan view and cross-section of the project, incorporating all impacts and conservation measures
- Location map of mitigation parcels.*
- Letter from Land Trust or other organization that relays a commitment to hold an easement on any relevant conservation properties*
- Consultation to Date (a list of any meetings or correspondence with any agency regarding this species)

**required, if applicable*

Appendix B. Maryland Habitat Conservation Program

The Maryland Department of Natural Resources' Heritage Program administers the Maryland Nongame and Endangered Species Conservation Act. Maryland State law requires projects that will take Puritan tiger beetles to obtain an Incidental Take Permit (COMAR 08.03.08.14). Maryland law provides, "A person shall obtain a permit from the Department before the person may conduct any activity that will result in the incidental taking of Puritan tiger beetles." As a condition for receiving a permit, the applicant is required to mitigate impact to the Puritan tiger beetles habitat, as follows:

- (1) Mitigation shall be employed whenever the habitat alteration will render a significant portion of the site unsuitable for Puritan tiger beetles in either their adult or larval life forms.
- (2) Mitigation shall occur at not less than a 1:1 ratio. Mitigation measures may include: (a) permanent protection of other property having PTB habitat, or (b) restoration or protection of PTB habitat by participating financially in the Department's Puritan tiger beetle habitat conservation program.

The State of Maryland has established the Puritan Tiger Beetle Habitat Conservation Program (HCP) to receive mitigation funds for the incidental take of this species. The purpose of Maryland's HCP is to mitigate the impact of "incidental take" by acquiring or restoring similar habitat for permanent protection of the PTB. A landowner, group of landowners, or a community (collectively, "landowner") may participate in the Department's HCP by making a payment into the "Fund". The amount of payment depends on the mitigation debt of the proposed shoreline or cliff alteration project as determined by the interagency review process.

For more information, please see the following internet web sites:

DNR:

http://dnr.maryland.gov/wildlife/Documents/PTB_HCP_October_2011.pdf

Table 3. Puritan Tiger Beetle Take Matrix - Sources and type of take of Puritan tiger beetles from a typical revetment project.

COUNTY and SUBPOPULATION:				
PROJECT NAME: Example from a typical revetment			DATE:	
PROJECT TYPE:				
	Direct impacts from actual process of habitat disturbance/destruction	Indirect (later) impacts from loss of habitat		
	take or harm - death, injury, or habitat modification that significantly impairs essential behavioral patterns resulting in death or injury	harass - significantly disrupt normal behavior patterns	take or harm - death, injury, or habitat modification that significantly impairs essential behavioral patterns	harass -significantly disrupt normal behavior patterns
Feeding and Sheltering of Young - LARVAE	Larvae that are in the cliff face can be killed by destruction or alteration of soil layers where larvae occur: this can occur through removing soil from the cliff face, or placing material to cover the cliff face.	n/a	Vegetation that is allowed to cover the cliff face prevents adults from laying eggs in the cliff face and prevents reproduction. Vegetation is promoted by placement of rock on beaches below the cliff:	n/a
Breeding and Feeding - ADULTS	Adults can be killed by placement of rock or other materials on beaches during the times of year when adults are active.	n/a	Placement of rock on beaches at any time of year destroys the habitat used by adults for feeding and breeding. Adults are thus not available to forage or mate on the beach and reproduction in this area stops.	Once shoreline control structures are in place, adjacent beach can be lost from scouring, reducing the amount of beach habitat in adjacent areas. In addition, they present a break in the habitat for beetles in adjacent areas. They cause minor or major obstacles for the dispersal of adults.