

# Bringing Tiger Beetles Together

by Michelle Babione



**Puritan tiger beetle**  
Photo by Phil Nothnagle

*P*uritan tiger beetles (*Cicindela puritana*) are found in only two places in the world: the Connecticut River in New England and a small part of the Chesapeake Bay in Maryland. This unusual species has already disappeared from most of its historical range in New England, and Maryland populations are threatened by habitat loss and degradation (U.S. Fish and Wildlife Service 1993). Due to declining populations and continuing threats, the Puritan tiger beetle was listed in 1990 as a threatened species.

The Puritan tiger beetle lives on sandy shores along fresh and brackish water-courses. It has a two-year life cycle, spending 23 months of its life underground as a larva. This efficient predator plugs the top of its tunnel with its flat head and attacks unsuspecting insects when they wander too close. The larva uses hooks along its sides as an anchor to prevent it from being dragged out of its tunnel.

As an adult, the tiger beetle is one of the top insect predators on the beach. It uses its large eyes to identify its prey, runs after it at burst speed, and then pauses, apparently to relocate its quarry. This behavior of running interspersed with pausing and looking has led researchers to believe that tiger beetles run so fast that they cannot see to follow their prey (Pearson and Vogler 2001).

The tiger beetle's prowess as a hunter is comparable to its tenacity as a courtier. Even though its copulation requires only a few minutes, male Puritan tiger beetles have been documented riding the backs of females for up to 6 hours (Davis 2002). Because it is likely that a male's sperm will be used to fertilize the female's eggs only if he was the last to mate with her, one theory for this

guarding behavior is that it safeguards the male's contribution.

Unfortunately, this prolonged coupling makes a mating pair largely immobile and therefore highly susceptible to interference from humans. In Massachusetts, more than 150 people per day have been observed using the sunny Connecticut River beaches that Puritan tiger beetles call home (Abbott 2001). Beachgoers disrupt copulation behaviors and disperse the beetles as the insects pursue other activities critical to their survival, such as hunting (personal observation).

For the last six years, the Silvio O. Conte National Fish and Wildlife Refuge, the Fish and Wildlife Service's New England Field Office, the Massachusetts Natural Heritage and Endangered Species Program, and the Connecticut Department of Environmental Protection have worked together to fund research



**Right: The beetle and one of its beach habitats.**

Top photo by Phil Nothnagle; bottom photo by Michelle Babione

and management on the precarious populations of Puritan tiger beetles in New England. All of the species' New England habitat falls within Conte NWR.

The Chesapeake Bay shoreline is the stronghold for this species. New England populations are less numerous and have experienced a precipitous decline in the past century. The construction of dams and other habitat losses along the Connecticut River have reduced the number of documented populations in the region from 11 to 2 (U.S. Fish and Wildlife Service 1993).

The two remaining New England populations are in Massachusetts and Connecticut. Connecticut boasts the larger of the two populations, with 947 adults counted in 2001 (Davis 2001). When the Massachusetts population was discovered in 1987, 100 to 200 adults were observed, but population sizes in recent years have been much lower, wavering from 32 to 41 adults per year between 1998 and 2001 (Davis 2001). This population of Puritan tiger beetles has become precariously close to becoming extirpated.

Because of low numbers, researchers proposed that the adult beetles in Massachusetts may be having a difficult time finding each other and reproducing on the long beach (approximately 2,600 feet, or 790 meters), which is regularly crowded with sunbathers. Three years ago, it was decided to augment the Massachusetts population with beetles from the Connecticut site. In 2000, 38 larvae were translocated to Massachusetts (Nothnagle 2001), supplemented by 60 in 2001 (Nothnagle 2002) and 65 in 2002 (Davis 2002).

The augmentation seems to be working. In 2002, adult counts in Massachusetts reached a record total of 112 individuals (Davis 2002). We hope the larger population size will increase the probability of reproductive success. This is an important step toward the ultimate goal of 500 to 100 adults in two populations in Massachusetts (U.S. Fish and Wildlife Service, 1993).



**Eileen West, a refuge volunteer, posts a sign marking beetle habitat.**

*Photo by Beth Goettel*

Research conducted in Connecticut has shown that the limiting factor for successful Puritan tiger beetle survival is sand grain size (Omland, 2002). This is critical information for management, because it helps managers decide the best places for reintroduction. A number of sites in Connecticut have been found to be suitable habitat for Puritan tiger beetle reintroduction. The Service is currently funding this work in the hope of finding a suitable location for a new population.

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