

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
22 Bridge Street, Unit #1
Concord, New Hampshire 03301-4986

Re: Biological Opinion on the Proposed Population Augmentation
of the Federally-Threatened Puritan Tiger Beetle (*Cicindela puritana*)
to Rainbow Beach, Massachusetts

May 10, 2000

Beth Goettel
Silvio O. Conte National Fish and Wildlife Refuge
38 Avenue A
Turners Falls, MA 02376

Dear Ms. Goettel:

This refers to the proposal by the Silvio O. Conte National Wildlife Refuge to translocate larvae of the federally-threatened Puritan tiger beetle (*Cicindela puritana*) from sites in Cromwell and Portland, Connecticut to Rainbow Beach in Northampton, Massachusetts for the purpose of augmenting an existing population of this species. This Memorandum documents formal intra-Service consultation on the proposed project, as required by Section 7(a)(2) of the Endangered Species Act of 1973), as amended (16 U. S.C. 1531 *et seq.*). A complete administrative record is on file in the New England Field Office.

CONSULTATION HISTORY

April 11, 1996 - Staff from the Silvio O. Conte National Fish and Wildlife Refuge (SOCNFWR) coordinated a meeting to discuss future plans for the Puritan tiger beetle in Massachusetts. Meeting participants recommended that population augmentation for Rainbow Beach be considered if the population does not appear to respond after five years (or less) of when monitoring and management have been completed.

July 1, 1996 - New England Field Office (NEFO) staff coordinated a tiger beetle recovery meeting of New England state biologists, academics and consultants to discuss the possible reintroduction and/or population augmentation of Puritan beach tiger beetles in New England. At that time, it was determined that habitat restoration and protection at Rainbow Beach in Massachusetts was a priority.

September 9, 1999 -NEFO and SOCNFWR staff met with state agencies and private organizations to discuss the 1999 survey of the Rainbow Beach population and future recovery actions. Population augmentation was determined to be necessary in order to move forward in the recovery of this species in Massachusetts.

October 10, 1999 - A proposal to augment the Rainbow Beach Puritan tiger beetle population was provided to NEFO, SOCNFWR, state agencies and other cooperators for review and comment.

April 10, 2000 - The NEFO received an intra-service Section 7 biological evaluation form from the SOCNFWR for the proposed population augmentation of Puritan tiger beetles at Rainbow Beach.

April 14, 2000 - The Northampton Conservation Commission endorsed the proposed Puritan tiger beetle population augmentation at Rainbow Beach.

BIOLOGICAL OPINION

It is my biological opinion that the proposed project will not jeopardize the continued existence of the Puritan tiger beetle. Critical habitat has not been designated for this species.

Description of the proposed action

The Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) requires the Secretary of the Interior to list and carry out programs to recover species of fish, wildlife, and plants determined to be threatened or endangered with extinction. The Puritan Tiger Beetle (*Cicindela dorsalis dorsalis*) Recovery Plan (U.S. Fish and Wildlife Service 1993) identifies one of the objectives for delisting as the maintenance or establishment of at least two large (500 to 1000 individuals) metapopulations and one small metapopulation (≤ 500 individuals) within the species' historical range on the Connecticut River. There are currently two Puritan tiger beetle metapopulations on the Connecticut River. One large metapopulation consists of three sites (500 to 1000 individuals) located in Cromwell and Portland, Connecticut, the second metapopulation (7 to 34 individuals) is found on Rainbow Beach and two nearby private beaches in Northampton, Massachusetts. Neither metapopulation is fully protected.

The proposed action is to move approximately 35 third instar larvae from the Cromwel/Portland metapopulation to the Rainbow Beach metapopulation. The larvae will be individually excavated from their burrows in late April or early May of 2000 and quickly transported (within 24 hours) to Rainbow Beach. A similar translocation of approximately 85 third instar larvae will occur in late spring the following year (2001).

Areas on Rainbow Beach where larvae have been found in previous years are considered optimal sites for transplanting the larvae. Larvae will be placed on the beach or at the outer edge of herbaceous vegetation in areas of less than 30% plant cover. Symbolic fencing will be used at beach transplant sites to reduce the likelihood of trampling of larval burrows.

The larvae will be placed in "pre-dug" burrows clumped approximately one meter apart, on the central portion of the upper beach. Burrows of transplanted larvae will be marked with individually-

numbered aluminum tags and monitored for signs of activity and emergence. Adults will be monitored in conjunction with annual monitoring.

Larvae will be sampled in the fall by searching the habitat on Rainbow Beach and the river banks to the north. Larval burrows will be individually marked, and the larval census will consist of three visits, approximately one week apart in late September and early October.

Direct measurement of the success of the transplanting will not be possible because larvae that emerge as adults will be unmarked as to place of origin. However, three indirect methods will be used to estimate the transplant success: 1) marked larval locations will be examined for signs of adult emergence, 2) the number and location of adult beetles will be compared with the previous two years of population data¹, and 3) the number of first-year larvae seen in the fall will be used as a measure of reproductive success.

The most significant measure of success will be the number of adult beetles emerging in 2002 and 2003 when translocated larvae have matured and reproduced. It is anticipated that a minimum of two years will be required to determine if the augmentation resulted in a marked increase in the population. However, a long-term self-sustaining population may not be realized for many more years and additional population augmentation may be desirable.

Status of the species/critical habitat likely to be affected

Most of the information presented below on Puritan tiger beetle habitat requirements, life history, status, and threats is taken from the Service's recovery plan (U.S. Fish and Wildlife Service 1993) and the Environmental Assessment for the Proposed Population Augmentation of the Threatened Puritan Tiger Beetle (*Cicindela purilana* G. Horn) at Rainbow Beach, Massachusetts (U. S. Fish and Wildlife Service 2000).

Species Description and Life History

The Puritan tiger beetle is a medium-sized (11.5 to 12.4 mm) terrestrial beetle of the family Cicindelidae that lives on sand and clay cliffs and beaches along the Chesapeake Bay in Maryland and sandy beaches and cliffs along the Connecticut River in Connecticut and Massachusetts. The elytra (wing covers) are bronze-brown, with fine marginal and transverse buff-colored markings.

The Puritan tiger beetle has a two-year life cycle, similar to that of other species in the genus *Cicindela* (Pearson 1988). As a consequence of this two-year life cycle, two cohorts are present, one that emerges as adults in even-numbered years (e.g., 1996, 1998, 2000), and a second whose adults emerge in odd-numbered years (e.g. 1995, 1997, 1999) (Knisley and Juliano 1988, Nothnagle 1991).

¹An increase in the annual total number of adults above the 30 to 35 seen in 1998 and 1999, and an increase in the number of sightings in the area where larvae were placed will indicate that the transplanted larvae emerged successfully.

In New England, adult Puritan tiger beetles require sandy beaches, both for mating and foraging. Adult beetles emerge from mid-June to August, with numbers peaking in early-to-mid-July. Information obtained from following marked adult Puritan tiger beetles indicates that the life span of individual adults ranges from several days to weeks, averaging approximately one week (Nothnagle 1996).

Adult beetles are most active during warm sunny weather, and are cursorial predators that hunt by running across the sand to capture a variety of small invertebrates in their sickle-shaped jaws. Adults feed actively along the shoreline. Mating occurs primarily in mid-to-late July, after which the female lays eggs in the sand. Approximately one week after eggs are laid, the eggs hatch into larvae that are about 6 mm long.

Puritan tiger beetle larvae pass through three developmental stages (first, second and third instar) before metamorphosing into adults. After hatching from eggs, first instar larvae molt into second instars by October, and are typically found in sandy burrows at least 50 cm deep. Larvae generally over-winter as second instars and become active again by the end of April. They molt to the third and last instar stage in May or June. Third instars have deep larval burrows that may be as deep as 75 to 100 cm. Larvae are dormant in their second winter, and pupate before emerging as a new generation of adults in June. Larvae are most active in the spring and fall and may have a period of summer dormancy or aestivation when many larval burrows appear closed.

Larvae are found in scattered herbaceous vegetation at the upper portion of flat or sloping sandy beaches, on flat areas of sand and clay banks, occasionally at the water's edge and occasionally at the base of low banks (Nothnagle 1991). Larvae are active day and night in cool weather in late spring and early fall. They plug their burrows with their flat-top heads and await their prey, which is believed to consist of small flies and other insects.

Status and distribution

Historically, the Puritan tiger beetle was known to occur along the Connecticut River in Vermont, New Hampshire, Massachusetts and Connecticut, and along the Chesapeake Bay in Calvert County, Maryland. Although few historical records exist for Puritan tiger beetles in the Chesapeake Bay region, intensive surveys conducted in the early 1990s located 16 extant sites in Calvert, Kent and Cecil Counties in Maryland. Of the 16 extant sites, four average 1,000 or more adults, 12 sites average fewer than 500 adults, and five sites average fewer than 100 adults. Systematic monitoring of the Maryland populations indicates that most of these populations appear to be stable. In contrast, the Puritan tiger beetle's range and numbers along the Connecticut River have decreased dramatically. Historic records indicate that 11 Puritan tiger beetle populations were documented along the Connecticut River from Claremont, New Hampshire to Cromwell, Connecticut. Currently, only two extant metapopulations remain: one in Hampshire County, Massachusetts, and one in Hartford County, Connecticut. The Connecticut metapopulation (comprised of three sites) averages 500 adults. The Massachusetts metapopulation averages between 20 and 30+ adults at two and sometimes three small sites (Davis 1998; Davis 2000).

Threats to the species

The decline of the Puritan tiger beetle along the Connecticut River is attributed to habitat degradation resulting from dam construction, riverbank stabilization, and other human activities. In Massachusetts and New Hampshire, many of the historic Puritan tiger beetle sites are now permanently inundated as a result of hydropower dam construction. Other sites may have been destroyed by river bank stabilization.

Additional causes of the decline of the Massachusetts metapopulation could be attributed to heavy recreational use at Rainbow Beach and Elwell Island. Pesticides were implicated in the death of a number of Puritan tiger beetles in Connecticut in 1998, and may have caused population declines in the past. The Massachusetts sites are located near commercial agricultural fields and may have been affected by pesticide drift.

Due to the decline of the Connecticut River populations and the ongoing threats to its habitat, as well as increasing shoreline development and beach stabilization activities at the Maryland populations, the Service listed this species as threatened in 1990. Critical habitat has not been designated for this species. Since the listing, extensive monitoring and surveys conducted in New England have not located any additional populations in Connecticut and Massachusetts.

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 action 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 that the action area for this project will encompass the Cromwell/Portland metapopulation sites in Connecticut and the Rainbow Beach site in Northampton, Massachusetts.

Status of the species in the Action Area

Cromwell/Portland metapopulation - The Connecticut metapopulation has been monitored since 1991. Peak adult numbers (the greatest number of adults observed during a single visit) range between 350 and 1015. It is estimated that at least two to three times the peak count could be considered to be the actual population. Table 2 in the EA provides a summary of the Puritan tiger beetle counts since 1991.

Rainbow Beach metapopulation - Peak count data for adult Puritan tiger beetles in the Massachusetts metapopulation have been collected since 1988, however annual total population counts were initiated in 1997. Peak adult numbers range from five individuals (1996) to 21 individuals (1988). Since 1997, the total population has ranged from 29 to 34 individuals (see Table 2 of the EA).

Effects of the Action

If successful, the proposed population augmentation of the Puritan tiger beetle to Rainbow Beach will promote the long-term viability of this metapopulation and contribute significantly to the recovery of the species. Therefore, the primary effect of the action will be beneficial.

Direct Effects

Puritan tiger beetles will be directly impacted as the larvae are dug up, transported and transplanted. Although care will be taken to avoid adversely affecting the larvae during the translocation, it is possible that some will not survive, thus resulting in the incidental take of an undetermined number of Puritan tiger beetle larvae.

After the larvae have metamorphosed into adults, it is possible that a few adults will disperse to locations with unsuitable habitat and perish.

Indirect effects

Indirect effects are defined as those that are caused by the proposed actions and are later in time, but still reasonably certain to occur (50 CFR 402.2).

Larvae will be placed in locations that are expected to be high enough on the beach to be protected from erosion, boat wakes or overwash. However, Indirect effects may occur if larval burrows are subjected to unusual erosion events and are washed away.

In order to avoid having an adverse impact on the source populations in Connecticut, the number of larvae taken will be no greater than ten percent of the peak count of adults seen in the previous two years' censuses, as recommended in Task 7.3 of the Recovery Plan (U.S. Fish and Wildlife Service 1993). Based on 1998 and 1999 census data, 35 larvae will be translocated in 2000 and 85 larvae will be translocated in 2001. Removing a number of larvae based on ten percent of the previous generation's adult peak census count has been determined to be sufficiently protective of the existing population. It is believed that the total population count is at least twice that of the peak count, therefore the number of larvae removed from the Cromwell/Portland metapopulation will be less than five percent of the number of adults present in the previous generation and any effects on the population are expected to be insignificant.

Cumulative effects

Cumulative effects include the effects of future state, tribal, 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 Endangered Species Act.

The three sites that comprise the Cromwell/Portland metapopulation are located on privately-owned land. One site is protected by a conservation easement and managed by a residential cooperative. This site receives very little recreational use and no cumulative effects are expected to occur. The other two sites may be affected by increased recreational use (ORVs and pedestrian traffic) and pesticide drift from nearby farms.

The Rainbow Beach metapopulation is primarily located on state and municipal land and is actively managed to protect the Puritan tiger beetle and its habitat. The two small sites that primarily contain larvae are on privately-owned land and receive little recreational use. No cumulative effects are expected.

Conclusion

After reviewing the current status of the Puritan tiger beetle throughout its range and in the action area, the environmental baseline for the action area, and the effects of the translocation and population augmentation of this species, it is the Service's biological opinion that the proposed population augmentation is not likely to jeopardize the continued existence of the Puritan tiger beetle. Furthermore, the proposed project may result in the long-term viability of the Rainbow Beach metapopulation of the Puritan tiger beetle, significantly benefitting the species' survival and recovery.

No critical habitat has been designated for this species, therefore none will be affected.

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 an undetermined number of Puritan tiger beetle larvae may not survive the translocation to Rainbow Beach. A worst case scenario would be the loss of all larvae in a given year (no more than 35 individuals in 2000 and 85 individuals in 2001). However, an experimental reintroduction of Northeastern beach tiger beetle larvae (*Cicindela dorsalis dorsalis*) to Sandy Hook, New Jersey (Knisley 2000) demonstrated that tiger beetle larvae will survive translocation; therefore, we do not expect all individuals to perish. The third instar stage of larvae transplanted to Rainbow Beach will metamorphose to adults within one to two months of the translocation, minimizing potential loss. Therefore, the Service anticipates that no more than 50% of the transplanted Puritan tiger beetle larvae will be lost either directly or indirectly as a result of the proposed reintroduction.

Since the dispersal of adult tiger beetles cannot be predetermined, the amount of anticipated incidental take will depend upon the movement of the dispersing adults. Adults dispersing to non-suitable habitat will not be expected to survive.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize impacts of incidental take of the Puritan tiger beetle :

- ? Reduce recreational impacts on Puritan tiger beetle adults, larvae and habitat.

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the Act, the Fish and Wildlife Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. Symbolically fence and sign the area in which Puritan tiger beetle larvae will be transplanted on Rainbow Beach.
2. Symbolically fence and sign currently occupied larval habitat on Rainbow Beach.
3. Provide information to recreational users about the Puritan tiger beetle and the need to conserve the species at Rainbow Beach.

REINITIATION NOTICE

This concludes formal consultation on the action. 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.

Thank you for your cooperation and please contact Susi von Oettingen of this office at 603-225-1411 if we can be of further assistance.

Sincerely,

Kenneth C. Carr
Assistant Supervisor
New England Field Office

LITERATURE CITED

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