# Two Kentucky Cave Beetles (Louisville Cave Beetle (*Pseudanophthalmus troglodytes*) and Tatum Cave Beetle (*Pseudanophthalmus parvus*)

Previous Federal Actions

The Louisville cave beetle and Tatum Cave beetle were added to the Federal list of candidate species in the November 15, 1994, CNOR (59 FR 58982) as Category 2 species. Category 2 candidate species were identified as those taxa for which the Service possessed information indicating proposing to list the taxa was possibly appropriate, but for which conclusive data on biological vulnerability and threats sufficient to support a proposed listing rule was lacking. The February 28, 1996, CNOR (61 FR 7596) discontinued recognition of categories, so both species were no longer considered candidate species and were therefore removed from the candidate

In the October 30, 2001, CNOR, the Service re-evaluated both cave beetle species, and placed them back on the candidate list through the Service's own internal process with an LPN of 5 (66 FR 54808). The Service received a petition from the Center for Biological Diversity and others, dated May 11, 2004, to list eight cave beetles, including the Louisville cave beetle and Tatum Cave beetle, as endangered or threatened species. In the May 11, 2005, CNOR (70 FR 24870), the Service determined that listing the Louisville cave beetle and Tatum Cave beetle was warranted but precluded by higher priority listing decisions. Further, we have included both species addressed in this finding in every CNOR since 2001 (see October 30, 2001 (66 FR 54808); June 13, 2002 (67 FR 40657); May 4, 2004 (69 FR 24876); May 11, 2005 (70 FR 24870); September 12, 2006 (71 FR 53756), December 6, 2007 (72 FR 69034), December 10, 2008 (73 FR 75176), November 9, 2009 (74 FR 57804), November 10, 2010 (75 FR 69222), October 26, 2011 (76 FR 66370), November 21, 2012 (77 FR 69994), November 22, 2013 (78 FR 70104), December 5, 2014 (79 FR 72450), and December 24, 2015 (80 FR 80584)).

## Background

These two species are small (about 4 mm (0.16 in) in length), predatory cave beetles that occupy moist habitats containing organic matter transported from sources outside the cave environment. Members of the *Pseudanophthalmus* genus vary in rarity from fairly widespread species that are found in many caves to species that are extremely rare and commonly restricted to one or only a few cave

habitats. The Louisville cave beetle is restricted to four caves in Jefferson County, Kentucky, while the Tatum Cave beetle is known from one cave (Tatum Cave) in Marion County, Kentucky.

### Summary of Status Review

When the Louisville cave beetle and Tatum Cave beetle were identified as candidates for protection under the Act in the October 30, 2001, CNOR (66 FR 54808), the Service considered both species to be vulnerable to toxic chemical spills, discharges of large amounts of polluted water, closure or alterations of cave entrances, and the disruption of cave energy processes by highway construction and industrial, residential, and commercial development. Our general perception was that both species were vulnerable to these habitat stressors, and we suspected that these stressors were significant and the species' overall population trends were likely decreasing. We also noted the lack of State or Federal regulations to ameliorate those threats. In the May 11, 2005, CNOR (70 FR 24870), we noted both species' limited distribution and how that would increase their vulnerability to isolated events that would have only a minimal effect on more wide-ranging members of the genus Pseudanophthalmus. Both species were assigned an LPN of 5.

### Louisville Cave Beetle

Over the last 2 years, field surveys for the Louisville cave beetle have provided new information on the species' distribution and stressors. Based on this new information, we have re-examined the species' status and re-evaluated the magnitude and imminence of its threats. Lewis and Lewis confirmed the continued presence of P. troglodytes in Eleven Jones Cave (a period of 20 years) and observed the species in three new caves (Sauerkraut Cave, Cave Hill Cave, and Cave Creek Cave), demonstrating that the species is more abundant and widespread than previously believed. The species was difficult to find in each of these caves (one to four individuals observed), but this is not unusual for the genus Pseudanophthalmus, which is often difficult to find and is frequently observed in low numbers. Population estimates or discernable trends for these populations have not been possible due to the low number of individuals observed and the difficulty in finding specimens during repeat visits. We acknowledge that caves within the species' range likely continue to be affected by many of the same stressors identified by previous investigators:

reduced energy inputs, sedimentation, pollution, and human visitation. However, we have no evidence that these stressors are operative threats that are adversely affecting *P. troglodytes* at a population level.

#### Tatum Cave Beetle

With respect to the Tatum Cave beetle, we have no evidence suggesting that the species is still extant in Tatum Cave. The species was relatively abundant (20 individuals) in Tatum Cave when first observed by C. H. Krekeler in 1957, but the species appeared to be less common in 1965, when T. C. Barr observed only two individuals. Since 1965, extensive surveys of Tatum Cave have been completed on eight separate occasions, using search techniques similar to those used by C. H. Krekeler and T. C. Barr (i.e., methodical visual searches of all available habitats). Three of these survey efforts also involved the use of baited pitfall traps (small cups buried in the substrate and baited with limburger cheese) placed in several locations within Tatum Cave for a period of one week. Despite all of these searches, no Tatum Cave beetles have been observed in Tatum Cave since the last observation by Barr in 1965 (a period of 51 years).

The Tatum Cave beetle is small in size and may be more difficult to locate than some cave organisms; however, both Krekeler and Barr were able to find the species using methodical, visual searches of suitable habitats in Tatum Cave. Subsequent researchers have used identical search methods on eight separate occasions in the exact same habitats within Tatum Cave, but no Tatum Cave beetles have been observed. Therefore, based on our review of the best available scientific and commercial information, the Service believes the Tatum Cave beetle to be extinct. We acknowledge that it is difficult, if not impossible, to verify a species' extinction. There is considerable uncertainty about the actual status of the species, and we acknowledge that, as suggested by Lewis and Lewis, there is some chance that the species remains extant but occurs in low numbers and is simply undetectable using traditional search methods. However, considering the best available scientific and commercial information, we believe that it is reasonable to conclude that the species is extinct. The Service encourages continued surveys for the Tatum Cave beetle in Tatum Cave, as time and funding allow. If the species is subsequently found to be extant, we can reevaluate its legal status under the Act in the future.