



United States Department of the Interior



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APR 05 2016

Mr. Dennis Will
City of Colorado Springs
Parks and Recreation Department, Forestry Division
1401 Recreation Way
Colorado Springs, Colorado 80905-1975

Dear Mr. Will,

This letter transmits the U.S. Fish and Wildlife Service's (Service) comments regarding the proposed tussock moth treatments within the Bear Creek drainage on Pikes Peak in El Paso County, Colorado. The Service (Colorado Ecological Services Field Office) met with you in the Service's office in Lakewood, Colorado, on February 18, 2016, to discuss the proposed project. We received your email on February 18, 2016, requesting our comments on the proposed project. We had previously received electronic mail from you on December 2, 2015, that provided the MSDS sheet and label for the proposed spray (Foray 48 B) as well as the treatment area map. These comments are provided in accordance with the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.).

We understand from our joint discussion and your email that the proposed action involves the aerial spray application of Btk (*Bacillus thuringiensis* var *kurstaki*) to mitigate a recent infestation of tussock moth and spruce budworm in the foothill areas around Colorado Springs. We understand that the proposed treatment area had included the Bear Creek drainage.

As we discussed at our meeting, Bear Creek contains the greenback cutthroat trout (*Onchorhynchus clarkii stomias*) (greenback). The Service listed the greenback as an endangered species in 1967 (32 FR 4001). The Service downlisted the greenback to a threatened status in 1978 because of recovery efforts that reintroduced greenbacks, removed non-native trout from suitable habitat, established captive broodstocks, developed stable populations, and initiated catch-and-release fisheries (43 FR 16343).

The Bear Creek greenback population is extremely important for the conservation of the species as there are only two populations of greenbacks present in the wild. Bear Creek contains the only remaining greenback stream population. Greenbacks are also present in Zimmerman Lake as a result of the 2014 and 2015 reintroduction of greenbacks by Colorado Parks and Wildlife; these fish had been collected from Bear Creek and then raised in state and federal hatcheries.

Several age classes of greenbacks are currently present in state and federal fish hatcheries. At this time, other reintroduction projects are being planned for sites in the South Platte River drainage with hatchery fish collected from Bear Creek. However, the Zimmerman Lake population and the hatchery populations do not contain the full genetic material of the greenback; only Bear Creek contains the full component of genetic material of the remaining greenback. Therefore, the successful recovery of the greenback depends on the persistence of the Bear Creek population.

Greenbacks are present along approximately 3.4 miles of stream in upper Bear Creek. The greenback population is maintained by series of cascades near the caretaker's cabin that provide a barrier from invasion of non-native fish species (i.e., brook trout) that are present below the barrier. Brook trout present a competition and predation threat to greenbacks.

The Service is concerned that a tussock moth treatment within the Bear Creek drainage could adversely affect the greenback present in Bear Creek. Our primary concern identified at this time is the anticipated mortality to terrestrial insects, especially Lepidopterans (i.e., moths and butterflies), which represent a portion of cutthroat trout diet. We consider the Bear Creek drainage to be the area described as the Bear Creek Catchment Basin in the U.S. Forest Service's Bear Creek Watershed Restoration Project Biological Assessment (USFS 2015).

Terrestrial Insects – Due to Btk's mode of toxic action, target and non-target lepidopteran larvae are likely to experience mortality following its application. Field studies have shown decreases in the species richness and abundance of non-target lepidopteran larvae following Btk applications (e.g., Miller 1990a, 1990b). Peacock et al. (1998) further evaluated the toxicity of Btk (as Foray 48B) on 42 species of lepidopterans in a laboratory setting using a test dose equivalent to 36 BIU/acre. In 5-7 days following application, the authors identified significant increases in mortality in 27 of the 42 species. Toxicity toward bees and other terrestrial invertebrates is less defined, but some evidence suggests that it may be toxic to honey bees. Atkins (1991) exposed adult worker honey bees to a flowable powder formulation of Btk at concentrations equivalent to application rates of approximately 10, 20, and 30 BIU/acre and found mortality rates from 12 – 19 percent.

A review by Baxter et al. (2005) indicated that terrestrial invertebrates comprise an average of 50 percent of a stream salmonid's annual diet and energy budget and can reach as high as 86 percent during summer months. Consumed arthropods include the adults and larvae of several orders including those classified as Lepidopterans (i.e., moths and butterflies). In July – August 1958, Bulkley (1959) found that terrestrial invertebrates averaged 75 percent of the stomach contents in greenback cutthroat trout collected from the headwaters of the Big Thompson River Drainage. Fausch and Cummings (1986) also examined the diets of greenback cutthroat trout in Rocky Mountain National Park and suggested that terrestrial invertebrates made up a constant portion of their diet through September. Further stomach content analysis of another cutthroat trout species, the Colorado River cutthroat trout, by Young et al. (1997) indicated that Lepidopterans alone comprised 10 percent of their total diet in July 1993. Among consumed terrestrial invertebrates, this ranked third in percentage of stomach contents behind Coleopterans (i.e., beetles) and Hymenopterans (i.e., bees, ants) on July 20 and first on July 27.

The direct input of terrestrial invertebrates to a stream system can also influence the distribution and health of resident fish. Kawaguchi et al. (2003) demonstrated this by experimentally reducing the amount of falling terrestrial insects into a forested headwater stream by placing canopies over study reaches. These authors found that over 4 weeks, fish biomass in study reaches was reduced by 50 percent. Using a similar experimental design that involved placing canopies over stream reaches, Baxter et al. (2007) showed that a 70 percent decrease in the input of falling terrestrial invertebrates resulted in a 25 percent reduction in the growth rate in Dolly Varden char over 6 weeks.

Aquatic Insects - Some evidence suggests that Btk may increase short-term drift rates of aquatic invertebrates. During the first 3 hours after treatment with Btk, Richardson and Perrin (1994) demonstrated that a concentration equivalent to 50 BIU/acre slightly increased the per capita drift rate of Baetis mayflies in a mesocosm experiment. At a concentration 100 times this level, the author's found analogous, but more pronounced short-term drift effects. The effects were transient, however, as per capita drift rates were essentially equivalent across treatments and control groups as soon as 21 hours after the initial exposure. Kreuzweiser et al. (1992) similarly noted a slight increase in the percent drift of 5 of 10 tested aquatic invertebrate taxa in the first hour after treatment with a high Btk concentration 100 times that expected in the environment following a 30 BIU/acre application. While marginally elevated, these short-term drift rates were not significantly different from control groups. This short-term drift of aquatic insects could result in a decrease in available food for greenbacks.

In summary, aquatic and terrestrial insects, including lepidopterans, are an important component of the diet of cutthroat trout. A decrease in available forage due to the mortality of moths and butterflies from the application of Btk within the Bear Creek drainage could adversely affect the survival of these greenbacks. Application of Btk has also been shown to result in some drift rates of aquatic insects, which could further reduce the available forage for greenbacks in Bear Creek. Given that Bear Creek contains that only remaining greenback cutthroat trout stream and the proposed action could result in a decrease of the food source for these fish, we strongly recommend that the tussock moth treatments avoid the Bear Creek drainage in its entirety.

Thank you for the opportunity for us to provide comments on the proposed project. Please direct any comments or questions to Leslie Ellwood of this office at (303) 236-4747 or leslie_ellwood@fws.gov.

Sincerely,



Drue DeBerry
Acting Supervisor Colorado Field Office

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