

of mainland Canada, Alaska, and many of the contiguous northern United States. While burbot in North America (*Lota lacustris*, Walbaum) were originally considered a separate species from those in Europe (*Lota lota*, Linnaeus), they have since been reduced to a single species throughout their range. However, the available information supports the recognition of two distinct lineages, or subspecies, which are: the palearctic group of northern Canada, Alaska, and Eurasia (*Lota lota lota*), and the neararctic group in the remainder of North America (*Lota lota maculosa*), which includes the lower Kootenai River burbot. On the basis of available information, we considered the following factors with regard to the potential significance of the lower Kootenai River burbot to the remainder of the neararctic subspecies (*Lota lota maculosa*):

Ecological Setting: Neararctic burbot occupy numerous and varied lake, riverine, and tributary systems throughout their distribution in the northern United States and Canada. At the commencement of our status review for the subject petition, very little information was available regarding the potential uniqueness or unusual nature of the ecological setting occupied by lower Kootenai River burbot in relation to the remainder of the neararctic region. In addition, little such information has since been provided or otherwise obtained during the course of our status review. The petitioners assert that the Kootenai River population of burbot exists in a unique and unusual ecological setting because two genetically distinct populations are in the same river: those that occur in the lower Kootenai River and those that occur in the Kootenai River above Kootenai Falls. However, genetic differences can occur in the absence of unique or unusual ecological settings, and the available information does not indicate that any unique or unusual ecological features have contributed to the genetic differentiation that may be occurring in these burbot. Furthermore, no information is available to indicate that having two genetically distinct populations in the same river basin is unique for this species.

The petitioners further assert that the loss of these burbot would be a loss of a rare population at the southern edge of the species' range and that other Columbia River burbot populations may likewise be at risk of extirpation. We disagree based on the information currently available. First, populations of burbot are still found in Indiana, Kentucky, Ohio, Michigan, Minnesota, South Dakota, Wisconsin, and

Wyoming, all of which also represent the southern extent of the species' distribution. Second, currently available information is not sufficient to enable us to determine if other burbot populations within the Columbia River system may be at risk of extirpation.

On the basis of available information, we conclude that burbot likely occupy a wide variety of habitats throughout their range, and that there are no indications of any unique or unusual ecological features within the lower Kootenai River basin. Therefore, we do not currently consider the ecological setting occupied by the discrete population of burbot within the lower Kootenai River as significant to the remainder of the taxon.

Significant Gap in Range: Loss of the lower Kootenai River burbot, as compared to burbot throughout the remainder of the neararctic region, would mean the loss of less than 1 percent of the entire range of the taxon. In addition, when we consider either the historic or current distribution of lower Kootenai River burbot, we determine that loss of this population segment would not isolate one or more otherwise contiguous populations of burbot within the Kootenai River basin. On the basis of the above information, we conclude that loss of the lower Kootenai River burbot would not represent a significant gap in the range of the taxon.

Genetic Characteristics: We reviewed three available studies, in various stages of completion, that address the genetic differentiation of burbot across portions of the taxon's range. One investigated the genetic characteristics of burbot populations within the Kootenai River basin (Paragamian *et al.* 1998), a second addressed genetic differentiation west and east of the continental divide (Dalby, pers. comm., 2002), and a third addressed genetic differentiation of burbot populations across the entire range of the species, and was conducted to help clarify the species' phylogenetic history and potential taxonomic relationships (Van Houdt and Volckaert in draft 2002). All of these investigations identified several common, rare, and/or unique haplotypes, from mitochondrial deoxyribonucleic acid (mtDNA), among burbot populations. In addition, these studies indicate that haplotype frequencies and the level of genetic diversity likely also vary among the local and regional populations of burbot sampled. Finally, these studies indicate that geographic patterning in the genetic profiles of burbot are apparent and consistent with known or suspected glacial refugia.

The results suggest that genetic differences between burbot populations in this region may be occurring. The referenced studies rely on relatively limited sample sizes and lack information from key population segments and/or other major drainages occupied by neararctic burbot. Therefore, these investigations are likely to be confounded by the effects of small population size, genetic drift, and/or sampling bias, and the differentiation patterns noted may similarly reflect the potential negative consequences of isolation, range contraction, and/or recent significant declines of local burbot populations. As such, to what extent the forces of isolation, adaptive change, genetic drift, and/or inbreeding may have influenced the genetic profiles of neararctic burbot populations, including those that remain within the Kootenai River basin, is uncertain. Results of the genetic studies further demonstrate the discreteness of the lower Kootenai River burbot; however, they do not indicate that genetic differentiation of this population segment is significant to the remainder of the taxon. No information at this time concludes that the genetic difference that is presented in the studies is anything more than what would be expected from such a wide-ranging species. More comprehensive behavioral, morphological, ecological, and genetic studies of burbot are needed to help clarify whether the currently observed differences may be significant to the evolutionary legacy of the neararctic taxon.

Life History/Behavior: As previously discussed, the lower Kootenai River burbot does exhibit a different adfluvial life history strategy compared to other locally known neararctic burbot populations. For example, lower Kootenai River burbot travel greater distances to traditional spawning sites (greater than 100 km (62 mi)) than other known adfluvial burbot, which typically travel between 1 and 25 km (0.6 and 15.5 mi). In addition, lower Kootenai River burbot begin their migration 2 to 3 months prior to spawning and spawn at least 1 month earlier than other burbot populations within the Kootenai River basin. However, their spawning time occurs within the wide range of spawning periods observed throughout the entire range of burbot. Given the circumpolar distribution of the neararctic burbot, it is likely that a wide range of behavioral differences are exhibited within the species range. Since it is unclear how pliable burbot behavioral patterns may be, and how readily, or whether, burbot populations