

The petitioners requested listing of the Kootenai River burbot as an endangered species throughout its range in the Kootenai River and spawning tributaries in Idaho, on the basis of threats to the population and its potential isolation from the remainder of the taxon. We considered this request because, while we do not base listing decisions on political subdivisions other than international boundaries, we must consider for listing under the Act any population of vertebrate taxa (species or subspecies) if it may represent a DPS. In our 90-day administrative finding for the subject petition (66 FR 49608, September 28, 2001), we recognized that burbot in Idaho are part of a transboundary population, spending a portion of their life cycle in the South Arm of Kootenay Lake and the lower Kootenai River in British Columbia. In addition, the available information indicated that this population segment is separated behaviorally from the only other burbot population remaining in Kootenay Lake's North Arm, primarily because of the populations' to their differing life history strategies. Finally, we recognized that lower Kootenai River burbot do not use the Kootenai River in the segment that runs from a point upstream from approximately Bonners Ferry, Idaho, to just below Kootenai Falls in Montana, because of the presence of naturally unsuitable habitats. Therefore, the geographic area considered for our status review, and addressed by the following DPS analysis, includes the South Arm of Kootenay Lake and the lower Kootenai River from its mouth upstream to Bonners Ferry, Idaho.

In accordance with our DPS policy (61 FR 4722), we use two elements to assess whether a population segment under consideration for listing may be recognized as a DPS. The elements are (1) the population segment's discreteness from the remainder of the species to which it belongs and (2) the significance of the population segment to the species to which it belongs.

Discreteness

Discreteness refers to the separation of a population segment from other members of the taxon based on either (1) physical, physiological, ecological, or behavioral factors or (2) international boundaries that result in significant differences in control of exploitation, habitat management, conservation status, or regulatory mechanisms.

The lower Kootenai River burbot have been historically isolated from the burbot population within the upper Kootenai River by natural barriers, which consist of (1) a narrow canyon

with a higher gradient that causes an increased water velocity from approximately Bonners Ferry (river km (rkm) 246 (river mi (rm) 153)) to Kootenai Falls (rkm 310 (rm 193)) and (2) the Kootenai Falls themselves. Downstream movement by burbot over Kootenai Falls is possible; however, none of the more than 400 burbot tagged in Montana above Kootenai Falls have been recaptured downstream in Idaho or British Columbia (Paragamian *et al.* 1999). In contrast, 40 of the 266 burbot tagged in the lower Kootenai River have been recaptured in the same sampling areas (Diane Wakkinen, Idaho Department of Fish and Game, pers. comm., 2002). While not conclusive, if tagged burbot from Montana moved downstream over Kootenai Falls and into the lower Kootenai River, we expect that they would also be recaptured. In addition, isolation of lower Kootenai River burbot from the population above Kootenai Falls is further supported by recent genetic analyses that indicate these two populations differ genetically (Paragamian *et al.* 1999). Even so, our DPS policy does not require absolute reproductive isolation as a prerequisite to recognizing a DPS. Therefore, even if a low level of genetic exchange existed between burbot populations within the Kootenai River basin, it would not necessarily preclude a determination of discreteness.

The available information also indicates that lower Kootenai River burbot are behaviorally different from other burbot populations in the Kootenai River basin due to their adfluvial life history strategy (Northcote 1973; Paragamian *et al.* 1999). The only other known remaining burbot reproduction that occurs within Kootenay Lake is from the remnant lacustrine population in the North Arm (Spence 1999). While mixing of the lacustrine fish and the adfluvial fish may have occurred in the past, the available information suggests that these two burbot populations do not currently interact (Paragamian, pers. comm., 2000; Spence 1999). Telemetry studies of lower Kootenai River burbot indicate that these fish primarily use the delta area near the mouth of the Kootenai River, and no fish have been tracked moving as far north as the West Arm of Kootenay Lake. In addition, telemetry studies of lacustrine burbot indicate that these fish do not distribute throughout the lake, but stay within the area of the North Arm (Paragamian, pers. comm., 2000; Spence 1999).

Spawning time for the lacustrine form of burbot in the North Arm of Kootenay Lake is approximately 1 month later

than the adfluvial form in the lower Kootenai River (Spence 1999; Paragamian 2000; Kozfkay and Paragamian 2002). In addition, the burbot that previously occurred in the West Arm of Kootenay Lake were believed to have commenced spawning in April, and spawning may have continued from mid-May to mid-June (Martin 1976 in Redfish Consulting Ltd 1998; Martin 1977 in McPhail and Paragamian 2000). Because both gamete maturation and arrival at spawning sites are known to be highly synchronous in burbot (Arndt and Hutchison 2000; Evenson 2000), it is likely that the disparity in spawning periods between the various populations effectively isolates them reproductively from one another.

Finally, with regard to the remainder of the subspecies' range, Kootenai Falls in Montana forms an upstream barrier to burbot movement, while Bonnington Falls in British Columbia, which is downstream from Kootenay Lake and above the confluence with the Columbia River, forms a downstream barrier. These two barriers have been in place since at least the last period of glaciation (roughly 10,000 years before present).

On the basis of available information, we conclude that the lower Kootenai River burbot is discrete from other populations of the same taxon as a consequence of physical, ecological, and behavioral factors. Therefore, we considered the potential significance of this discrete population to the remainder of the taxon.

Significance

Under our DPS policy, once we have determined that a population segment is discrete, we consider its biological and ecological significance to the larger taxon to which it belongs. This consideration may include, but is not limited to: (1) Evidence of the persistence of the discrete population segment in an ecological setting that is unique for the taxon; (2) evidence that loss of the population segment would result in a significant gap in the range of the taxon; (3) evidence that the population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range; and (4) evidence that the discrete population segment differs markedly in its genetic characteristics from other populations of the species.

As previously discussed, burbot distribution is circumpolar, and burbot are well distributed in North America and northern Eurasia. The species' range in North America includes the majority