

Columbia Basin pygmy rabbits held in captivity, and site security as an important management consideration to address this potential threat. *See* Summary of Factors Affecting the DPS and Available Conservation Measures sections.

(3) Washington State legislation (HB 1309) provides measures with regard to conservation of the Columbia Basin pygmy rabbit. *See* Summary of Factors Affecting the DPS section.

(4) Regarding the status and results of ongoing conservation and research efforts for the Columbia Basin pygmy rabbit, there is updated information concerning the WDFW's captive propagation program and research addressing the effects of livestock grazing. *See* Current Management Actions, Distinct Population Segment Review, and Summary of Factors Affecting the DPS sections.

(5) There is potential for a significant gap in the range of the pygmy rabbit should the Columbia Basin population segment become extirpated. This assessment helps further clarify the concept of significance as it is defined in the Act and our policy addressing the recognition of DPS. *See* Distinct Population Segment Review section.

(6) Control of exotic plant species is a habitat protection and restoration measure for consideration during management actions and scientific investigations. *See* Available Conservation Measures section.

#### Summary of Factors Affecting the DPS

After a thorough review and consideration of all available information, we have determined that the Columbia Basin pygmy rabbit warrants classification as an endangered DPS pursuant to the Act. We followed procedures found in section 4 of the Act and regulations promulgated to implement the listing provisions of the Act (50 CFR part 424). We may determine a DPS to be endangered or threatened due to one or more of the five factors described in section 4(a)(1). These factors and their application to the Columbia Basin pygmy rabbit (*Brachylagus idahoensis*) follow.

*A. Present or threatened destruction, modification, or curtailment of habitat or range.* During the first half of the 1900s, large portions of more mesic (moist) shrub steppe habitats on deeper soils within the Columbia Basin were converted for dryland crop production (Daubenmire 1988; Franklin and Dyrness 1988; WDFW 1995a). During the mid-1900s, large-scale irrigation projects led to further conversion of more xeric (dry) shrub steppe habitats on deeper soils within the Columbia

Basin for irrigated agriculture (WDFW 1995a; Franklin and Dyrness 1988; U.S. Department of Interior (USDI) 1998). In addition, urban and rural developments (e.g., housing, industrial facilities, transportation corridors) in central Washington permanently remove native shrub steppe habitats. In 1994, it was estimated that approximately 60 percent of the original shrub steppe habitat in Washington had been converted for human uses (Dobler 1994), and shrub steppe habitats within the Columbia Basin continue to be converted for a variety of human uses. The Columbia Basin pygmy rabbit can not occupy these converted sites. Due to the small home ranges and relatively restricted movements of pygmy rabbits, conversion of native habitats in the Columbia Basin also removes or severely limits their dispersal corridors between suitable habitats.

A number of other, often interacting, influences affect the remaining native shrub steppe habitat within the Columbia Basin, including altered fire frequencies, invasion by non-native species, recreational activities, and livestock grazing. Sagebrush is easily killed by fire and, when it occurs at increased frequencies, it can remove sagebrush from the vegetation assemblage (Daubenmire 1988). In the absence of a sufficient seed source, sagebrush cannot readily reinvade sites where it has been removed, and it may be many years before it can become reestablished (WDFW 1995a). Due to a variety of factors (*see* below), the fire frequency has increased over portions of the remaining shrub steppe habitat within the Columbia Basin. Because of their close association with tall, dense stands of sagebrush, pygmy rabbits are precluded from occupying frequently burned areas.

Various non-native, invasive plant species, such as cheatgrass (*Bromus tectorum*) and knapweed (*Centaurea* spp.), have become well established throughout the Columbia Basin (Daubenmire 1988; Franklin and Dyrness 1988). Areas with dense cover of cheatgrass are apparently avoided by pygmy rabbits in Oregon (Weiss and Verts 1984), and these newly established plant communities often provide fine fuels that can carry a fire. Combined with widespread unimproved road access and informal recreational activities that provide multiple sources of ignition, the establishment of non-native species increases the risk of fire and further reduces the security of areas that could potentially support the Columbia Basin pygmy rabbit (WDFW 1995a).

Fire was implicated in the loss of the only pygmy rabbit subpopulation ever recorded in Benton County, Washington, in 1979 (WDFW 1995a), and was directly associated with the loss of one of the few remaining subpopulations in Douglas County in 1999 (WDFW 2001b). The WDFW has taken measures to reduce the risk of fire at the Sagebrush Flat site (e.g., constructing firebreaks). However, unimproved road access and informal recreational activities provide a continuing source for ignition of uncontrolled fires in the area (WDFW 1995a). Due to the extremely low number of Columbia Basin pygmy rabbits in the wild, their restriction to one known site, and their reliance on relatively tall, dense stands of sagebrush, natural and human-caused fire represents a significant threat to this portion of the population.

Land managed for livestock grazing is often cleared of sagebrush to increase the production of grasses and forbs as forage for cattle (WDFW 1995a; Rauscher 1997), although this management practice in the Columbia Basin has declined from past levels (L. Hardesty, WSU, pers. comm. 2002). Clearing areas of sagebrush cover removes habitat patches potentially used by the Columbia Basin pygmy rabbit. In addition, it can reduce the value of more marginal stands of sagebrush that may act as dispersal corridors for pygmy rabbits, further fragmenting the remaining suitable habitats. Much of the remaining shrub steppe habitat in the Columbia Basin is managed for livestock grazing (WDFW 1995a; N. Hedges, pers. comm. 2001).

Excessive livestock grazing removes current herbaceous growth and residual cover of native grasses and forbs and can increase the density of various non-native, invasive species and—over several years—young sagebrush stands (Daubenmire 1988; WDFW 1995a). In some instances, this disturbance may eventually result in the growth of tall, dense stands of sagebrush (Daubenmire 1988), potentially improving the shrub forage and cover conditions for pygmy rabbits. However, livestock grazing at these levels potentially reduces the forage base and cover characteristics of grasses and forbs for Columbia Basin pygmy rabbits (Green and Flinders 1980b; Rauscher 1997). Excessive livestock grazing may also cause structural damage to dense stands of older sagebrush. This acts to open the canopies of these sites and potentially makes them less suitable as cover for Columbia Basin pygmy rabbits (Gahr 1993; Rauscher 1997). Currently, it is unclear if light or moderate levels of