

segments; or (2) international governmental boundaries between which differences in regulatory mechanisms exist that are significant with regard to conservation of the taxon. The pygmy rabbit does not occur outside of the lower 48 conterminous United States, so the international boundary criterion does not apply.

The Columbia Basin pygmy rabbit has been physically discrete from the remainder of the taxon for several millennia (*see* Distribution and Status, above). In addition, there is current evidence that the Columbia Basin pygmy rabbit is genetically and ecologically discrete from the remainder of the taxon (*see* Significance, below). Based on this information, we find that the Columbia Basin pygmy rabbit population segment is discrete from the remainder of the taxon pursuant to the Act. Physiological, behavioral, or morphological differences between the Columbia Basin pygmy rabbit and populations throughout the remainder of the species' range are not known at this time.

Significance

The types of information that may demonstrate the significance of a discrete population segment to the remainder of its taxon include, but are not limited to: (1) Persistence of the population segment in an ecological setting unusual or 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 discrete population segment represents the only surviving natural occurrence of the taxon that may be more abundant elsewhere as an introduced population outside its historic range; and (4) evidence that the population segment differs markedly from other population segments in its genetic characteristics. The following significance factors have bearing on the Columbia Basin pygmy rabbit.

Markedly different genetic characteristics. Several studies have been initiated to investigate the pygmy rabbit's genetic profile (WDFW 2000c; WDFW 2001a, c; Cegelski and Waits, undated). To date, the genetic analyses

include current (*ca* 1990s to present) samples from Washington, Idaho, and Montana; and museum specimens (*ca* 1910s to 1980s) from Washington, Idaho, Montana, and Oregon, with a median date of 1949 among these States (WDFW 2001c). Analyses have included both mitochondrial DNA (from current samples only) and nuclear DNA markers (WDFW 2001c; K. Warheit, pers. comm. 2001, 2002).

Results from recent genetic analyses indicate that the Columbia Basin pygmy rabbit is markedly different from other pygmy rabbit population segments (WDFW 2001c; K. Warheit, pers. comm. 2001, 2002). These differences are consistent in both mitochondrial DNA and nuclear DNA indices, and between current (Washington versus Idaho and Montana) and museum (Washington versus Idaho, Montana, Oregon) samples. The genetic results suggest that the Columbia Basin pygmy rabbit diverged (*i.e.*, was genetically isolated) from the remainder of the taxon at least 10,000 to 25,000 years BP, and possibly as long as 40,000 to 115,000 years BP (WDFW 2001c; K. Warheit, pers. comm. 2001, 2002). The genetic differences that have so far been identified between the Columbia Basin pygmy rabbit and other pygmy rabbit populations are similar in nature to subspecific differences recognized in other mammal species. However, potential taxonomic reorganization of the pygmy rabbit species will require additional study (WDFW 2001c).

In addition to the genetic differences that likely result from long-term isolation described above, the Columbia Basin pygmy rabbit also exhibits significantly less genetic diversity compared to other pygmy rabbit populations. Furthermore, the level of genetic diversity in this population segment has declined significantly and at an accelerated rate since the mid-1900s (Washington current versus Washington museum specimens). These results suggest a recent and rapid decline in the effective population size (*i.e.*, the number of individuals contributing to reproduction) of the Columbia Basin pygmy rabbit, and that this population segment may be

experiencing a degree of inbreeding depression (WDFW 2001c).

Two conclusions may be drawn from the recent results of the genetic research on the pygmy rabbit—(1) the unique genetic characteristics of the Columbia Basin pygmy rabbit represent an important component in the evolutionary legacy of the species and, therefore, a genetic resource worthy of conservation; and (2) efforts should be undertaken to address the low level of genetic diversity within this population segment (K. Warheit, pers. comm. 2001, 2002).

Persistence in an unusual or unique ecological setting. With regard to the historic distribution of the pygmy rabbit, several studies have defined and mapped landscape-level ecosystem components of Washington and Oregon and, to varying degrees, address the management of natural resources within these regional ecosystems (Daubenmire 1988; Franklin and Dyrness 1988; Keane *et al.* 1996; Quigley *et al.* 1997; Wisdom *et al.* 1998). Although there are considerable differences between the studies, the ecosystem mapping units that were developed as a result of these studies are relatively consistent. These ecosystem mapping units are important for determining if the Columbia Basin pygmy rabbit may occupy an unusual or unique ecological setting. In addition, it is important for delineating the boundaries of any potential DPS in the region, as required by our DPS policy. Currently, there is insufficient information available to address the other shrub steppe ecosystems comprising historic pygmy rabbit range outside of Washington and Oregon.

During the early 1900s, the pygmy rabbit populations in Washington and Oregon (Figure 2) occurred in five ecosystems identified by the above studies. For the purposes of this DPS analysis, we refer to these ecosystems as the Columbia Basin, High Lava Plains, Northern Great Basin, Owyhee Uplands, and Modoc Plateau (after Quigley *et al.* 1997). The Columbia Basin occurs in Washington and northern Oregon; the other four ecosystems occur in central and southern Oregon (Figure 3).

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