

where they have entered settled areas it “keeps hidden from the watcher.” During surveys on McChord AFB, observers noted that western gray squirrels often fled from the presence of the observer (The Nature Conservancy of Washington and Washington Department of Natural Resources (WDNR) 1996). More recently, researchers conducting surveys on Fort Lewis described western gray squirrels as “very wary and challenging to approach and therefore can be difficult for observers to detect” (Bayrakçi *et al.* 2001).

In Oregon, although described as “shy and retiring” in the countryside where they have little human contact, western gray squirrels can be found in urban parks where they are more tolerant of human contact (Susan Weston, *in litt.* 2003). Along the Nevada/California border, western gray squirrels appear to be well-adapted to the urban-forest interface (P. Maholland, pers. comm. 2003) and have been reported as common in the Lake Tahoe basin, especially in the urbanized areas (J.S. Romsos, pers. comm. 2003).

Whether the western gray squirrels in Washington are more secretive than those elsewhere in the range of the subspecies is unclear. Although evidence of shy behavior of the western gray squirrel has long been documented for the Washington population, similar behavior has been documented in Oregon (Susan Weston, *in litt.* 2003). We believe this behavior may be consistent with a species at the edge of its range, where the amount of habitat is restricted by fragmentation and may be less than optimum, and that rather than being “shy,” they are difficult to observe and maintain a close affinity with the habitat that remains. The observation of western gray squirrels in towns in Oregon and Nevada may also be an artifact of there being larger populations of squirrels in this portion of the subspecies’ range. The differences between rural and urban communities may also be less distinct in Oregon and Nevada, with the rural characteristic of large Oregon white oak or ponderosa pine trees or possibly other planted nut trees providing suitable habitat for the squirrels in the urban environment.

Overall, much of the available information on “secretiveness” of the subspecies is anecdotal in nature and there are no comparative studies to determine whether real behavioral differences in secretiveness exist across the range of the subspecies. Even if such differences do exist, the reasons for them are not clear, including whether or how such behavior might be related to the periphery of the range. The

significance of such differences, if they exist, also is unclear.

In evaluating potential differences in the subspecies at the northern extent of its range, we also considered information on morphology and home range size. Body measurements of western gray squirrels in Klickitat County, Washington, were found to be significantly larger than elsewhere in the subspecies’ range (M. Linders, pers. comm. 2003d). This study was conducted in a small area of Klickitat County and results were compared to another study in Washington with a small sample size, and with two California studies. Based on the limited area studies and the small sample size, the results may not be conclusive and applicable for western gray squirrels over their entire range. We also considered information showing that western gray squirrels on the Klickitat Wildlife Area have substantially larger home range sizes when compared with home range estimates elsewhere in the subspecies’ distribution. In this same study, western gray squirrels also used significantly more nests per squirrel than recorded for the subspecies in Oregon (Linders 2000). These results, while interesting, do not explain the reasons for the differences in home range size and numbers of nests. The limited sample size is a confounding factor in interpreting these results. Also, as noted above, differences in methods used to determine home range sizes may be a source of variability in results among studies (Ryan and Carey 1995a). Many factors could account for these differences, and we have no basis for concluding that these results should be attributed to the location of the study area at the northern periphery of the range of the subspecies. Consequently, we do not believe that the information concerning morphology, home range size, or number of nests described for western gray squirrels in Klickitat County provides a justification for a determination of significance under the DPS policy.

The importance of peripheral populations in relation to climate change is a continuing source of discussion and study in the scientific community. Species’ ranges can change dramatically with global shifts in climate. Peripheral populations may survive in isolated refugia that later, with different environmental conditions, serve as a source population for an expanded range and subsequent radiation. What constitutes a peripheral population today could be the center of a species’ range in the future, and consequently peripheral populations are vitally important to a species’ past,

present, and future existence (Nielsen *et al.* 2001).

We have considered the extent to which western gray squirrels in Washington may be significant in relation to climate change. As the result of a climate shift, as occurred in the past when Oregon white oaks moved northward from Oregon, the northern limits of the western gray squirrel range could expand northward as the changing climate again favors Oregon white oak distribution over conifer distributions. At this time there is speculation, but no clear evidence, of the potential role that western gray squirrels in Washington might play in relation to the rest of the subspecies in response to climate change. Similarly, the nature and extent of the effects of climate change on ecological conditions for the western gray squirrel in Washington are not known. Based on the speculative nature of the situation involving the western gray squirrel in relation to climate change, we do not have a basis for concluding that a potential gap in the distribution of western gray squirrels at the northern extent of its range would have evolutionary implications for the subspecies in relation to the potential effects of climate change.

Lastly we consider whether the potential reduction in the range of the subspecies that could occur in the event of the hypothetical loss of the Washington populations, collectively or individually, would meet the significance criterion of the DPS policy. Individually, we do not find that the loss of range that would be represented by the loss of any of the current Washington populations meets the significance criterion of the DPS policy. The limited population information available makes a determination about potential significance particularly difficult, but when viewed individually we do not see the potential reduction in range of each population as reaching significance to the subspecies. Collectively, the loss of all of the Washington populations would represent a serious reduction in the species range. However serious such a hypothetical reduction might be, we do not have information currently that demonstrates this consideration would meet the DPS policy’s requirement of significance to the taxon (subspecies) as a whole, since there is only limited information on the potential biological and ecological significance for Washington in terms of range of the subspecies.

*Whether the Population Represents the Only Surviving Natural Occurrence of the Taxon.* As part of a determination