

take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section" (emphasis added).

Under our DPS policy, 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 taxon; and (2) the population segment's significance to the taxon to which it belongs. Both elements must be present for a segment to qualify as a DPS. When responding to a listing petition, we are required to use all information available to us at the time we make the finding. If we determine that a population segment being considered for listing represents a DPS, then the level of threat to the population segment is evaluated based on the five listing factors established by the Act to determine if listing it as either threatened or endangered is warranted. Those listing factors are: (1) The present or threatened destruction, modification, or curtailment of habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; and, (5) other natural and manmade factors affecting its continued existence. Listing is warranted if one or more of those threats could lead to the extinction of the species throughout all or a significant portion of the range of the species in the foreseeable future.

Discreteness—A population segment of a vertebrate species may be considered discrete if it satisfies either one of the following two conditions: (1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation, (2) It is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant with regard to conservation of the taxon.

The petition asserts that the Tri-State segment of trumpeter swans is geographically and biologically distinct from other trumpeter swans in North America and the United States. The petitioners propose that the segment is discrete because it is separated by physical, physiological, ecological, behavioral, "or other factors," and is separated by approximately 400 miles

from any other significant breeding groups of this species. Petitioners also assert that the Tri-State Area flock is distinct from other swan flocks in Canada because of the presence of the international boundary and because of alleged differences in exploitation and management of this species between Canada and the United States. Below we discuss in detail the conditions for which we will consider a population to be discrete under the DPS policy as applied to the Tri-State Area flock.

(1) Is the Tri-State Area Flock Markedly Separated From Other Populations of the Same Taxon as a Consequence of Physical, Physiological, Ecological, or Behavioral Factors?

Historic range maps indicate that the trumpeter swan had a more contiguous distribution than exists today. As the species' range was restricted due to overexploitation and habitat loss, remnant groups of birds inhabited disjunct breeding areas. Although the exact time at which the present degree of separation occurred is unknown, we believe that it occurred during the peak of trade in swan skins in the mid- to late 1800s. Trumpeter swans have relatively long life spans; birds more than 24 years old have been recaptured in the wild (Kennard 1975). Hence, relatively few (perhaps 6 or 7) generations of trumpeter swans have elapsed since that time. Suzuki *et al.* (1981) state that only one immigrating individual per generation is necessary to maintain genetic continuity between spatially segregated groups of individuals within a species. Mills and Allendorf (1996) suggest a minimum range of 1 to 10 individuals per generation is needed to maintain gene flow between groups of animals. Limited monitoring studies have documented several individuals in non-natal nesting areas (Gale *et al.* 1987, Dubovsky and Cornely 2002) and one mixed-group (*i.e.*, Canadian/Tri-State) pairing (Shea and Drewien 1999). Further, the Interior Canada and Tri-State birds are spatially segregated only during the nesting season; they are sympatric (overlapping in range) during winter, when pairing usually occurs (Johnsgard 1978, Gale *et al.* 1987). For these reasons, we conclude it is unlikely that the Tri-State Area flock has become genetically distinct from the Interior Canada birds. Even if little or no movement of birds between flocks has occurred, there is no evidence that a sufficient amount of time has passed since the mid-1800s for morphology, behavior, and genetics of Tri-State birds

to become distinctly different from those of other flocks.

Recently, the Service, in consultation with the Flyway Councils, divided trumpeter swans into three administrative populations on the basis of areas in which they nest. These populations are defined primarily for management purposes and not in recognition of reproductive isolation or genetic differentiation (Trost *et al.* 2000). In fact, one of the populations is derived exclusively from birds and eggs translocated from the other two populations.

The Pacific Coast Population (PCP) is comprised primarily of birds that nest in Alaska and winter along the west coast of Canada and the United States as far south as Oregon (Figure 1). Observations of a very limited number of marked birds from this group suggest that birds nesting in Alaska do not often migrate or winter east of British Columbia or the Pacific Coast States (Dubovsky and Cornely 2002).

The RMP is comprised of birds that nest east of the range of the PCP to areas just east of the western border of Saskatchewan and points south. Most birds in the RMP winter at the confluence of the borders of Montana, Idaho, and Wyoming (hereafter termed the "Tri-State" Area) (Subcommittee on Rocky Mountain Trumpeter Swans 1998).

The Interior Population (IP) is comprised of birds that nest east of the range of the RMP. The IP is the result of extensive restoration efforts, and is composed almost exclusively of PCP and RMP birds and eggs that were translocated to these eastern areas. Birds from the IP tend to winter primarily in areas near to or south of their nesting grounds (Dubovsky and Cornely 2002).

Of all the populations, the status of the RMP has been subject to the largest amount of debate over the years. The RMP is comprised primarily of two groups of birds: one that nests in Canada and the other that nests in the Tri-State Area. The latter group contained only about 70 birds in the early 1930s. These were erroneously thought to be the only free-ranging trumpeter swans in the world (Banko 1960). The birds nested primarily in Yellowstone National Park and the Centennial Valley area of Montana, and wintered in those areas and adjacent areas in Idaho (Banko 1960).

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