

had far greater numbers than usual (birdsource.org 2003).

Pesticide Application and Exposure

Grasshoppers occur throughout the breeding range of the mountain plover and can reach population levels considered a threat to agriculture. The APHIS (2002) has authorized rangeland grasshopper and Mormon cricket control in areas occupied by mountain plovers. Dimilin, malathion, and carbaryl are the identified chemicals when grasshoppers reach economic thresholds (APHIS 2002). Control on private lands can be undertaken by State agencies or private landowners without participation or oversight by APHIS.

The emphasis of the rangeland grasshopper control program is to reduce rather than eliminate grasshoppers, but effects to nontarget insects also occur. The effects of treatment are immediate, and some treatments can depress insect populations into the second year (APHIS 2003). Grasshoppers and other insects are major prey items of mountain plovers, and control may influence mountain plover productivity (Graul 1973, Knopf 1996b, Knopf and Rupert 1996). In conferring under section 7 of the Act on the effects of treatments on mountain plover, we concluded that the application of rangeland grasshopper control as described by APHIS (2002) on mountain plover breeding habitat could result in reduced prey, greater foraging distances, increased chick predation, and reduced survival (W. Knapp, Service, in litt. 2002; R. Williams, Service, in litt. 2003).

In Montana, grasshopper control is authorized to occur in 2003 on both public and private lands (APHIS 2003). Because APHIS, in conference with the Service, has agreed to treatments that will avoid active black-tailed prairie dog colonies and because mountain plovers in Montana are closely associated with black-tailed prairie dog colonies, we believe that treatments are not likely to threaten the plover there. Similarly, in Wyoming, planning is underway to authorize grasshopper control on BLM lands throughout Wyoming. After conferring with the Service, APHIS has agreed to avoid prairie dog colonies and to avoid known mountain plover nesting sites not associated with prairie dog colonies (K. Dickerson, Service, pers. comm. 2003). Control on private lands can be undertaken by State agencies or private landowners without participation or oversight by APHIS or the Service. While control of grasshoppers and other pests on private lands may pose a threat, we do not believe that it is of a magnitude or

immediacy that warrants listing the species.

Mountain plovers may be exposed to pesticides while they occupy winter habitat in California (Knopf 1996). In conferring under section 7 of the Act, we concluded that malathion application to control curly-top virus in the Imperial and San Joaquin Valleys would harass some wintering mountain plovers, but the timing and location of treatment was not likely to result in direct exposure, or significant impacts to mountain plover prey (W. White, Service, in litt. 2001b). More recently, the California Department of Fish and Game conducted an assessment of exposure risk in Imperial County, specifically, by comparing mountain plover presence in the Valley with crop types predominately used by them, and the pesticides typically applied to these crops (B. Hosea, California Department of Fish and Game, in litt. 2003; Wunder and Knopf 2003). This information suggests that direct exposure to mountain plovers is reduced because application of pesticides occurs when plovers are not using the fields. For example, insecticides are usually applied to alfalfa fields when the alfalfa is too high to be attractive to mountain plovers. Also, insecticides are not applied while livestock are grazing fields to minimize pesticide exposure to livestock, and pre-planting herbicides are usually incorporated into the soil as a granular form, thus reducing exposure risk. Potential impacts to the mountain plover prey base on the wintering grounds are not known, but also appear to be minimal for reasons cited above (B. Hosea, in litt. 2003). Pesticide exposure by aerial drift is likely due to mosaic cropping patterns, but effects to mountain plovers are unknown.

A review of exposure to organochlorines, selenium, and heavy metals showed that concentrations in mountain plovers were below thresholds that cause population-level effects (A. Archuleta, Service, in litt. 1997). More recently, the Service analyzed pesticide levels in 20 mountain plover eggs collected from Colorado and 4 from Montana. Dichlorodiphenyldichloroethylene (DDE) levels were detected in all eggs; in four eggs levels were above those known to be detrimental to other bird species (K. Dickerson, Service, in litt. 2002). While the levels detected in the mountain plover eggs may have been influenced by prolonged storage prior to analysis, the results nonetheless suggest that mountain plovers may be at risk from organochlorine pesticide exposure (K. Dickerson, Service, pers. comm. 2003). The DDE is a metabolite of

dichlorodiphenyltrichloroethane (DDT), known to be responsible for eggshell thinning, and is extremely persistent in the environment. In addition, a recent investigation found a wide disparity in cholinesterase levels between mountain plovers collected in the Central Valley (pesticide use widespread) compared to those from the Carrizo Plain (pesticide use minimal), but no differences in mountain plover body condition (Iko, *et al.* 2003).

Status Summary

The species was proposed in 1999 and 2002 as threatened because the best information available at that time indicated breeding population declines and loss of habitat due to a variety of factors, including agricultural practices, prairie dog declines, and grassland conversion. Research on some of these issues, reanalysis of old data, and new information obtained in the last year lead us to conclude that the threats to the species are such that listing is not warranted.

There is no information to document that the mountain plover population is declining or will be in danger of extinction in the foreseeable future. The declines apparent in the BBS data turned out to be statistically insignificant. The CBC data in California are tremendously variable, but suggest a slow downward trend, whereas surveys on the wintering grounds by researchers do not demonstrate declines. Although there are many specific instances of grassland conversion destroying plover nesting habitat, nesting habitat does not appear to be limiting. Occupied prairie dog habitat is more abundant and more stable than previously thought, providing breeding and nesting habitat for plovers. Nesting appears to be equally successful on croplands as on native grassland. Distribution of plovers across the wintering range appears to depend more on annual farming practices and weather rather than on permanent habitat destruction.

In the last few years, Federal land management agencies and State and county governments have become more actively involved in mountain plover management. In 1994, the Forest Service developed a "Mountain Plover Management Strategy" for the Pawnee National Grassland in Colorado. We believe formalized conservation efforts by the CDOW will improve the status of the mountain plover in Colorado. Other new conservation efforts within the breeding range include the recently-established Federal, State, and private High Plains Partnership; the Department of Defense's Integrated Natural Resource Management Plan for Fort Carson,