

necessary to bring any endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. When a species no longer meets the definition of an endangered or threatened species under the Act, it is recovered, and we are to delist it.

The meaning given to "recover" in common conversational usage is "to restore to a previous, or to the original, condition." However, incorrectly ascribing this common meaning to "recover" as used in the Act has led some individuals to mistakenly believe the Act functions as a biodiversity restoration program. The goal of the Act—preventing species extinctions—is much narrower than the rangewide wolf restoration and biodiversity restoration goals implicit in these comments.

We have evaluated, in light of the conservation biology principles discussed previously, our three continuing recovery programs for the gray wolf in the context of its previous listing across the 48 conterminous States and Mexico. We have concluded that sufficient redundancy and resiliency will be achieved by establishing three separate viable wolf populations or metapopulations in widely spaced areas of that geographic area. If each of these three populations contains enough reproducing packs so that it is a viable and self-sustaining population, its numerical size and geographic extent will provide the resilience needed for it to bounce back from newly developing or expanding adverse factors (e.g., disease, massive wildfire, or the temporary decline of a prey species' population) in the foreseeable future. Furthermore, if these three populations are widely spaced and somewhat isolated from one another it is very unlikely that all three populations would simultaneously, or in rapid sequence, suffer from the same catastrophic event.

Once they are completed, the Service's three current gray wolf recovery programs will result in wolf populations of sufficient size and relative isolation to provide the necessary resiliency and redundancy. For example, the Northern Rocky Mountain gray wolf population—now at recovery levels—exceeded 560 animals at the end of 2001, and preliminary results from the end of 2002 indicate a population of approximately 660 wolves (Tom Meier, Service, *in litt.* 2003). The Midwestern gray wolf population—which has exceeded the numerical goals of the Eastern Gray Wolf Recovery Plan—is estimated to be over 3000 wolves. (Final recovery goals have not yet been established for the

Southwestern (Mexican) gray wolf recovery program, but they will be designed to ensure long-term viability of that wolf population.) The currently occupied areas of the Eastern and Northern Rockies populations are separated by approximately 1000 kilometers (600 mi), and a similar distance currently separates the Greater Yellowstone Area wolf packs from the reintroduced wolves in the Southwest. Each of these gray wolf populations will be viable and self-sustaining when their recovery programs are completed, and the distances between them, while not providing total isolation, will provide a great deal of protection from multi-population catastrophic events.

Both the Northern Rocky Mountain and Eastern gray wolf recovery programs—when all recovery goals are achieved—will each cover sufficient geographic area and have enough wolves in a population or metapopulation structure to be sufficiently resilient to respond to adverse factors that may arise in the future. The Southwestern (Mexican) gray wolf recovery program, when a final recovery goal is established and attained, similarly will have sufficient distribution and number of wolves. Thus, the conservation biology principle of resiliency is satisfied by the achievement of the respective recovery goals of these 3 recovery programs.

Commenters suggested that additional gray wolf populations should be established in the western United States in order to maximize the species' long-term survival and minimize the likelihood of extinction. However, the Act does not mandate maximizing species survival, nor does it require undertaking widespread species restorations to minimize extinction risk. Rather, as discussed above, its mandate is to recover species to the point that they are "not likely" to become in danger of extinction in the foreseeable future. We believe the "not likely" standard will be exceeded by establishing three geographically widespread gray wolf populations that are independently viable, because it is highly unlikely that future threats will endanger multiple widely separated wolf populations. Thus, the conservation biology principle of redundancy is satisfied by our three current recovery programs.

The concept of representation, when applied to the conservation of the gray wolf, argues that we should preserve enough of its remaining genetic diversity so that future genetic problems are unlikely to lead to its extinction. These problems may include genetic drift, inbreeding depression, and

diminished ability to survive as new environmental conditions develop. The three current gray wolf recovery programs are preserving all of what remains of the species' genetic diversity in the 48 States and Mexico. The current genetic diversity of the wolves in the western Great Lakes is a product of the remnant wolf population that survived in northeastern Minnesota, Canadian wolves from southwestern Ontario and Manitoba that moved into Minnesota, as well as southern Ontario wolves that moved into the eastern portion of Michigan's Upper Peninsula. The Northern Rockies wolf population is a mixture of southern Canadian wolves that repopulated the Glacier National Park area and wolves from Alberta and British Columbia, Canada that were brought into central Idaho and Yellowstone National Park. These two recovery programs are preserving all the remaining genetic material of the gray wolves that formerly inhabited those areas. Both the Midwestern and Northern Rockies wolf populations are believed to contain sufficient genetic diversity to survive over the long term, even if they were to become completely and permanently isolated from neighboring wolves across the Canadian border.

The reintroduced Southwestern (Mexican) gray wolf population originated from small captive populations composed of individuals captured in the wild in Mexico and identified in captive facilities in Mexico and the United States (Hedrick *et al.* 1997). Detailed records and careful selection of captive breeding pairs has ensured the conservation of this founding Mexican wolf genome. This recovery program is utilizing all the remaining genetic material that has been preserved from the wild Southwestern and Mexican wolf population, and when completed, it will ensure the long-term survival of that unique genetic diversity and maximize the ability of this isolated population to cope with, adapt to, and evolve in response to environmental change.

Thus, our three current wolf recovery programs are doing all that can be done to preserve the remaining genetic material from the gray wolves that previously occupied the 48 conterminous States and Mexico. Establishing additional populations would provide no additional genetic benefits to wolf recovery under the Act (with the possible exception of the Northeast; see below). Therefore, the conservation biology principle of representation is satisfied by these three gray wolf recovery programs.