

RESOURCE NOTES

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Genetic Management of Small Populations: the Special Case of Feral Horses

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The sixth in a series of 13, Session 2

Background

Only the Plains zebra, among all the Equidae, can be counted as a wild species that is not endangered. The Przewalski's horse (*Equus przewalskii*), the African wild ass (*Equus africanus somaliensis*), the Asiatic wild asses (*E. kiang*; *E. hemionus onager*; *E. hemionus luteus*; *E. hemionus khur*), Grevy's zebra (*E. grevyi*) and the Mountain zebras (*E. zebra zebra*; *E. zebra hartmannae*) are all endangered species (see Resource Note #24). Donkeys and horses, the domestic equids, thrive in the presence of human culture, contrary to the situation pertaining for populations of wild equids.

Discussion

Conservation efforts for wild equids include establishment of protected areas for surviving

populations, such as Samburu National Park in Kenya and Cape Mountain Zebra National Park in South Africa. Often, habitat alterations are undertaken in order to support these native species, including management action to ensure access to water resources. Ex situ conservation of equid gene pools involve intensive management of small populations through programs like the Species Survival Plans (SSP) of the American Zoo and Aquarium Association. The goal of the structured breeding programs of SSP is to preserve target amounts of genetic variation for defined periods of time (typically 90-95% of average heterozygosity over 100-200 years). Equalizing founder contribution and family size maximizes

the genetically effective size of these managed populations.

Domestic horses have become feral at numerous times and at numerous places in the world, establishing expanding populations that have produced a variety of environmental impacts. Feral horse populations have tended to be managed first for demographic considerations (carrying capacity, number of individuals removed). Founder effect, natural selection, genetic drift, and gene flow through introduction of new individuals into relatively isolated breeding populations serve as the major features influencing the gene pool of feral horse populations. Selective forces acting on feral horses include the impacts of



WILD HORSE AND
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the natural environment as well as anthropogenic influences, such as removal of individuals from the herd.

Conclusion

Assuming that management of populations of feral horses requires identification of the maximum number of individuals to occupy individual management units (carrying capacity), managers are faced with decisions regarding impacts of intervention on the gene pool. Differing

scenarios for removal of individuals in order to maintain populations below carrying capacity produce different impacts on the population's gene pool over time, especially under circumstances in which migration of individuals between populations is rare. Modern methods of genetic analysis applied to horses that have been removed from feral populations can shed insights into population structure and help constrain alternatives for population management.

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