SUMMARY

Horses increased to over 300 in many weather scenarios, and even to >400, if they were not culled. This could be regarded as the ecological carrying capacity of the population. At ecological carrying capacity, plant cover would be considerably lower than it is now. The range would appear to be extremely heavily utilized as grass offtake would climb to over 90% in many areas. Some areas would be nearly barren. Herbaceous biomass above and belowground would be reduced to less than 20% of potential in many areas. There would probably be secondary effects on wildlife. With greater exposure due to reduced plant and litter cover, soil erosion rates would likely be higher than at present. Horses would be in generally lower condition. Total annual horse mortality would be high, due to a larger total number of horses would be higher, and the fact that annual births would have to be balanced by deaths. Thus, to meet range management and animal welfare objectives, the population must be managed below its ecological carrying capacity.

Continuous rather than threshold responses to increasing horse made the task of deciding upon an appropriate number of horses difficult. The analysis showed no optimal number of horses, as in a peak level of performance of ecosystem processes. With as few as 50 horses, there was some decrement of plant growth. Given this, the optimum number of horses may be the minimum number needed to safely ensure the population and genetic viabilities of the horses. This number would minimize decrements to vegetation productivity, while ensuring continued viability of the horse herd.

These results are not in conflict with the general management strategies that the BLM has employed in the past in their efforts to balance the conservation of rangeland health with the population viability of a unique strain of wild equids. However, the model provides a more solid foundation upon which to base those management decisions. The traditional approach to evaluating carrying capacity based upon forage supply and animal requirements could not provide sufficiently clear answers to the complex questions of resource management in a dynamic and heterogenous landscape. The ecosystem modeling approach, while more difficult to implement, does have the power to address those complex questions.

As part of an adaptive management process, the model should be revisited periodically, to check the consistency of it's predictions with actual results. The model should then be revised and a new assessment should be carried out. The combination of field research and ecosystem modeling that has been carried out in the PMWHR is an example for improving the scientific management and conservation of wild equids on rangelands in the western United States and other regions of the world.