We offer our viewpoint for consideration by groups like the National Academy of Science, as their effort will set the stage for future land management events in and around the boundaries of Yellowstone National Park. Findings of the National Academy of Science Committee may serve as the basis by which land managers evaluate the interaction of large ungulates with their habitats on all public lands throughout the western United States.

BIODIVERSITY

Yellowstone National Park is much more than its elk population. An approach that gauges the success or failure of National Park Service policy by how well the elk population sustains itself does a disservice to the citizens of our country and the ecological integrity of the lands they manage. A monitoring approach, without regard to the effects on the array of flora and fauna associated with Yellowstone National Park is not acceptable; it does not reflect what the Park's founders intended. The National Parks Organic Act passed in 1916, established the purpose of our National Parks to conserve natural and historic elements and wildlife of our nation for future generations to enjoy. We recognize the importance of the ongoing research efforts that take place in National Parks, but also believe it is important to recognize that our National Park System was not created just to provide experimental research areas for scientists to perform experiments. If Park policy is to be responsibly monitored, the effect of natural regulation on the array of potential plants and animals in the Park must be a key element of research. How the many years of natural regulation has affected the biodiversity of Yellowstone National Park is key to understanding if the policy has been effective. An understanding of effects on biodiversity is fundamental to determining if natural regulation has enhanced or degraded the values the Park was established to conserve.

A number of authors have published reports and articles describing changes in woody vegetation that have occurred due to intensive forage use by the "naturally" regulated elk population These changes are most noticeable for many woody or browse species, and raises the issue of how intensive browsing has affected the biotic community. The effect on Park biodiversity should be central to the National Academy of Science analysis of natural regulation.

Fig. 1. ***Lamar Exclosure YNP, established 1957. Photo at the top of the page was taken in 1958 shortly after the exclosure was established, protecting the area inside from browsing by large ungulates. The lower photo was taken in 1995. Note the recovery of woody species, especially aspen. Upper photo NPS, lower photo by Carl Wambolt.***

Aspen

What are the consequences on winter ranges in and around the Park where, due to browsing by elk, there are essentially only two aspen size classes contributing to stand structure? At many locations, on winter ranges in and around the Park, tall mature aspen and aspen stems 20 inches or shorter in height are all that exist (Figure 1). There are almost no aspen between 20 and 80 inches in height. Essentially, all young aspen are held within the 7 to 8 foot browse zone of elk and other large ungulates by browsing. If this trend continues, as tall aspen die, the stands may be converted to shrub type aspen. How does this altering of aspen stand structure effect the survival and species richness of neotropical migrant birds and small mammals that occur in such habitat types? Several different authors have described the negative effect of altered woody species stand structure, due to browsing, on birds. Measuring the effect of natural regulation on overall landscape biodiversity should be a fundamental component of any objective review of Park policy.

Willow

What are the consequences on winter ranges in and around the Park where, due to browsing by elk, the structur - al component of willow communities have been modified to varying degrees by herbivory ?

On portions of the Northern and Gallatin winter ranges, due to browsing, the only available willow is the current years growth. Over most of these winter ranges the tall willow component has been removed by browsing. The further one travels outside the Park on these winter ranges, into Montana, a more complex structural component of woody vegetation becomes discernible. On portions of the winter range outside of the Park, young woody stems within the browse zone are achieving a growth form that will allow them to develop to their typical stature. As with aspen, an important issue regarding loss of structural diversity is the effect on neotropical song birds and small mammals which can be expected to occur in such potentially diverse habitats. Where willow communities occur along stream courses, the effect on water quality and water-dependent wildlife species becomes an important consideration.

Shrub/gGassland Plant Communities

What are the consequences resulting from changes in shrub/grassland plant communities?

A decline of tree and shrub communities has caused an expansion of grassland communities. The shrub component has

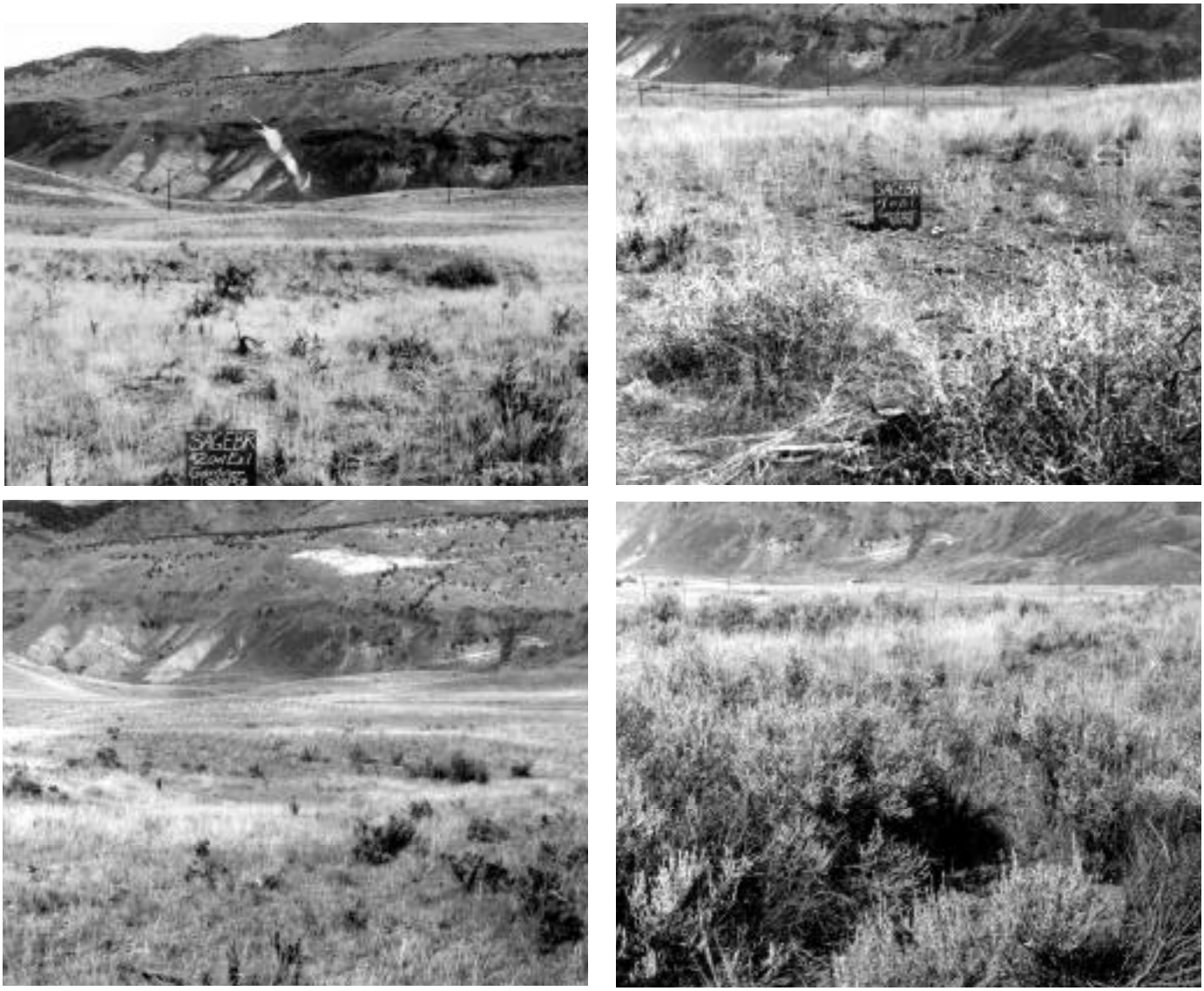

Fig. 2. ***Exclosure near Gardiner, MT, YNP. Photo in upper left was taken in 1958 outside of the exclosure, photo upper right was taken inside the exclosure in 1958 shortly after the exclosure was constructed. Notice the similarity. The lower left photo was taken in 1995 at the same location outside the exclosure; photo lower right was taken in 1995 inside the exclosure at the same location. Note the establishment of woody vegetation in the lower right photo as a result of protection from browsing. The photos may not fully reflect the site's potential as they only reflect 37-years of protection from browsing. Upper photos NPS, lower photos by Carl Wambolt.***

been removed or significantly altered, by browsing, in favor of grassland communities over large portions of the winter ranges associated with the Park (Figure 2.). The increase of woody species, within the exclosure, in Figure 2 may not fully reflect the potential of the site as the photos only reflect protection from browsing for a 37-year period. As with the aforementioned woody species, the effect on overall landscape level biodiversity becomes a key issue.

Other Ungulates

Elk are the dominant ungulate on rangelands associated with Yellowstone National Park. When it comes to using a variety of forage species and habitats, elk are the most adaptable of the large ungulates. As a result, elk may be the least sensitive indicator of environmental health. Other ungulates in the Park include bison, Rocky Mountain bighorn sheep, shiras moose, pronghorn antelope, Rocky Mountain goat, and mule deer. How natural regulation has affected the survival of ungulates other than elk within and adjacent to the Park is also central to considering issues related to biodiversity within the Yellowstone ecosystem.

SUMMARY

An objective analysis of natural regulation Policy must include a landscape level investigation, considering the effects on overall biodiversity. Yellowstone National Park is one of our largest National Parks and represents a significant portion of the largest intact natural area in the lower 48 states. Maintaining biodiversity in and around the Park as part of our cultural heritage assures Yellowstone Park will continue to fulfill its intended purpose for future generations. The findings of the NAS Committee may provide a series of guidelines for assessing the effect of grazing and browsing by large ungulates (both domestic and wild) on our public lands throughout the west.

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Kurt Alt, Wildlife Biologist, Montana Fish, Wildlife & Parks, Region Three, 1400 South 19th, Bozeman, MT 59715

Michael R. Frisina, Range Coordinator, Montana Fish, Wildlife & Parks, 1330 West Gold Street, Butte, MT 59701