1 December 1988

Interim Report

of the

Greater Yellowstone Postfire Ecological Assessment Workshop

Introduction

The workshop participants met on 19-20 November with the following objectives.

1. *Evaluate the apparent ecological impacts and implications of the 1988 fires as they relate to the areas of watersheds, fisheries, wildlife, forests, soils, ranges, and biological diversity.*

2. *Consider the short- and long-term need for reseeding these areas for soil stabilization and erosion control.*

3. *Evaluate the need or desirability of a reforestation program in the parks, in wilderness areas, and in commercial forest stands.*

4. *In light of both the drought and fires of 1988, consider the need or desirability for supplementary feeding of ungulate species during the winter of 1988-1989.*

5. *Develop a list of short- and long-term postfire research needs.*

6. *Prepare a report summarizing the workshop proceedings.*

This interim report addresses objectives two, three, and four which we agreed required immediate attention. The broader objectives one and five will be addressed in our final report which will be made available no later than 1 February 1989. Our recommendations were arrived at after on-site reconnaissance, evaluation of available data and published literature relevant to our specific objectives, and considerable discussion during the workshop.

Objective Two: Seeding

Fire suppression activities within the Greater Yellowstone Area in 1988 involved caterpillar dozing of firelines (catlines) and helipads, as well as the cutting of firelines using hand tools. Furthermore, burned areas potentially susceptible to erosion have been identified. Should these human-disturbed and erosion-susceptible sites be seeded with short-lived exotic species to stabilize soils and control erosion?

To date, catlines in National Forests and bordering Yellowstone Park have been seeded with short-lived wheat and cereal rye. Catlines and trails within the park have had top soil (salvaged during line construction) moved back onto lines and covered with slash and other material to minimize soil erosion and facilitate natural reseeding. Roadcuts within the Park were reseeded with native species collected from within the Park.

Seeding may indeed stabilize soil surfaces and reduce soil erosion on a short-term basis, however, such activities are potentially harmful in the long term. Non-native species are potential competitors for native trees and shrubs, inhibiting

establishment of many of these plants. Thus, the presence of such species will tend to slow the natural process of plant succession which will ultimately control erosion over the long term. The establishment of native trees and shrubs will minimize long-term erosion processes such as soil slips that may occur as the roots of fire-killed trees and shrubs eventually decay. Planting of exotics has actually been observed to accelerate erosion even within a few years of fires in certain situations. Annual species often form dense root mats in the first year or two following establishment. Poor establishment in subsequent years (a likely scenario in high-elevation habitats) may create conditions favorable to mass slipage of surface soil layers bound together by such root mats.

The planting of commercial seed mixes will undoubtedly introduce annual and perennial weeds other than wheat and rye into wilderness ecosystems. Certainly, planting of exotic species diminishes the pristine nature of the ecosystems into which they are introduced. We view the potential introduction of noxious weed species into park ecosystems as a serious problem.

The seeding activities done to date may minimize short-term effects of severe suppression impacts, particularly on catlines cut on steep slopes. However, we recommend that areas where such seeding has been done be monitored carefully for signs of longer-term negative consequences. We recommend that no additional seeding of exotic annual or perennial species be permitted, especially in designated wilderness areas and within the Park. Rehabilitation practices such as respreading of topsoil and slash on catlines and hand lines within the park will facilitate the natural successional processes on these sites.

Objective Three: Reforestation

Given the severity and extent of the 1988 fires, would it not be prudent to reseed or plant seedlings of native trees and shrubs to accelerate natural successional processes to mature forests? Such activities might be especially appropriate in areas visited by particularly intense fires.

To date, reforestation activities have been confined to commmercial forest lands within the National Forest areas surrounding Yellowstone Park and to a few very localized sites with the Park near dwellings or along road cuts. Within the Park, care has been taken to collect seed for such activities from very near the planting site.

Postfire successional processes in the various forest, shrubland, and grassland ecosystems within the Greater Yellowstone Area have been extensively studied. In all cases it is clear that wildfire has been an integral ecosystem and landscape process for thousands, perhaps millions, of years. Nearly all native species in these ecosystems are adapted to fire in one way or another; indeed, a number of plant species depend on fires for successful reproduction. Adaptations include fire resistant bark, underground burls and root systems that resprout following fire, serotinous cones that open and release their seeds following fire, and heat stimulated flowering and seed germination. The specific patterns of succession in these ecosystems will depend on a number of factors, including prefire ecosytem structure and species composition, local site environment, local patterns of fire severity, and postfire impacts such as year-to-year variations in climate. It is this combination of variables that was responsible for much of the landscape variability prior to the fires and will undoubtedly contribute to the heterogeneity of the future landscape of the Greater Yellowstone Area.

Fires of the magnitude and extent of those observed in the Greater Yellowstone Area in the summer of 1988 are relatively common in many western coniferous ecosystems and have been demonstrated to be an integral part of the Yellowstone landscape prior to the advent of European man. Indeed, much of the structure and heterogeneity of that landscape prior to this year's fires was a consequence of large fires in the early eighteenth century. Certainly, this is sufficient evidence that the natural successional processes are all that is necessary to regenerate the full range of forest ecosystems in the Greater Yellowstone Area. The goal in wilderness areas should be to preserve ecosystems and landscapes such that they appear and behave as they would in the absence of human interference. We should intervene in natural disturbance and successional processes only when necessary to protect life or property.

Reforestation activities will at best do little to accelerate regeneration of wilderness ecosystems and, at worst, may be quite detrimental. Activities associated with planting of seed and seedlings are likely to increase soil damage and erosion owing to trampling and mechanical activities. Furthermore, seeding in addition to the natural seed rain may result in overstocking (unnaturally high seedling densities) which can alter the course of forest succession. Much of the genotypic diversity of forest trees in western coniferous ecosystems has been shown to be related to small-scale variations in site conditions and past disturbance history. The obvious mosaic of site conditions created by the 1988 fires will undoubtedly select for a wide variety of genotypes among native species. There is no possible way in which artificial reseeding activities can duplicate this important selective process. The Yellowstone fires will provide an important laboratory in which to improve our understanding of the process of forest regeneration and the role of natural disturbance on landscapes. Interventions such as reforestation will severely compromise that research value.

We conclude that reforestation activities, such as seeding or planting of seedlings are unnecessary given the natural regenerative potential of these ecosystems. Furthermore, such activities will have a variety of undesirable consequences in National Forest and National Park wilderness areas. Succession may indeed be somewhat slower in areas where fires were especially severe; this was certainly the case with past severe fires. Such variation in succession in relation to patterns of fire severity will contribute to future landscape heterogeneity and should be allowed to proceed with no human intervention. We recommend that no reforestation activities be attempted in Greater Yellowstone Wilderness areas. We recognize that such reforestation may be legislatively mandated and prudent in commercial forest areas. Reforestation activities in these areas should be reviewed by silviculturalists expert in postfire planting strategies.

Objective four: Artificial Feeding of Ungulates

Given the combination of drought and the 1988 fires, is it necessary or desirable to provide supplementary feed for ungulate species during the winter of 1988-89? Experience in Europe and in other locations in North America indicate that ungulate populations can be manipulated by artificial feeding. Such feeding programs have been instituted to prevent malnutrition loss, alter distribution patterns, and increase over-winter survival.

A primary purpose of the national parks and the national wilderness preservation system is to perpetuate and restore natural dynamic processes that operate among the flora, fauna, climate, and landscapes within. It follows that human interference with these processes must be minimal. The ungulates which occur in the Greater

Yellowstone Area are part and product of the natural dynamic processes we seek to foster. They exert an influence on the vegetation and, in turn, are affected by their predators, the grizzly bear, black bear, cougar, coyote, and humans. They also help support the diversity of scavengers within the park, inccluding eagles, ravens, magpies, bears, and coyotes.

Artificial feeding focuses on only one component of these ecosystems and ignores the others. The management objective for ungulates in the Yellowstone Wilderness does not include production of harvestable surpluses. Mortality through disease, malnutrition, predation, and accidents varies from year to year. Ungulates within the Park have exhibited increases over the past ten years, and decreases will also inevitably occur. These fluctuations may be obvious during some years and virtually unnoticeable in others, depending on winter severity, extent of drought, and other conditions. Attempts to prevent declines will inevitably exacerbate the situation in the long term. Indeed, feeding might actually have an adverse effect on elk herds by facilitating disease transmission.

The argument that the fires of 1988 were unique and therefore justify unusual activities such as winter feeding is very questionable. For example, less than 10% of the winter range of the northern herd was consumed by fire. Available evidence indicates that virtually all plant communities within this region originated from past fires. As indicated above, fires burn large areas of western coniferous forest each year and fires of this extent burned much of the Greater Yellowstone Area in the early eighteenth century. The elk populations have obviously coevolved over a long time with fire in this region, as elk have in many other areas within their range. We should make every effort to allow such evolution to continue without undue interference.

Supplemental feeding carried out in a one-time crash program is predicted to cost in excess of $2,000,000, with a low probability of success in terms of broad-scale effects. Such feeding would have to be initiated in early winter to provide for maximum effectiveness. Given that envrionmental impact statements must be prepared, appeals (if any) considered, and funds, feed, equipment, and personnel acquired to mount such an effort, it seems unlikely that the objectives could be met in time.

As with other forms of interference, a feeding program, regardless of its intent or success, would compromise ongoing research. The northern elk herd in Yellowstone has been the subject of a very long-term research effort; supplemental feeding--even for one year--would seriously complicate those studies by adding a variable the effects of which would be difficult, if not impossible, to assess.

Finally, one measure of our success in wildlife management consists of the degree to which we maintain wildlife populations independent of our influence. Aldo Leopold wrote that all wildlife exists at the discretion of mankind, implying that we exert indirect and direct influences over all living things on earth. Places where we must feed wildlife in order to sustain populations are places where we must settle for something less than what we have in Yellowstone. Dynamic processes take avenues which may seem cruel and wasteful by some standards, but not from the standards of stewardship of natural ecosystems. The tendency to interfere is an understandable natural response. However, in the case of our national parks and wilderness areas, this interference does not serve a useful purpose in the long-term scheme within which wildlife populations are being allowed to exist.

In summary, we recommend that feeding to mitigate the combined effects of drought and fire in the Yellowstone ecosystem should be rejected because: 1. it is contrary to the intent of management of the National Parks and the adjacent wilderness to maintain natural ecosystem processes; 2. it is unlikely to be effective and may produce effects opposite to those intended over the long term; (for example, it may enhance potential for disease transmission); 3. it is expensive to conduct; 4. it will confound long-term observations of elk responses to habitat.

Respectfully submitted,

Peter Brussard, Montana State University
Norman L. Christensen, Duke University (Chairman)
Jay Hughes, Colorado State University
Dennis Knight, University of Wyoming
G. Wayne Minshall, Idaho State University
James Peek, University of Idaho
Stephen Pyne, University of Arizona
Stephen Wells, University of New Mexico
Steven Williams, University of Wyoming
Henry Wright, Texas Technical University

Technical Advisors

James Agee, National Park Service
Jack Ward Thomas, U.S.D.A. Forest Service