

WILDLAND FIRE MANAGEMENT PLAN

FOR

National Elk Refuge

Jackson, Wyoming

March 15, 2002

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I. INTRODUCTION

The National Elk Refuge (NER) lies in the Jackson Hole area of northwestern Wyoming. On August 10, 1912, Congress established the Refuge to acquire, preserve, and manage lands for wintering elk. The elevation of the Refuge varies from 6,200 feet to 7,200 feet. The Tetons to the west rise to 13,766 feet at the summit of Grand Teton. The valley and the surrounding mountains show classic examples of glaciation. The Refuge is within Teton County and is bounded on the north by Grand Teton National Park, on the east by Bridger-Teton National Forest, and on the south by the town of Jackson (Figure 1). The Jackson National Fish Hatchery is located within the boundaries of the Refuge.

The NER was established to protect both human and elk interests in the Jackson Hole valley. In an attempt to preserve some remaining native elk winter range, maintain elk population levels, and prevent elk depredation on private hay supplies used to feed livestock during the winter, the newly established Refuge began feeding wintering elk with hay cut on its original 2,760 acres. Since establishment, the Refuge has acquired additional lands to reach its present size of 24,774 acres. Large numbers of elk reside on the Refuge between November and May and animals forage on Refuge grasses for 3-4 months, depending on weather conditions and forage availability. Supplemental feeding efforts are initiated when adequate supplies of standing forage are no longer available to elk, generally in mid-January, and feeding continues for an average 72 days. Supplemental feeding of elk has occurred in all but nine winters (10%) since 1912. Over the years, changes in Refuge management, feeding methods and sources of feed have led to the use of compressed alfalfa pellets purchased from commercial sources, a practice which began in 1973. Interest and effort to reduce the amount of supplemental feeding by increasing standing forage production has steadily grown over the past 20+ years.

This Fire Management Plan (FMP) is written to help achieve resource management goals and objectives as defined in the Operating Statements of the National Elk Refuge. These objectives will also be reflected in the Comprehensive Conservation Plan presently under development. This plan updates the 1984 Fire Management Plan and meets that commitment.

The FMP is developed to provide direction and continuity and to establish operational procedures to guide all wildland fire program activities to insure that fire is properly used as a means of habitat management. The FMP presents actions that will integrate fire management with National Elk Refuge land management goals. This plan will be evaluated and updated in future years as required by changes in policy, management actions, and priorities.

Figure 1: Map of NER

U.S. Fish and Wildlife Service policy requires that an approved Fire Management Plan must be in place for all Service lands with burnable vegetation. Service Fire Management Plans must be consistent with firefighter and public safety, protection values, and land, natural, and cultural resource management plans, and must address public health issues. Fire Management Plans must also address all potential wildland fire occurrences and may include the full range of appropriate management responses. The responsible agency administrator must coordinate, review, and approve Fire Management Plans to ensure consistency with approved land management plans.

Service policy allows for a wildland fire management program that offers a full range of activities and functions necessary for planning, preparedness, emergency suppression operations, emergency rehabilitation, and prescribed fire operations, including non-activity fuels management to reduce risks to public safety and to restore and sustain ecosystem health.

The Jackson National Fish Hatchery, a separate entity, is not required to have a Fire Management Plan because it is within the boundaries of the NER.

II. DESCRIPTION OF REFUGE

A. General Description

The 24,774 acre National Elk Refuge is located in the Jackson Hole area of northwestern Wyoming. Jackson Hole is a fault trough surrounded by an extensive system of fault block mountains. The elevation of the Refuge varies from 6,200 to 7,200 feet. The northern half of the Refuge is dissected by steep rolling hills. The southern half is primarily glacial out wash material with one resistant formation (Miller Butte) rising about 500 feet above the valley floor. The refuge relative location is depicted in the Vicinity Map (Figure 2).

Dominant areas within or adjacent to the Refuge include the Gros Ventre River along much of the northern boundary and Flat Creek, flowing east to west and nearly bisecting the refuge. Other prominent habitat types include riparian areas, re-seeded grasslands, and interspersed timber throughout the northern third of the Refuge. Grassland is the most prominent vegetative type on Refuge. The Town of Jackson borders the Refuge on the south, and the Town of Kelly is situated near its northern boundary. Lands to the south and west of the Refuge are mostly privately owned. East of the NER are lands administered by Bridger-Teton National Forest (BTNF) including the nearby Gros Ventre Wilderness. To the north and northwest of the Refuge are lands within Grand Teton National Park (GTNP). Yellowstone National Park (YNP), located some 35 miles north, does not border the NER but shares migratory and non-stationary resources with the Refuge. Ecologically, YNP as well as other federally managed and private land surrounding and including the Refuge share many biotic and abiotic elements and is part of a larger area referred to as the Greater Yellowstone Ecosystem (GYE).

Figure 2: Vicinity Map of the NER

Much of the refuge consists of grassy meadows and marshes on the valley floor with sedges, bluegrass and brome grass being important components of the communities. The flood plain forest along the Gros Ventre River contains blue spruce, narrow-leaf cottonwood, red osier dogwood, willow and balsam poplar as major species. There are extensive areas of big sagebrush and rock outcroppings. The forested areas of lodgepole pine, Douglas fir, and aspen are mostly on the northern slopes of the Gros Ventre Hills.

B. Climate

Typical of most northern Rocky Mountain valleys, Jackson Hole is characterized by long, cold winters with deep snow accumulations, and short, cool summers providing for a short growing season. Temperatures range from highs in the 80's and 90's to lows of -35Eto -40E Fahrenheit. In contrast to the widely ranging seasonal temperatures, precipitation levels remain relatively steady throughout the year, with a total annual accumulation of 17.18 inches. Average monthly precipitation levels range between one and 2 inches, with May and June being wettest and July and October driest. Jackson Hole averages 90 inches of snowfall per year, accounting for 60% of annual precipitation. Snow accumulations of 6-18 inches in southern portions of the Refuge and 48 inches in the northern half are common. Prevailing winds in the valley come from the southwest but strong winds are relatively rare.

| MONTH | MEAN DAILY MAX. TEMP. | MEAN DAILY MIN. TEMP | PRECIPITATION |
|--------------|------------------------------|-----------------------------|----------------------|
| January | 25 | 2 | 1.62 |
| February | 31 | 5 | 1.32 |
| March | 38 | 11 | 1.35 |
| April | 48 | 22 | 1.17 |
| May | 61 | 31 | 1.99 |
| June | 71 | 37 | 1.73 |
| July | 81 | 41 | 1.11 |
| August | 79 | 39 | 1.25 |
| September | 69 | 32 | 1.44 |
| October | 57 | 24 | 1.16 |
| November | 39 | 15 | 1.51 |
| December | 28 | 3 | 1.53 |

| Table 1. CLIMATIC DATA - Jackson, Wyoming | | | |
|--|----|----|-------|
| ANNUAL | 52 | 22 | 17.18 |

C. Topography

The Refuge lies in a glacial valley. Soils at the lower elevations are alluvial, generally composed of loam or sandy loam and are shallow and permeable. The soils of the higher elevations are also loamy, but mixed with considerable gravel and cobblestone on the south slopes and ridges. The northern half of the Refuge consists of steep rolling Gros Ventre Hills with some gully erosion present on the steeper slopes. The southern half is glacial out wash material, with one resistant formation (Miller Butte) rising approximately 500 feet above the valley floor. Soil erosion resulting from prescribed fire or wildland fire suppression is generally not a problem on the Refuge.

D. Vegetation

Thirty-three (33) plant community types have been identified on the National Elk Refuge. Twenty-three (23) of these are primarily indigenous plants or plant communities naturally occurring on the Refuge under current conditions and 10 are classified as "cultivated species" indicating their introduction and/or perpetuation as a result of agricultural activities. Although some have adapted to natural conditions on the Refuge, most of the cultivated species are supported by continued irrigation.

Refuge plant communities are classified under five general categories: marshland, native grassland, shrub land, woodland, and cultivated grasslands. Areas vegetated predominantly in sedges (*Carex* spp.), rushes (*Juncus* spp.), cattails (*Typha latifolia*), and bulrushes (*Scirpus* spp.) are classified as marshland and encompass about 1,263 acres. Native grasslands, including some bluegrasses (*Poa* spp.), wheat grasses (*Agropyron* spp.), and needle grasses (*Stipa* spp.), cover approximately 7,962 acres. The most abundant vegetative grouping is shrub land which covers approximately 37% (9,394 acres) of the Refuge. The primary species found in these shrub lands are sagebrush (*Artemisia tridentata* and *A. tripartite*) and willow (*Salix* spp.), although stands of snowberry (*Symphoricarpos oreophilus*), wild rose (*Rosa* spp.), and cinquefoil (*Pentaphylloides floribunda*) are also present. Douglas rabbit brush (*Chrysothamnus viscidiflorus*) is found throughout the Refuge but occurs as a subdominant. Forested areas cover 12.1% (3,091 acres) of the NER and include stands of quaking aspen (*Populus tremuloides*), narrow-leaf cottonwood (*Populus angustifolia*), Douglas fir (*Pseudotsuga mesa*) with lodgepole pine (*Pinus contorta*), and juniper (*Juniperus scopulorum*). Of these, aspen stands are most abundant, occurring in four varieties with willow, Douglas fir, pinegrass (*Calamagrostis rubescens*), and snowberry as subdominants. Engelmann spruce (*Picea engelmannii*) trees are also found scattered throughout the dominant woodland stands. Cultivated grassland fields occur in 10 varieties (2,519 acres) on the Refuge with smooth brome (*Bromus inermis*) fields being most common. Water features, roads and other administrative sites account for the remaining 545 acres.

| Table 2. Vegetation Types | |
|---------------------------|---------------|
| Vegetation | Acreage |
| Marshland | 1,263 |
| Native Grassland | 7,962 |
| Shrubland | 9,394 |
| Forest Area | 3,091 |
| Cultivated | 2,519 |
| Administrative/Misc. | 545 |
| Total | 24,774 |

Specific vegetation types by FMU are discussed in the individual description of the Fire Management Unit.

E. Noxious Weeds and Other Problem Species

Currently, there are no large monotypic stands of noxious weeds on refuge, although there are numerous scattered stands. The most common weeds are Canada thistle (*Cirsium arvense*) and musk thistle (*Carduus nutans*), with spotted knapweed (*Centaurea maculosa*) and dalmatian toadflax (*Linaria genistifolia*) beginning to show up in spots. Spotted knapweed and dalmatian toadflax are of special concern due to their ability to spread rapidly and restrict growth of other more desirable plant species. State law dictates control efforts for noxious weeds and the Refuge voluntarily participates in control programs, including the use of prescribed fire. Prescribed fire or wildfire can also increase the spread and density of some noxious weeds depending on environmental and phenological conditions.

F. Threatened, Endangered, and Special Concern Species

Four species listed under the Endangered Species Act of 1973 are found on the National Elk Refuge. Endangered species include the Peregrine falcon (*Falco peregrinus*) and whooping cranes (*Grus americana*) and threatened species include the bald eagle (*Haliaeetus leucocephalus*) and grizzly bear (*Ursus arctos horribilis*). Bald eagles are year around residents and nest in the Jackson Hole valley. Peregrine falcons are observed on the refuge with some regularity and whooping cranes are occasional visitors. While the grizzly bear is rarely seen in the valley, it is expanding its range as the Yellowstone Ecosystem population grows. The gray wolf (*Canis lupus*) was recently reintroduced to Yellowstone National Park and has since expanded in population and range. Two packs of wolves were present on the Refuge during the winter of 98-99. It is anticipated that at least one pack will use the Refuge each winter.

The Refuge will implement its fire management program within the restraints of the Endangered Species Act (1973), as amended, and will take appropriate action to identify and protect from adverse impacts any rare, threatened, or endangered species and its habitats located within the Refuge. Fish and Wildlife Service policy requires that State T&E species and species of concern be incorporated into all planning activities.

G. Birds

Approximately 200 species of birds occur on or near the refuge, including upland birds, passerine or song birds, wading birds, waterfowl, shorebirds and raptors. Riparian and wetland areas generally provide habitat for the greatest number of species and host the largest concentrations of birds. Many species such as red-tailed hawks, American white pelican, prairie falcon, and all warblers are migratory and leave the refuge during winter. Others, such as the bald eagle, Clark's nutcracker, Canada goose, trumpeter swan, common raven, sage grouse, and northern goshawk are resident species, remaining on refuge year-round.

H. Mammals

Fifty-four species of native mammals occur on refuge. A large portion of the Jackson elk herd, one of the largest elk herds in North America, and the Jackson bison herd, one of the largest free roaming bison herds, spend late fall, winter and early spring in the refuge. Moose winter in the valley and move to higher elevations during the summer. Mule deer occur in small numbers through the north end of the refuge and a small number of pronghorn antelope use the refuge as summer range. Coyotes are commonly seen on refuge and black bears are occasional visitors as are mountain lions. Other commonly occurring mammals include the red squirrel, beaver and porcupine. Mammals that are less commonly seen include the pine martin and long and short-tailed weasels. Many species of rodents, including the common Uinta ground squirrel, and six species of bats also occur on the Refuge.

I. Fish, Reptiles, and Amphibians

The number of reptile and amphibian species (9) is extremely limited because of the refuge's high elevation and cold climate. Common and western garter snakes, rubber boas, western toads, spotted, leopard land chorus frogs, and tiger salamanders occur throughout the flatland and foothill regions of the refuge.

J. Cultural Resources

Several old structures occur on the Refuge but only one falls under the jurisdiction of the National Historic Preservation Act. The Miller House, a homesteader's house located along the Elk Refuge Road in the southern portion of the Refuge, is the only historic structure on the Refuge listed in the National

Register of Historical Places. The Miller Barn, located next to the Miller House has been nominated to the National Register of Historical places.

Eight archeological sites have also been identified on the Refuge. They include teepee rings, buffalo slaughter sites and encampments. The known sites, with the exception of the teepee rings, have been investigated.

No cultural overview was completed for the Refuge as part of the CCP process.

K. Soils

The National Elk Refuge lies in a glacial valley. Soils at the lower elevations are alluvial, generally composed of loam or sandy loam and are shallow and permeable. The soils of the higher elevations are also loamy but mixed with considerable gravel and cobblestone on the south slopes and ridges. Sheet and gully erosion is present on the steeper slopes.

L. Wilderness

The National Elk Refuge does not have areas established as wilderness nor areas that meet wilderness criteria. Wilderness lands are found on neighboring jurisdictions.

M. Smoke Management / Air Quality

In general, the air quality of Jackson Hole is very high. Airborne pollutants generated by industrial activities pose no significant threats to the air quality of the valley. However, Jackson Hole is a high elevation valley surrounded by mountains and is particularly susceptible to air quality problems associated with temperature inversions. Grand Teton National Park directly north of the Refuge is Class I air. The refuge itself is in a Class II airshed.

Ambient air quality on the Refuge, although not measured or monitored, is considered very good to excellent with very low concentrations of pollutants throughout the year.

N. Facilities

The facilities found within the National Elk Refuge consist of a visitor center, office and housing complex, maintenance shop/RV pad complex, five Refuge staff houses, horse barns and storage sheds. The refuge has three metal Quonset alfalfa pellet sheds capable of storing in excess of ½ million dollars worth of feed.

The town of Jackson lies directly south of the Refuge boundary fence. This is a resort town highly dependent on visiting tourists and vacationing home owners. Extended periods of smoke tend to discourage tourism.

About a dozen multimillion dollar homes border located in the Twin Creek Subdivision and Teton Highlands Subdivision border the Refuge. These homes are typically located in grasslands similar to those on the Refuge.

Two motels and the National Museum of Wildlife Art are located on our west boundary across U.S. Highway 191.

O. Fire History and the Role of Fire on the National Elk Refuge

A. Fire History

Historical records date back to 1946. Records indicate the largest wildfire occurred in 1946 and burned 150 acres. Since 1980, when the Refuge started keeping better records, 29 wildland fires were reported, including prescribed fires, which burned 3,455.3 acres (Appendix A).

Table 3: Refuge Fire History - 1980 to 1999

| Fire Type | Number of Fires | Acres |
|--------------------|-----------------|---------|
| Wildfire | 17 | 14.8 |
| Prescribed Burning | 13 | 3,448.0 |
| Total | 30 | 3,462.8 |

During the years 1980-1999, wildland fires tended to be very small, approximately ½ acre, and all were the Class sizes A or B. Wildfires are generally suppressed within the first burning period. Most of these fires are

lightning caused and quickly reported.

Based on this history and data used by the Bridger-Teton National Forest, the primary wildfire season for the area is June 15 through September 30.

2. Role of Fire

Although fire was historically an important component of the ecosystem within the valley, it has been virtually eliminated as a naturally occurring process on the National Elk Refuge since the inception of the Refuge in 1912. Early records on Jackson Hole indicate wildfires were a common occurrence here in the late 1800's. The most obvious result of these fires was the limiting of coniferous forest and sagebrush in favor of aspen and deciduous shrubs. Active wildfire suppression since the 1930's has permitted a shift to the conifers and sagebrush at higher elevations, a reduction in the size and distribution of willows, and no appreciable change on sparsely vegetated sites at lower elevations.

For the National Elk Refuge one of the most obvious ecological and beneficial impacts of fire are the maintenance and rejuvenation of decadent aspen groves. Another important natural role of fire is its positive effect on the nutrient cycle by releasing nutrients from old vegetation growth back to the soil.

a. Vegetation and Fuels (Ecology)

Grasslands are burned primarily to manipulate vegetation and enhance biological productivity and diversity of specific organisms. The use of fire will help managers accomplish wildlife and landscape management objectives. Fire will be used to retard invasion of undesirable species and open up overgrown areas, rejuvenate grasslands, and reduce vegetative litter. It is also an important grassland management tool. Fire will be used to remove accumulations of thatch and dead plant material. This will expose the soil surfaces to sunlight and increase early spring soil temperature needed for plant growth.

Fire will be an important wetland management tool, especially in areas where marsh vegetation has become rank and is of little value to many marsh birds. Dormant season burning may be used to remove accumulation of emergent vegetation to improve nesting for marsh bird species.

b. Wildlife

Fires affect wildlife primarily by modification of habitats. Burns also increase local habitat diversity by creating a mosaic of habitats and increasing habitat interspersion and edge.

A major effect fire can have on wildlife is the destruction of nesting habitat. However, one of the primary reasons to use fire as a tool is to remove excessive litter that is of little use to nesting birds. Although fire can be detrimental to ground nesting birds, prescribed burns can be timed to avoid overlap with nesting seasons. Some species are known to successfully re-nest following disturbance.

Fire tends to have little direct effect on large mammals mainly due to their ability to move. Prescribed fire removes accumulated mats of dead vegetation making new growth more accessible and palatable to grazers. In addition, bison, elk, pronghorn, and rabbits concentrate on burned areas in North American grasslands (Lewis 1973, Evans and Probasco 1977). A wildfire in the late summer or in the fall could result in the loss of critically important winter forage for elk, bison, and bighorn sheep.

Small mammals are generally unable to run from fire and thus must otherwise be adapted to survive in a fire frequented environment. The abundance of small mammals in grassland ecosystems is evidence of their behavioral, physical, or reproductive capacity to survive in a fire environment (Bragg 1994). Searches following burning rarely find many dead small mammals. The effect of fire on small mammals is generally indirect. Populations of small mammal herbivores tend to be reduced following a burn; whereas, granivores and omnivores tend to increase (Algren 1966; Stout et al 1971; and Kaufman et al 1983). Further information concerning the effects of fire on wildlife can be reviewed in The Effects of Fire in the Northern Great Plains, prepared by Higgins, Kruse, and Piehl; and The Physical Environment of Great Plains Grasslands, by Bragg.

Reference on the effects of fire on reptiles and amphibians in grasslands is limited (Mushinsky 1985). These animals try to escape fire by going below ground when possible. However, caught above ground, the physiological and morphological status of herpetofauna makes these animals particularly susceptible to being killed in a fire, perhaps because their body temperature rapidly reaches a lethal level (Bragg 1994)

c. Air Quality

Particulate matter in smoke can impair visibility. Volume and nature of smoke produced depends upon burn size, general moisture conditions, and type of vegetation. The higher moisture content of vegetation, the more smoke produced. The impacts of smoke can be mitigated by burning with wind and unstable atmospheric conditions to loft smoke and dissipate most ground level smoke.

The presence of smoke must be expected from any type of burn, but smoke will not be an air quality problem. The majority of fuels are fine and create little smoke as these fuels are consumed rapidly. Generally, the fine grass fuels and small burn size (1-500 acres) generate low volumes of smoke for a short duration (4-5 hours), however, fires occurring in the this habitat have the potential to produce smoke for longer periods of time.

The management of smoke is incorporated into the planning of prescribed fires, and to extent possible, in the suppression of wildfires. Air quality on the Refuge is usually very good, still, sensitive areas are identified and precautions are taken to safeguard local neighbors, visitors and the communities of Jackson and Kelly. Visibility along Highway 187, located adjacent to the west boundary of the Refuge, may also be temporarily affected by smoke. Efforts will be undertaken to prevent unacceptable impacts in these areas. All prescribed burning prescriptions will be written with smoke as a primary area of concern. Smoke dispersal is a consideration in determining whether or not a prescribed fire is within prescription.

All prescribed burning requires a permit from DEQ prior to burning. All applications for permits require that a hard copy SASEM run be mailed to DEQ and that permit applications be submitted via a diskette or electronic mail to
KRAIRI@MISSC.STATE.WY.US

Burning should only take place if weather conditions allow quick dispersal of smoke.

d. Soils

Given adequate soil moisture, fire generally increases vegetative growth and plant reproduction. Plants are often greener, larger, and more vigorous. This results in improved quantity and quality of forage for elk and bison. Exposed ground and residual ash creates a darkened soil surface. Burned surfaces warm more

quickly in spring, increasing soil heating and often increase rates of microbial activity, seed germination, sprouting, and overall plant growth.

Increased soil heating could increase evaporation and transpiration, which could be detrimental to plants during warm, dry months. Generally, dark ash is broken down and the soil is shaded by new growth by midsummer.

Fire can create conditions (temporarily) where erosion is elevated by increased soil exposure. Sod usually is sufficient to hold soil in place until vegetation regrowth occurs.

Fire also can cause temporary reduction of soil microflora and microfauna, especially in wet soils. Additionally, there is a loss of residue to build organic matter.

Since only small acreage will be burned at any one time, and since the fire is not expected to completely denude the soil of vegetation, the Refuge expects to see little erosion following prescribed fires.

Refuge prescribed burn sites are on generally flat terrain and soil erosion is minimal. Wildfire could impact some steep terrain in the Gros Ventre hills. These soils are heavy clay soils and erosion would be expected to be minimal. South facing slopes in these hills generally have very light plant cover and yet erosion is minimal.

III. FIRE MANAGEMENT RESPONSIBILITIES

Wildland fire assignments are made on the basis of individual qualifications (Appendix B) and position requirements.

The National Elk Refuge does not have a dedicated Fire Management Staff. Fire Management responsibilities fall under the direction of the Assistant Manager.

All fire management duties on the Refuge are collateral duties. While the Assistant Manager is responsible for planning and implementation of an effective and safest possible fire management program at the Refuge, The Project Leader is ultimately responsible for all fire management decisions related to both wildfire and prescribed fire in the Refuge. The fire job responsibilities in the Fireline Handbook and the ones described for the positions below are to be fulfilled. A listing of staff and their qualifications can be found in Appendix B.

B. Project Leader

- ! Responsible for the overall management of the refuge including fire management.
- ! Insures fire management policies are observed.
- ! Fosters effective cooperative relations within the refuge, cooperating fire organizations, and adjoining land owners.
- ! Makes fire assignments.
- ! Approves individual prescribed fire plans.
- ! Makes Media contacts.
- ! Serves as collateral duty firefighter, as qualified.

C. Assistant Manager

Within budgetary constraints, insures sufficient collateral duty firefighters meeting Service standards are available for initial attack.

- ! Supervises the collateral duty fire staff.
- ! Responsible for planning and coordinating preparedness activities including:
 - # The Refuge fire training program.
 - # Physical fitness testing and Interagency Fire Qualification System (IFQS) data entry.
 - # Coordinating with cooperative agencies on a regional level.
 - # Revising cooperative agreements as necessary.
 - # Insuring the Step-up Plan is followed.
 - ! Prepares annual Firebase budget request and manages and tracks use of Firebase account.
 - ! Responsible for coordinating prescribed fire activities including:
 - # Reviewing proposed annual prescribed fire program to meet resource management objectives.
 - # Writing prescribed burn plans.
 - # Completing daily validation that prescribed fires are under prescription and meet all other Service policy requirements.
 - ! Maintains liaison with Regional Fire Management Coordinator and Cooperators.
 - ! Maintains fire records, reviews completed DI-1202's for accuracy and submits them to the Zone FMO, and annually reviews and updates as necessary the Fire Management Plan.
 - ! Serves as collateral duty firefighter, as qualified.
 - ! Serves as Prescribed Fire Burn Boss, as qualified

C. Refuge Mechanic

- ! Maintains engine(s) in a state of readiness.
- ! Repairs fire equipment.
- ! Supervises and trains assigned engine crew in the operation of pumps, etc., as qualified.
- ! Serves as collateral duty firefighter, as qualified.

D. Clerk

- !
- ! Serves as Dispatcher
- ! Completes all necessary administrative documents associated with fire management activities

C. Seasonal and Collateral Duty Firefighters

- !
- ! Responsible for insuring the accuracy of their own fire records, equipment, and physical conditioning.
- ! Qualifies annually by completing the appropriate fitness test by May 15, or within 2 weeks of EOD date.
- ! Maintains assigned fire equipment in ready state and using all safety gear assigned.
- ! Assists the Assistant Manager maintain fire records.
- ! Serves as collateral duty firefighter, as qualified

D. Wildfire Incident Commander (as assigned)

- !
- ! The Incident Commander (IC) is responsible for the safe and efficient suppression of the assigned wildfire.
- ! Fulfills the duties described for the IC in the Fireline Handbook.
- ! Notifies the Assistant Manager or Dispatcher of all resource needs and situational updates, including the need for extended attack.
- ! Ensures wildfire behavior is monitored and required data are collected.
- ! Ensures personnel are qualified for the job they are performing.
- ! Ensures personnel are briefed on local weather and fire behavior predictions, the effect of drought on expected fire behavior, LCES.
- ! Identifies and protects endangered and threatened species and sensitive areas according to the Fire Management Plan.
- ! Utilizes minimum impact tactics to the fullest extent possible.
- ! Ensures fire is staffed or monitored until declared out or until the management of rehabilitation has been assigned.
- ! Ensures that the fire site is fully rehabilitated or that management is notified that rehabilitation is required.
- ! Submits completed DI-1202 (wildfire report), Crew time sheets, a listing of any other fire related expenditures or losses to the Assistant Manager, and completes taskbooks within three days of fire being declared out.

E. Prescribed Burn Boss (as assigned)

- ! Writes or reviews prescribed burn prescriptions for assigned blocks.
- ! Implements approved prescribed burn plans.
- ! Assist with the administration, monitoring, and evaluation of prescribed burns.
- ! Submits completed DI-1202 (wildfire report), Crew time sheets, a listing of any other fire related expenditures or losses to the Assistant Manager, and completes taskbooks within three days of fire being declared out.

Table 4. Fire Management Staffing Needs

| Position | Minimum Number Required |
|---|--------------------------------|
| Incident Commander Type 5 (ICT5) | 1 |
| Prescribed Fire Burn Boss Type 3 (RXB3) | 1 |
| Engine Boss (ENGB) | 1 |
| Engine Operator (ENOP) | 2 |
| Fire Fighter Type 2 (FFT2) | 2 |

Note: A firefighter can be qualified in more than one position.

H. Cooperators

Along with other land management agencies, the Service has adopted the National Interagency Incident Management System (NIIMS) Wildland and Prescribed Fire Qualification Subsystem Guide, PMS 310-1 to identify minimum qualification standards for interagency wildland and prescribed fire operations. PMS 310-1 recognizes the ability of cooperating agencies at the local level to jointly define certification and qualification standards for wildland fire suppression. Under that authority, local wildland fire suppression forces will meet the standards established for their agency or department. All personnel participating in prescribed fire management activities must meet Service fitness and training standards.

IV. COMPLIANCE WITH FISH AND WILDLIFE SERVICE POLICY

This plan meets National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) compliance. Regulations published in the Federal Register (62 FR 2375) January 16, 1997, categorically excludes prescribed fire when used for habitat improvement purposes and conducted in accordance with local and State ordinances and laws. Wildfire suppression actions are categorically excluded, as outlined in 516 DM 2, appendix 1. An Environmental Assessment that addresses the use of fire to achieve management objectives has been completed and a Finding of No Significant Impact has been signed by the Regional Director (Attachment 1).

The U.S. Fish and Wildlife Service (Service) policy requires that all refuges with burnable vegetation develop a Fire Management Plan. The plan must detail wildfire suppression policies, the use of prescribed fire for attaining resource management objectives, and fire program operational procedures. This plan meets those requirements and provides fire management guidelines for the National Elk Refuge.

The Fire Management Plan is one of several step down management plans developed from land and resource management goals and objectives identifying the specific actions to be taken to achieve Refuge objectives.

Authorities for implementing this plan are found in:

1. Protection Act of September 20, 1922 (42 Stat. 857; 16 USC 594).
Authorizes the Secretary of the Interior to protect from fire, lands under the jurisdiction of the Department directly or in cooperation with other Federal agencies, states, or owners of timber.
2. Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856, 1856a and b). Authorizes reciprocal fire protection agreements with any fire organization for mutual aid with or without reimbursement and allows for emergency or major disaster by direction of the President.
3. National Wildlife Refuge System Administration Act of 1966 (80 Stat. 927; 16 USC 1601) 668dd-668ee). Defines the National Wildlife Refuge System as including wildlife Refuges, areas for the protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas and waterfowl production areas.
4. Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 USC 2201). Provides for reimbursement to state or local fire services for costs of firefighting on federal property.
5. Departmental Manual (620 DM-1). Defines Department of Interior Fire Management Policies.

6. U.S. Fish and Wildlife Service Manual (621 FW). Defines Fish and Wildlife policies based on Departmental Manual 620 DM.
7. U.S. Fish and Wildlife Service Fire Management Handbook 1998 (621 FW). Provides general planning and operational guidance for fire management programs in the Fish and Wildlife Service.
8. Economy Act of June 30, 1932. Authorizes contracts for services with other Federal agencies.
9. Disaster Relief Act of May 22, 1974 (88 Stat. 143;42 U.S.C. 5121). Authorizes Federal agencies to assist state and local governments during emergency or major disaster by direction of the President.
10. Wildfire Suppression Assistance Act of 1989 (Pub. L. 100-428, as amended by Pub. L. 101-11, April, 1989).
11. Federal Grants and Cooperative Act of 1977 (Pub. L. 95-244, as amended by Pub. L. 97-258, September 13, 1982, 96 Stat. 1003 31 U.S.C. 6301-6308).

A. National Elk Refuge Mission Statement

The stated mission of the National Elk Refuge is "to provide, preserve, restore, and manage winter habitat for the nationally significant Jackson Elk Herd and habitat for endangered species, birds and other big game animals, and provide compatible human benefits associated with its wildlife and wildlands." As a component of the National Wildlife Refuge System, the refuge is directed to fulfill not only its own specific directives but also the broader mission of the System which was established "for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (United States 1997). To these ends several goals and objectives have been developed by the NER to more specifically define the management direction of the Refuge.

B. National Elk Refuge Goals and Objectives

Goal I. Preserve, restore, and enhance in their natural ecosystems, all species of animals and plants that are endangered or threatened with becoming endangered. (Endangered Species Act of 1973)

OBJECTIVES - Preserve and enhance federally listed endangered and threatened species and their habitats, and monitor their populations. Species include bald eagles, peregrine falcons, and whooping cranes.

Goal II Preserve and protect archaeological and historic sites.

OBJECTIVES - Preserve and maintain the Miller House and integrity of the site which is listed on the National Register of Historic Places and is protected by the National Historic Preservation Act. Maintain the structure through adaptive use as a living quarters, thus preserving and stabilizing the building.

Protect and preserve Refuge archaeological sites such as the Goetz site and other sites identified presently, or in the future, under the Archaeological Resources Protection Act of 1979 and the Antiquities Act of 1906.

Goal III Perpetuate the migratory bird resource.

OBJECTIVES - Manage wetlands including development and maintenance of migratory and nesting habitat for swans, ducks, and Canada geese. A species of high concern is the trumpeter swan where emphasis is placed on nesting requirements and brood rearing, as well as on winter habitat protection.

Preserve and enhance habitat for all other migratory birds including shorebirds, marsh birds, raptors, passerines, etc.

Goal IV Manage elk and elk winter range - Manage the Refuge, consisting of 24,774 acres, as elk winter range by providing an adequate natural and supplemental winter food supply for a maximum of 7,500 elk for a six-month period, generally November to May. Supplemental feed is provided when natural forage is not sufficient.

OBJECTIVES

1. Land Acquisition - Acquire private lands within the Executive Order boundaries of the Refuge identified for acquisition to prevent development of these lands and provide additional elk winter range.
2. Range Management and Forage Production - Produce as much standing elk forage as possible thus enhancing Refuge carrying capacity and reducing need for supplemental feeding. Accomplished through irrigation, seeding, prescribed burning, and water development.
3. Supplemental Feeding - Supplemental feeding elk when necessary to maintain elk numbers and prevent excessive mortality. Reasons for supplemental feeding:
 - a. Forage unavailable by utilization or severe weather conditions.
 - b. Excessive elk numbers for limited range and carrying capacity.
 - c. Get better elk distribution throughout range to utilize more natural

forage and reduce disease potentials.

d. Protect winter range from over use and destruction.

e. Political/social considerations.

4. Monitoring Elk Numbers - Winter "a maximum of 7,500" elk on feed on the Refuge. This objective is a result of a 1974 Cooperative Agreement between the USFWS/National Elk Refuge and the Wyoming Game and Fish Department (WGFD). This objective is arrived at as a result of a combination of factors:

a. "Historic" average population levels since the Refuge began in 1912.

b. Winter range carrying capacity and disease transmission potential.

c. Cost of supplemental feeding.

d. WGFD objective levels for the Jackson Elk Herd unit.

5. Control of Elk Numbers - Control of elk through planned harvest levels in cooperation with the WGFD on all herd segments, including a hunting program on the Refuge.

6. Research Studies - Conduct scientific work to learn more about elk, their summer and winter ranges, migrations, habitat, controls, diseases, needs, etc.

7. Cooperative Elk Management - Conduct management and research efforts with other agencies, i.e. National Park Service, Wyoming Game and Fish Department, US Forest Service, etc.

Goal V Preserve a natural diversity and abundance of local and residential fauna and flora on Refuge lands (biodiversity). The Refuge manages and protects diverse habitat for a variety of other highly visible and important species of animals and plants.

OBJECTIVES - Provide a safe, healthy habitat for a variety of wildlife including species of special recognition. Species include moose, mule deer, bighorn sheep, antelope, bison, coyotes, ravens, prairie falcons, sandhill cranes, long-billed curlews, sage grouse, golden eagles, and osprey.

Manage and maintain a variety of diversity of vegetation habitat types from forested land to riparian and marsh areas. One important objective, for example, is to maintain aspen stands and promote aspen regeneration.

Goal VI Provide opportunities for scientific and professional services.

OBJECTIVES - Provide a site for scientific study and research of animal and plant species and their relationships within the ecosystem.

V. REFUGE FIRE MANAGEMENT OBJECTIVES

A. Introduction

The Fire Management Plan will provide direction in achieving many of the Refuge goals and objectives. The guidance it provides will enhance natural ecosystems to support threatened or endangered species and reduce fuel loads to protect archeological and historical sites and nearby residents. Improved grassland stand conditions will increase nesting habitat for migratory waterfowl, and most important, achieve Goal IV, Objective 2. (Refuge managers are attempting to maximize standing forage production and decrease the necessity of supplemental feeding while concurrently attempting to reduce herd size. As stated in the goals and objectives, supplemental feeding is not the primary aim of the NER but rather a tool to maintain the Jackson Elk Herd when natural forage is insufficient). Using fire as a management tool in conjunction with other management strategies will aid in reducing or eliminating supplemental feeding in all but the most severe winters.

Operating Statements, operational plans, Executive Orders, and laws pertaining to the Refuge include objectives which pertain to fire management. For example, safety objectives are:

1. To provide a working tool for both employees and visitors when conducting business on this facility.
5. To provide a safe and healthful environment for both employees and visitors to the facility.
6. Identify procedures for handling situations of an emergency nature.
7. To identify availability of equipment, its location and sources of help.
8. Identify individual responsibilities.
9. To inform the staff of health and safety requirements.
10. To promote a healthy safety attitude.

As previously stated, the mission of the National Elk Refuge is "to provide, preserve, restore, and manage winter habitat for the nationally significant Jackson Elk Herd and habitat for endangered species, birds and other big game animals, and provide compatible human benefits associated with its wildlife and wildlands."

The goal of wildland fire management is to plan and make decisions that help accomplish the mission of the National Wildlife Refuge System. That mission is to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. Fire management objectives (standards) are used in the planning process to guide management to determine what fire management responses and activities are necessary to achieve land management goals and objectives.

The primary goal is to provide for firefighter and public safety, property, and natural resource values. Service policy and the Wildland Fire Policy and Program Review direct an agency administrator to use the appropriate management strategy concept when selecting specific actions to implement protection and fire use objectives. The resulting Appropriate Management Response are specific actions taken in response to a wildland fire to implement protection and fire use objectives. With an approved Fire Management Plan, the Refuge staff may use wildland fire in accordance with local and State ordinances and laws to achieve resource management objectives (habitat improvement).

B. Considerations

The following considerations influenced the development of the Refuge's fire management goals and objectives.

1. Wildland fire is a part of the National Elk Refuge habitat management program.
2. An uncontrolled wildfire has the potential to negatively impact resources and values at risk on and off the Refuge.
3. Positive or negative effects of prescribed fire on vegetation, and wildlife depend on burning conditions and species involved.
4. Use of "minimum tool" concept will minimize resource damage.
5. Rapid rates of spread and response time of suppression forces can create suppression problems and increase the likelihood of escape onto adjacent lands or wildfires entering the refuge.

It is the intention of the fire management program to support the management objectives and operational goals of the Refuge by protecting resources and habitats from the undesirable effects of an uncontrolled wildfire. The fire management program will also include the use of prescribed fire to restore and enhance refuge habitats and promote natural diversity.

C. Fire Management Goals for the National Elk Refuge

1. Protect life, property, habitat, and other resources from unwanted fire.
2. Use wildland fire as a resource management tool to accomplish management goals and objectives.

D. Fire Management Objectives for the Refuge

11. Firefighter and public safety is the priority objective of the program. All Fire Management activities will reflect this commitment.
2. To protect life, natural and cultural resources, real and private property from wildland fires that start on Service lands.
3. Safely suppress all wildland fires using strategies and tactics appropriate to safety considerations, values to be protected, and in accordance with Service policy.
4. Restore and perpetuate native wildlife species by maintaining a diversity of plant communities through use of fire.
5. Manage all wildland fires in a cost-effective manner.
6. Invigorate desirable marsh, grass, forb, shrub and tree species, and improve nutrition and production of vegetation to be used by wildlife.
7. Educate the public regarding the role of prescribed fire within the Refuge.
8. Manage of wildland fire to achieve identified management goals.
9. Prevent unplanned human-caused ignitions.
10. Restore and rehabilitate resources lost or damaged by fire or suppression activities.
11. Manage all wildland fires using the Incident Command System.

E. Effects of Fire Management Activities on Refuge Objectives

Wildland fire is a natural part of the environment. It is expected that fire will be an effective tool to remove dead vegetation that hinders new growth and will create favorable conditions for the establishment of desirable forbs and grasses in the monotypic stands of sagebrush and elsewhere. Smoke from wildland and prescribed fire activities could have short-term impacts on the surrounding

community. The impacts are expected to be short-lived, and impacts to public health will be addressed and mitigation measures identified in each prescribed burn plan. A successful prescribed program could have positive effects on the community, as well. Sound fuel management practices, especially near the town of Jackson Hole and along Refuge boundaries will create changes in fuel continuity that would halt or reduce the rate of spread for an advancing wildfire that originated in Refuge boundaries and protect the Refuge from wildfires that start outside the boundaries. The results would also increase the safety of firefighters and the public.

VI. FIRE MANAGEMENT STRATEGIES

A. Introduction

It is the intention of the U.S. Fish and Wildlife Service to continue to suppress all wildland fire occurring within the National Elk Refuge, including naturally occurring lightning ignitions. Management ignited prescribed fire will be utilized under controlled conditions and defined weather variables.

Fire suppression strategies for the Refuge will place primary emphasis on the development of a fire suppression program that is capable of suppressing unwanted wildland fire quickly, while minimizing resource damage from both the fire and suppression efforts. Fire suppression capabilities will be enhanced by hazard fuel reduction projects and fire prevention programs. Hazard fuel reduction will primarily consist of the systematic application of prescribed fire to gradually reduce accumulations of dead fuels in timber stands, utilizing fires of varying intensities under controlled conditions.

Every wildfire on or threatening Service lands will be managed using the appropriate management response concept. The level of response will be consistent with land use objectives, and will be executed to minimize suppression cost and resource damage. The appropriate action may include high intensity direct efforts, lower intensity indirect efforts, or surveillance to ensure confinement within a designated area. A Wildland Fire Situation Analysis (WFSA) (Appendix C) will be prepared to govern suppression actions for all fires when it is determined that initial attack efforts will be unsuccessful.

B. Strategy

The basic fire management strategy for the Refuge will be to manage each wildland fire using the Appropriate Management Response Concept. The primary suppression strategy used will be direct attack. However, there may be occasions when taking direct attack action on a high intensity, rapidly spreading wildfire would jeopardize firefighter safety and would not be appropriate; also all-out direct suppression actions may be too costly and often ineffective until the fire

reaches ridge tops or other barriers. In these cases, a strategy employing indirect attack tactics will be employed utilizing natural and human-made features as wildfire control points.

During the early and late season when fire danger is low a surveillance strategy may be all that is required to ensure confinement within a designated area. An example is a lightning fire in an area surrounded by snow banks that does not threaten life or property, is not causing any adverse resource damage, and will go out naturally. Suppression actions, other than monitoring, will not be required for this type fire as long as management objectives are being met. Criteria for confinement strategy are:

1. Normally applied to spring and fall fires (before 5/1 and after 10/1).
2. Burning Index 0-15 (3-day average).
3. Wind speed 0-10 mph.
4. No weather changes predicted.
5. No air stagnation alert.
6. Fire is restricted to one area and low potential for spreading out of the unit.

Overall wildfire suppression strategies are outlined below and will be employed to meet refuge fire management objectives:

1. Conduct all fire management programs in a manner consistent with applicable laws, policies, and regulations.
2. All wildfires will be managed using the appropriate management response concept. Suppression strategies and tactics will be unique to each wildland fire, predicated by weather parameters, suppression costs, fuel conditions, safety considerations, availability of resources, and location of the fire in relation to Refuge and other threatened values at risk. It may be necessary to employ an indirect strategy utilizing existing fuel breaks, such as roads, within close proximity of the fire, in conjunction with burnout operations.
3. Suppress all unplanned ignitions in a safe and cost-effective manner consistent with resources and values to be protected. If it becomes necessary to prioritize between property and cultural/natural resources, the response will be based on the relative values to be protected, commensurate with fire suppression costs.
4. Minimum impact strategies and tactics will be used when possible.

However, utilization of heavy equipment remains an option for control of high intensity fires and fires threatening critical values such as human life, historical structures, endangered species, cultural resources, private property, and the like, with appropriate Line Officer approval.

5. Prescribed fire will be used to manipulate degenerated grasslands, help open up wetlands and timber, and as a tool for hazard fuel reduction to compliment resource management objectives.
6. Initiate cost-effective fire monitoring which will tell managers if objectives are being met. Monitoring information will be used to refine burn prescriptions to better achieve objectives.
7. Fire management planning, preparedness, suppression, prescribed fire operations, monitoring and research will be conducted on an interagency basis with involvement of all partners, when appropriate.

C. Constraints

Constraints on the refuge fire management strategies include the following:

1. Smoke management must be carefully considered for any prescribed burn and will be addressed in all prescribed burn plans.
2. Suppression resources will be assigned to all wildland fires occurring on the Refuge until mopped-up and declared safe to

demobilize.

3. The use of heavy equipment, such as dozers, in and around sensitive areas must have approval of the Refuge Manager or his/her acting.

D. Rationale

1. The Appropriate Management Response concept and the use of prescribed fire to achieve management goals and objectives will provide for the safety of firefighters and the public, the protection and enhancement of natural resources, and provide for the protection of other values at risk in an efficient, cost-effective manner.
2. Wildfires occurring in grassy and timbered areas could quickly exceed the capability of the Refuge staff to suppress the fire. Consequently, MOUs must be maintained with local rural fire districts and cooperators so that assistance can be sought in the event the refuge staff cannot contain the wildfire.
2. Reduced fuel loading in some areas will contribute to firefighter safety and reduce the possibility of damage to resources and other values at risk resulting from a wildfire. When it is deemed necessary or desirable to reduce fuel loading, fuel reduction projects will compliment resource management objectives.

VII. FIRE MANAGEMENT UNITS (FMUs)

The guidance provided in this section will pertain to both wildfire and prescribed fire. The National Elk Refuge will be divided into four Fire Management Units delineated by the predominate vegetation (Forest, Brush, Marsh, Grassland) within the unit (Figure 3).

Fire management units (FMUs) are areas within or near the Refuge that have common fire management strategies. Although the Refuge has been divided into four Fire Management Units, the units based on fuels and expected fire behavior, they have similar characteristics and require similar efforts when suppressing a wildfire or conducting a prescribed burn. Generally, direct attack will be the most effective control strategy, except during periods of drought and extremely high wind when rates of spread may be too great, making indirect attack necessary.

Table 5: Fire Management Units

| Fire Management Unit | Acres |
|----------------------|-------|
| FMU 1 - Forests | 2224 |
| FMU 2 - Grasslands | 8175 |

| | |
|---------------|------|
| FMU 3 - Marsh | 6200 |
| FMU 4 - Brush | 8175 |

All lands within the Refuge boundaries are classified as full suppression. MIST will be incorporated into suppression strategies whenever possible.

Figure 3: Fire Management Units

Management considerations for each FMU are discussed below:

A. Fire Management Unit 1: Forest

This Unit primarily comprises timbered riparian areas along the Gros Ventre River. The topography is generally flat, however, the northern half of the Refuge consists of steep rolling Gros Ventre Hills with some gully erosion present on the steeper slopes. Due to the lack of access to some areas due to soil moisture and the terrain, direct attack using engines may be difficult.

3. Fire Management Objectives

1. Ensure the safety of Service staff and the visiting public.
2. Minimize the damage of fire and fire suppression efforts on Refuge resources by using Minimum Impact Suppression Tactics.
3. Prevent fires from escaping Refuge boundaries onto adjacent private lands.
4. Utilize prescribed fire when it will be useful in achieving Refuge wildlife and habitat objectives. On average, treat 20 acres annually.
5. Respond to wildfires in a cost-effective manner consistent with the values at risk.

4. Unit Strategies

The full range of fire suppression strategies may be considered when suppressing a fire in this unit. Strategies will vary depending on safety considerations, burning conditions, location of the wildfire, time of day and year, cost, smoke problems, political concerns, and current and predicted weather and fire behavior. Over the past 20 years the National Elk Refuge has experienced approximately 17 wildfires burning approximately 15 acres. Few of these fires have occurred in this FMU.

All fires will be sized up by the responding Refuge fire personnel and a decision made as to whether the responding initial attack personnel can contain and control the fire. If there is any doubt, then assistance should immediately be requested from local fire departments or interagency resources.

3. Unit Tactics

- a. The number of people dispatched to the fire will depend on the time of year and burning conditions at time of ignition. At a minimum, two people will be dispatched and the Incident Commander will determine additional needs.
- b. The main method of suppressing a wildfire will be direct attack. The use of existing barriers to conduct burn-out operations will be

used to control fires where direct attack is not feasible. Also existing barriers will be utilized when managing a fire under a confinement strategy. In cases where the wildfire is only to be monitored, no direct suppression action should be necessary. An observer will monitor the fire to insure it behaves as planned, meets management objectives, and will not escape predetermined boundaries.

- c. Fires will receive aggressive suppression action if they appear to be a threat to escape the Refuge.

4. Fuels

Two predominant NFFL Fuel Models that can be used to predict fire behavior are present:

Fuel Model 8 Timber - Describes areas where slow burning ground fires with low flame length are generally the case, although the fire may encounter an occasional “jackpot” or heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperatures, low humidity and high winds do the fuels pose fire hazards.

Fuel Model 10 Timber - Describes areas where fires burn in the surface and ground fuels with greater fire intensity than the other timber litter models. Dead-down fuels include greater quantities of 3-inch or larger limb wood resulting from over maturity or natural events that create a large load of dead material on the forest floor. Crowning out, spotting and torching of individual trees are more frequent in this fuel situation, leading to potential fire control difficulties.

5. Fuel Loading and Unusual Fire Behavior

Fuel loading in this unit falls within the normal range. Fire Weather is collected from weather stations located within the Jackson Hole Valley and maintained by the National Park Service. A Burning Index (BI) reading of 40 or greater indicate that very high to extreme burning conditions are possible where direct attack may not be feasible. Prescribed burns should not be conducted when the BI exceeds 34 or when the Palmer Drought Index is - 4 or lower.

6. Expected Fire Effects

Expected fire effects are discussed in Section II - Role of Fire and Appendix L.

7. Limits to Strategy and Tactics

- a. The use of mechanical equipment will not be permitted on Service lands except to protect life or improvements such as buildings or bridges, and only with the approval of the Project Manager or his/her acting.
- b. Hand line construction which causes soil disturbance is to be avoided.
- c. Aerial retardants and foams will not be used within 300 feet of any waterway as described in the Guidelines for Aerial Delivery of Retardant or Foam near Waterways.
- d. Files and records of cultural resources and the Regional Fire Archeologist should be consulted before major ground disturbing suppression action takes place and during the planning of prescribed burns.

B. Fire Management Unit 2: Grasslands

The Grassland Unit primarily is located to the east of the Gros Ventre River and rises toward the ridge on the east side of the valley. In addition to grasses and forbs, aspen stands are present on the slopes.

b. Fire Management Objectives

- b. Ensure the safety of Service staff and the visiting public.
- c. Minimize the damage of fire and fire suppression efforts on Refuge resources by using Minimum Impact Suppression Tactics.
- d. Prevent fires from escaping Refuge boundaries onto adjacent private lands.
- e. Utilize prescribed fire when it will be useful in achieving Refuge wildlife and habitat objectives. On average, treat 1,000 acres annually.
- f. Respond to wildfires in a cost-effective manner consistent with the values at risk.

c. Unit Strategies

Main method of suppressing a wildfire will be direct attack. The use of existing barriers to set backfires will be used to halt the spread of a wildfire where direct attack is not feasible. Also existing barriers will be

utilized when managing a fire under a confinement strategy.

All fires will be sized up by the responding Refuge fire personnel and a decision made as to whether the responding initial attack personnel can contain and control the fire. If there is any doubt, then assistance should immediately be requested from local fire departments or interagency resources.

3. Unit Tactics

- a. The number of people dispatched to the fire will depend on the time of year and burning conditions at time of ignition. At a minimum, two people will be dispatched and the Incident Commander will determine additional needs.
- b. Fires will receive aggressive suppression action if they appear to be a threat to escape the Refuge.

4. Fuels

Two predominant NFFL Fuel Models that can be used to predict fire behavior are present:

Fuel Model 1 Grass - Describes areas dominated by short grass, such as saltgrass. Rate of spread of 78 chains/hour with flame lengths of 4 feet are possible under moderate conditions. This fuel model occurs on low river terraces.

Fuel Model 3 Tall Grass - Describes areas dominated by grass or grasslike vegetation averaging 3 feet in height. This would include cured stands of cattail and patches of basin wildrye. Rate of spread of 104 chains/hour with flame lengths of 12 feet are possible under moderate conditions. This fuel model occurs around developed wetlands and some naturally occurring wetlands.

5. Fuel Loading and Unusual Fire Behavior

Fuel loading in this unit falls within the normal range. Fire Weather is collected from weather stations located within the Jackson Hole Valley and maintained by the National Park Service. A Burning Index (BI) reading of 40 or higher indicates that unusual fire behavior may occur. Prescribed burns should not be conducted when the BI exceeds 34 or when the Palmer Drought Index is - 4 or lower.

6. Expected Fire Effects

Expected fire effects are discussed in Section II - Role of Fire and Appendix L. It is anticipated that fire under the right conditions will rejuvenate decadent stands of aspen that are present in this unit.

7. Limits to Strategy and Tactics

- a. The use of mechanical equipment will not be permitted on Service lands except to protect life or improvements such as buildings or bridges, and only with the approval of the Project Manager or his/her acting.
- b. Hand line construction which causes soil disturbance is to be avoided.
- c. Aerial retardants and foams will not be used within 300 feet of any waterway as described in the Guidelines for Aerial Delivery of Retardant or Foam near Waterways.
- d. Files and records of cultural resources and the Regional Fire Archeologist should be consulted before major ground disturbing suppression action takes place and during the planning of prescribed burns.

C. Fire Management Unit 3: Marsh

The Marsh Unit primarily is located on the flood plain of the Gros Ventre River. Wildfire frequency in this unit is low. The unit is in close proximity to a major north-south highway, the Town of Jackson Hole, and other areas of development.

b. Fire Management Objectives

- b. Ensure the safety of Service staff and the visiting public.
- c. Minimize the damage of fire and fire suppression efforts on Refuge resources by using Minimum Impact Suppression Tactics.
- d. Prevent fires from escaping Refuge boundaries onto adjacent private lands.
- e. Utilize prescribed fire when it will be useful in achieving Refuge wildlife and habitat objectives. On average, treat 1,000 acres annually.
- f. Respond to wildfires in a cost-effective manner consistent with the values at risk.

c. Unit Strategies

Main method of suppressing a wildfire will be indirect attack. The use of existing barriers to set backfires will be used to control fires where direct

attack is not feasible. Also existing barriers will be utilized when managing a fire under a confinement strategy.

All fires will be sized up by the responding Refuge fire personnel and a decision made as to whether the responding initial attack personnel can contain and control the fire. If there is any doubt, then assistance should immediately be requested from local fire departments or interagency resources.

3. Unit Tactics

- a. The number of people dispatched to the fire will depend on the time of year and burning conditions at time of ignition. At a minimum, two people will be dispatched and the Incident Commander will determine additional needs.
- b. Fires will receive aggressive suppression action if they appear to be a threat to escape the Refuge.

4. Fuels

The predominant NFFL Fuel Model that can be used to predict fire behavior is:

Fuel Model 3 Tall Grass - Describes areas dominated by grass or grasslike vegetation averaging 3 feet in height. This would include cured stands of cattail. Rate of spread of 104 chains/hour with flame lengths of 12 feet are possible under moderate conditions.

5. Fuel Loading and Unusual Fire Behavior

Fuel loading in this unit falls within the normal range. Fire Weather is collected from weather stations located within the Jackson Hole Valley and maintained by the National Park Service. A Burning Index (BI) reading of 40 or greater indicate that very high to extreme burning conditions are possible where direct attack may not be feasible. Prescribed burns should not be conducted when the BI exceeds 34 or when the Palmer Drought Index is -4 or lower.

6. Expected Fire Effects

Expected fire effects are discussed in Section II - Role of Fire and Appendix L.

7. Limits to Strategy and Tactics

- a. The use of mechanical equipment will not be permitted on Service lands except to protect life or improvements such as buildings or bridges, and only with the approval of the Project Manager or his/her acting.
- b. Aerial retardants and foams will not be used within 300 feet of any waterway as described in the Guidelines for Aerial Delivery of Retardant or Foam near Waterways.
- c. Files and records of cultural resources and the Regional Fire Archeologist should be consulted before major ground disturbing suppression action takes place and during the planning of prescribed burns.

D. Fire Management Unit 4: Brush

The Brush Unit primarily is located on the bench-land and rocky ridges. The primary species in this unit are sagebrush and willow, although stands of snowberry, wild rose, and cinquefoil are also present. Douglas rabbit brush is found throughout the unit but occurs as a subdominant. Currently, this unit is primarily a monoculture dominated by sagebrush. It is the intent of Management to increase the presence of grasses and forbs by opening the stands of sagebrush using management ignited prescribed fire.

1. Fire Management Objectives

- a. Ensure the safety of Service staff and the visiting public.
- b. Minimize the damage of fire and fire suppression efforts on Refuge resources by using Minimum Impact Suppression Tactics.
- c. Prevent fires from escaping Refuge boundaries onto adjacent private lands.
- d. Utilize prescribed fire when it will be useful in achieving Refuge wildlife and habitat objectives. On average, treat 100 acres annually.
- e. Respond to wildfires in a cost-effective manner consistent with the values at risk.

2. Unit Strategies

Main method of suppressing a wildfire will be indirect attack. The use of existing barriers to set backfires will be used to control fires where direct attack is not feasible. Also existing barriers will be utilized when managing a fire under a confinement strategy.

All fires will be sized up by the responding Refuge fire personnel and a

decision made as to whether the responding initial attack personnel can contain and control the fire. If there is any doubt, then assistance should immediately be requested from local fire departments or interagency resources.

3. Unit Tactics

- a. The number of people dispatched to the fire will depend on the time of year and burning conditions at time of ignition. At a minimum, two people will be dispatched and the Incident Commander will determine additional needs.
- b. Fires will receive aggressive suppression action if they appear to be a threat to escape the Refuge.

4. Fuels

The predominant NFFL Fuel Models that can be used to predict fire behavior are:

Fuel Model 4 Shrub - Describes areas in which fast spreading fires involve the foliage and live and dead fine woody material. Stands of mature shrubs, 6 feet or more tall, are included. This fuel model occurs in scattered patches of mature stands of willow in the flood plain.

Fuel Model 6 Shrub - Describes areas where the shrub layer carries the fire at wind speeds greater than 8 mile/hour. Fire drops to the surface layer at lower wind speeds or openings in the stand. This fuel model occurs in extensive upland areas containing big sagebrush and several other species of desert shrubs. Little if any fine dead fuels may be present, and the shrub layer will only carry a fire under moderate to severe wind speeds.

5. Fuel Loading and Unusual Fire Behavior

Fuel loading in this unit falls within the normal range. Fire Weather is collected from weather stations located within the Jackson Hole Valley and maintained by the National Park Service. A Burning Index (BI) reading of 40 or greater indicate that very high to extreme burning conditions are possible where direct attack may not be feasible. Prescribed burns should not be conducted when the BI exceeds 34 or when the Palmer Drought Index is - 4 or lower.

6. Expected Fire Effects

The use of fire is expected to set back the sagebrush to provide openings for forbs and grasses to become established. Expected fire effects are discussed in Section II - Role of Fire and Appendix L.

7. Limits to Strategy and Tactics

- a. The use of mechanical equipment will not be permitted on Service lands except to protect life or improvements such as buildings or bridges, and only with the approval of the Project Manager or his/her acting.
- b. Hand line construction which causes soil disturbance is to be avoided.
- c. Aerial retardants and foams will not be used within 300 feet of any waterway as described in the Guidelines for Aerial Delivery of Retardant or Foam near Waterways.
- d. Files and records of cultural resources and the Regional Fire Archeologist should be consulted before major ground disturbing suppression action takes place and during the planning of prescribed burns.

VIII. WILDLAND FIRE PROGRAM

A. Safety

The safety of firefighters and the public is the first priority. Persons engaged in fire suppression activities are exposed to a high element of risk. The Refuge Manager and fireline supervisors must make every effort to reduce the exposure to risk and enhance performance. One way is through formal and on-the-job training and improved physical fitness. The Service has adopted the training and fitness standards established in 310-1, and all firefighters must meet these and other standards established by the Service to participate in fire management activities.

Other actions to improve safety include:

- a. Public access will be restricted during wildfire suppression and prescribed burn operations.
- b. Weather will be watched carefully, especially when conditions are unstable and fire behavior can be extreme. Suppression crew members must be aware of weather conditions and potential fire behavior.
- c. Crews will be briefed on escape routes and safety zones, and lookouts will be assigned.
- d. All fire suppression and prescribed burn personnel will be provided and use approved personal protective equipment (PPE).
1. Smoke from wildland fires is a recognized health concern for wildland firefighters. Incident commanders and Prescribed Burn Bosses must plan to minimize exposure to heavy smoke by incorporating the recommendations outlined in the publication Health Hazards of Smoke (Sharky 1997).
- f. During wildfires, the local law enforcement agency having jurisdiction is responsible for managing traffic hazards from smoke. The Incident Commander will alert sheriff or state police if fire or smoke is expected to impact county roads or state highways.
- g. Suppression forces will maintain communications between themselves, cooperators, and with dispatch.
- h. Extra precautions will be taken when fires are burning directly under power lines where the potential exists for electricity to arc to the ground in heavy smoke.

B. Fire Prevention

Objectives of the wildfire prevention program are to:

1. Reduce the threat of human caused fires through visitor and employee education.
2. Integrate the prevention message into interpretive programs conducted or sponsored by the Refuge.

Fire prevention on the refuge will be stressed mainly as a routine safety precaution, with employees being made aware of when high fire danger is likely to occur, and what precautions can be taken during regular working operations to prevent fires. Field vehicles will carry suppression tools during the fire season.

Site preparation will be completed around burn units not bordered by defensible barriers or other fuel breaks, and will vary depending on fuel types, values at risk, and other factors. Site preparation requirements will be included in the individual prescribed burn plan.

Smoking, open fires and Refuge access may be closed by the Manager during periods of extreme fire danger. Notices will be posted at appropriate entrances, roads and through local radio and news releases.

The Manager will coordinate with other State and Federal Land Management Agencies in periods of extreme fire danger.

C. Fire Season

A typical fire season extends from June through mid-September. However, the wildfire season in dry years can run from June through November.

D. Fire Behavior

Wildfire behavior is variable depending on the burning conditions as reflected by the Burning Index (BI). Factors used to calculate BI are relative humidity, air temperature, fuel type, fuel moisture, wind speed, slope, aspect, time of day, and season. BI's are obtained by calling Grand Teton National Park who has access to the WIMS database. Burning Indexes of 40 or greater in the Refuge fuel types indicate that very high to extreme burning conditions are possible where direct attack may not be feasible.

On-site predictions of estimated fire behavior can be made with the same inputs and provide outputs of rate of spread, fire line intensity, heat per unit area, and flame length through the use of nomagrams and other prediction tools.

E. Preparedness.

The Fish and Wildlife Service has minimum training requirements for all fire positions. The Service is a member of the National Wildfire Coordinating Group (NWCG) and accepts its standards for interagency operations. There is required refresher training for all personnel that are involved with wildland fire activities. These requirements are found in the Service Fire Management Handbook under Training, Qualifications and Certification. Only employees meeting current fitness, training, and experience requirements will be dispatched to fires. Employees not meeting these requirements may assist in support capacities, but are not permitted on the fire line.

Annual fire readiness standards require Personal Protective Equipment (PPE) for each employee assigned fire fighting duties. This equipment will be issued yearly prior to the onset of fire season. Also, all fire fighting equipment, such as engines and slip-ons, must be ready prior to the onset of fire season.

MOUs must be maintained annually with Local Fire Districts and other cooperators.

1. Training and Qualifications

Fish and Wildlife Service policy sets training, qualification and fitness requirements for all wildland firefighters and prescribed fire positions. All personnel involved in fire management functions will be provided with the training required to meet Service qualification standards for the duties they are expected to perform. Interagency training opportunities will be utilized whenever possible.

a. Training

The Regional Office will pay for most approved fire training if the following criteria are met:

1. Participant completes and submits to the Zone FMO a National Wildfire Coordinating Group Interagency Training Nomination form (NFES 2131), complete with supervisory approval and an estimated cost of training, travel and per diem prior to the commencement of training.
2. The training is approved by the Zone FMO, or in some cases the Regional Fire Management Coordinator.
3. Upon completion of the training, a copy of the Certificate of Completion and a copy of the travel voucher are sent to the Budget Assistant for

b. Annual Refresher Training

All personnel involved in Fire Management activities are required to participate in eight hours of fire management refresher training annually in order to be qualified for fire management activities in that calendar year. Refresher training will concentrate on local conditions and factors, the Standard Fire Orders, LCES, 18 Situations, and Common Dominators. NWCG courses Standards for Survival, Lessons Learned, Look Up, Look Down, Look Around, and others meet the firefighter safety requirement; but, efforts will be made to vary the training and use all or portions of other NWCG courses to cover the required topics. **Fire shelter use and deployment** under adverse conditions if possible, **must** be included as part of the annual refresher.

c. Physical Fitness

All personnel involved in fire management activities will meet the fitness standards established by the Service and Region. At this point in time, firefighters participating in wildfire suppression must achieve and maintain an **Arduous** fitness rating. Firefighters participating in Prescribed Burns must achieve and maintain a **Moderate** rating. Information found in Appendix F provides specific instructions to administer the tests, a health screening questionnaire to aid in assessing personal health and fitness of employees prior to taking the test, an informed consent form, and safety considerations. A trained and qualified American Red Cross First Responder (or equivalent) who can recognize symptoms of physical distress and perform the appropriate first aid procedures must be on site during the test.

Wildland fire fitness tests shall not be administered to anyone who has obvious physical conditions or known heart problems that would place them at risk. All individuals are required to complete a pre-test physical activity readiness questionnaire prior to taking a physical fitness test. They must read and sign the Par-Q health screening questionnaire, an informed consent form (Appendix G). If an employee cannot answer NO to all the questions in the PAR-Q health screening questionnaire, or is over 40 years of age, unaccustomed to vigorous exercise, and testing to achieve a Moderate or Light rating, the test administrator will recommend a physical examination. As noted below, all individuals over 40 years of age **must** receive an annual physical **prior** to physical testing.

d. Physical Examinations

In keeping with Service Policy, a physical examination is required for all new permanent employees and all seasonal employees assigned to arduous duty as fire fighters prior to reporting for duty. A physical examination may be requested for a permanent employee by the supervisor if there is a question about the ability of an employee to safely complete one of the work capacity tests. All permanent employees over 40 years of age who take the Pack or Field Work Capacity Test to qualify for a wildland or prescribed fire positions are required to have an annual physical examination before taking the test.

2. Annual Refuge Fire Management Activities

Table 6: Annual Refuge Fire Management Activities

| ACTIVITY | MONTH> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--|--------|---|---|---|---|---|---|---|---|---|----|----|----|
| Update Interagency Fire Agreements/AOP's | | x | | | | | | | | | | | |
| Winterize Fire Mgmt. Equip. | | | | | | | | | | | x | | |
| Inventory Fire Engine & Cache | | | | x | | | | | | | | | |
| Complete Training Analysis | | | x | | | | | | | | | | |
| Annual Refresher Training | | | | | | x | | | | | | | |
| Annual Fitness Testing | | | | | | x | | | | | | | |
| Pre-Season Engine Preparation | | | | | | x | | | | | | | |

| | | | | | | | | | | | | |
|--|--|--|---|---|---|---|---|---|---|--|--|--|
| Weigh Engines to verify GVW Compliance | | | | | x | | | | | | | |
| Prescribed Fire Plan Prep. | | | x | | | | | | | | | |
| Review and Update Fire Management Plan | | | | x | | | | | | | | |
| Prepare Pre-season Risk Analysis | | | | | x | | | | | | | |
| Live Fuel Moisture Sampling | | | | | | x | x | x | x | | | |

Activities should be completed prior to the end of the month that is indicated.

3. Emergency Preparedness

Prescribed fire activities will not be conducted when the National Preparedness is at Levels IV or V, without the concurrence of the Northern Rockies Coordination Group and the approval of the Regional Fire Management Coordinator. All other preparedness activities will be in accordance with the **Refuge Step-up Plan** (Appendix H).

F. Normal Unit Strength

1. Engines, tools, and other equipment

Engines are the primary initial attack resource on the Refuge because of the predominance of fine fuels and the availability of access roads. Earth moving equipment is available. However, it will only be used with the approval of the Refuge Manager and when no other alternatives exist. A listing of equipment and cache supplies can be found in Appendix N.

Engines will be fully prepared for fire suppression activities prior to the established fire season and after the possibility for a hard freeze is past, usually in May. All other equipment will be stored at Refuge headquarters and may be kept in the equipment storage building during the winter

months.

2.

Personnel

A listing of required positions for wildfire management activities can be found in Section III. Current staffing status can be found in Appendix B.

G. Severity Funding and Drought Indicators

Severity funding may be essential to provide adequate fire protection for the Refuge during periods of drought, as defined by the Palmer Drought Index or other appropriate drought indicator. Severity funds may be used to hire additional firefighters, extend firefighter seasons, or to provide additional resources.

Severity funding is different from Emergency Pre-suppression funding. Emergency Pre-suppression funds are used to fund activities during short-term weather events and increased human activity that increase the fire danger beyond what is normal. Severity funding is requested to prepare for abnormally extreme fire potential caused by unusual climate or weather events such as extended drought. Severity funds and emergency pre-suppression funds may be used to rent or preposition additional initial attack equipment, augment existing fire suppression personnel, and meet other requirements of the Step-up Plan.

Emergency Pre-suppression and Severity funds will be requested in accordance with the guidance provided in the Service's Fire Management Planning Handbook. As a general guide, Severity funding will be requested if a severe drought is indicated by a Palmer Drought Index reading of -4.0 or less or a Keetch-Byram Drought Index of 600 or greater and a long-range forecast calling for below average precipitation and/or above average temperatures. Drought Indices can be located at: <http://www.boi.noaa.gov/fwweb/fwoutlook.htm>

H. Detection

The Refuge relies on neighbors, visitors, cooperators, and staff to detect and report fires. In addition, the Step-up Plan provides for increased patrols by Refuge personnel during periods of very high and extreme fire danger.

When wildfire is reported on the Refuge, each fire-qualified employee at the scene must take immediate action and do the following:

1. Warn or evacuate people who may be in danger.
2. Call for necessary backup and take suppression action.
3. Try to prevent fire from spreading until help arrives.

There may be occasions when unqualified personnel discover a wildland fire. When this occurs, the employee should report the fire and request assistance before taking action to suppress or slow the spread of the fire. If the fire poses an

imminent threat to human life, the employee may take appropriate action to protect that life before requesting assistance. The unqualified personnel will be relieved from direct on-line suppression duty or reassigned to non-fireline duty when qualified initial attack forces arrive.

I. Suppression.

1. General

Service policy requires the Refuge to utilize the ICS system and firefighters meeting Service standards when responding to fires occurring on Refuge property. All suppression efforts will be directed toward safeguarding life while protecting the natural and cultural resources and private and public property from harm. Mutual aid resources responding from Cooperating Agencies must meet the standards of their Agency. Mutual aid resources will report to the IC (in person or by radio) and receive their duty assignment. Mutual aid forces will be first priority for release from the fire. If individuals arrive at a fire to assist but are not members of a fire department or qualified for any type of fire suppression they are not to be used as firefighters. If additional firefighters are needed, they will be ordered through the Teton Dispatch Center.

2. Initial Reporting and Dispatching

All fires occurring within or adjacent to the Refuge are to be reported to Refuge headquarters. **The person receiving the report will be responsible for implementing the Fire Dispatch Plan (Appendix I) and assume duties of Fire Dispatcher until relieved or released.**

For local fires, the **Fire Dispatcher** will stay on duty until: (1) all Refuge resources return; (2) relieved by another dispatcher; or (3) advised by IC that he/she can leave.

The IC will place all resource orders through the Dispatcher, and specify what is needed, when it is needed, and where it is needed. The **Fire Dispatcher** will be responsible for coordinating the filling and delivery of any resource orders made by the IC for all operational and logistical needs, including engines, aircraft, tools, supplies, and meals. The Dispatcher will promptly determine if the resource orders can be filled or procured locally and notify the IC. **If a resource order cannot be filled locally, the Dispatcher will place the order with the Teton Interagency Dispatch Center (739-3300).** The Zone FMO may generally be able to assist with ordering resources from outside the area.

Upon arriving at the fire and prior to deploying, all resources will report (either in person or by radio) to the IC.

Requests for assistance by cooperators on fires not threatening the Refuge must be made to the Refuge Manager or his/her designee. Only qualified and properly equipped resources meeting Service standards will be dispatched to fires off Refuge.

3. Communications

Appendix J contains a listing of communication frequencies commonly used and Appendix K contains a listing of Fire Cooperators for the National Elk Refuge.

4. Initial Attack

At a minimum, two fire fighters will be dispatched to a reported wildland fire. When the Burning Index is 40 or higher, a second initial attack unit will be dispatched.

All fires occurring on the Refuge and staffed with Service employees will be supervised by the highest qualified firefighter on the scene. This individual will serve as the Initial Attack Incident Commander (ICT4) and will be responsible for managing all aspects of the fire. If a qualified IC is not available, one will be ordered through the Teton Interagency Dispatch Center.

Upon arriving at the scene, the IC will:

- a. Size-up the fire and provide a report to the Dispatcher as soon as possible;
- b. Determine the resources needed for the fire;
- c. Advise the Dispatcher of resource needs on the fire;
- d. Brief fire fighters on the strategy and tactics to be used, weather conditions, expected fire behavior, and LCES;
- e. Take appropriate suppression action.

The basic fire management strategy for the Refuge will be to use the appropriate management response concept to suppress all wildfires commensurate with values at risk. Strategies employing a range of suppression options may be considered by the Incident Commander. The primary suppression strategy employed will be direct attack. However, there may be occasions when direct attack on high intensity, rapidly spreading wildland fire would jeopardize firefighter safety and not be appropriate. In these cases indirect attack will be employed utilizing natural and human-made features as wildfire control points. Minimum impact suppression techniques (MIST) will be utilized, whenever possible.

The matrix in Table 7 is intended to illustrate some of the options available to an Incident Commander.

Table 7: Appropriate Management Response

| SITUATION | STRATEGY | TACTIC |
|---|--|---|
| 1. Wildland fire on Refuge lands which does not threaten life, natural or cultural resources or property values. | Restrict fire within defined boundaries established either prior to the fire or during the fire. | 1. Holding at natural and man-made barriers. 2. Burning out and mop-up as necessary. 3. Observe and patrol. |
| 1. Wildland fire on Service property with low values to be protected. 2. Wildfire burning on to Service lands. 3. Escaped prescribed fire entering another unit to be burned. | Take suppression action, as needed, which can reasonably be expected to check the spread of fire under prevailing conditions. | 1. Direct and indirect line construction 2. Use of natural and man-made barriers. 3. Burning out. 4. Patrol and mop-up of fire perimeter. |
| 1. Wildland fire that threatens life, property or sensitive resources. 2. Wildland fire on Service property with high values to be protected. 3. Observed and /or forecasted extreme fire behavior. | Aggressively suppress the fire using direct or indirect attack methods, holding the fire to the fewest acres burned as possible. | 1. Direct or indirect line construction. 2. Engine and water use. 3. Aerial retardant. 4. Burn out and back fire. 5. Mop-up all or part of the fire area. |

5. Escaped Fires/Extended Attack

The Refuge is a signer of the Wyoming Interagency Cooperative Fire Protection Agreement, a mutual aid agreement for wildfire suppression. If a wildfire cannot be controlled with initial attack forces, the unit will utilize a decision making process, the Wildland Fire Situation Analysis, that evaluates alternative management strategies against selected environmental, social, political, and economic criteria (Appendix C).

The IC will notify the Dispatcher or Refuge Manager, in turn will notify the Zone FMO, whenever it appears a fire will escape initial attack efforts, escape Service lands, or when fire complexity will exceed the capabilities of command or operational forces. The Zone FMO will provide assistance, as available, with the implementation of the extended attack operations including:

- b. Assisting the Refuge Manager complete the WFSA (Wildland Fire Situation Analysis) (Appendix C).
- c. Assisting the Refuge Manager complete the Delegation of Authority (Appendix C), if needed.
- d. Ordering of appropriate resources through the Dispatch Center.

. Mop up Standards and Emergency Stabilization and Rehabilitation

The IC will be responsible for mop-up and mitigation of suppression actions taken on Refuge fires. The mop-up standards established in the Fireline Handbook will be followed. Refuge fires will be patrolled or monitored until declared out.

Prior to releasing all firefighters from a wildland fire the following actions will be taken:

All trash will be removed.

Firelines will be refilled and waterbars added if needed.

Hazardous trees and snags felled and the stumps cut flush.

Overturnd sod resulting from plowing must be rolled back with a grader or by hand and compacted to preserve native grass root stock.

Other emergency stabilization and emergency rehabilitation measures may be taken in accordance with Chapter 5 of the Fire Management Handbook. Briefly:

Emergency stabilization is the use of appropriate emergency stabilization techniques in order to protect public safety and stabilize and prevent further degradation of cultural and natural resources in the perimeter of the burned area and downstream impact areas from erosion and invasion of undesirable species. The Incident Commander may initiate emergency stabilization actions before the fire is demobilized, as delegated by the Agency Administrator, but emergency stabilization activities may be completed after the fire is declared out.

Rehabilitation is the use of appropriate rehabilitation techniques to improve natural resources as stipulated in approved Refuge management plans and the repair or replacement of minor facilities damaged by the fire.

Total "rehabilitation" of a burned area is not within the scope of the Emergency Rehabilitation funding. Emergency Rehabilitation funding can be used to begin the rehabilitation process if other funding is committed to continue the rehabilitation throughout the life of the project (beyond the initial three years of Emergency Rehabilitation funding). Major facilities are repaired or replaced through supplemental appropriations or other funding.

Because of the emergency nature of the fire event, the emergency stabilization section of the **Emergency Stabilization and Rehabilitation Plan (ESR Plan)** must be developed expeditiously and is frequently developed by a local unit or designated burned area ESR team. The rehabilitation section of the ESR Plan is not considered an emergency, and is developed as other Refuge land use plans. The Agency Administrator is responsible for preparing all ESR Plans. In order to be funded, ESR Plans must meet resource management objectives and be approved by the Refuge Manager and the Regional Director.

J. Records and Reports

The incident commander (IC) on a wildland fire or the prescribed fire burn boss on a prescribed burn will be responsible for the completion of a DI-1202 Fire Report as well as Crew Time Reports for all personnel assigned to an incident and return these reports to the Assistant Manager within three days of the fire being declared out. The IC or burn boss should include on the DI-1202 a list of all expenses and/or items lost on the fire and a list of personnel assignments. The narrative portion of the DI-1202 will address the specifics of the fire, actions taken and outcomes from those actions. The Assistant Refuge Manager will ensure the DI-1202 is submitted to the Zone FMO for input into the Fire Management Information System (FMIS) within 10 days of the fire being declared out. The Zone FMO will return the DI-1202 to the Refuge for their permanent files. A formal review will be conducted for all serious injuries and losses of significant resources.

IX. PRESCRIBED FIRE MANAGEMENT

The Refuge will use prescribed fire as a tool in two management areas - resource management and hazardous fuel reduction. Resource management prescribed burning is used to restore, create, and/or maintain a diversity of plant communities in order to restore and perpetuate native plant and wildlife species. The Refuge may use hazardous fuel reduction prescribed burns within or near Refuge development zones, sensitive resources, and boundary areas to reduce the risk from wildfire damage. To the greatest extent possible, hazardous fuel reduction prescribed fires will only be used when they complement resource management objectives.

An approved Prescribed Burn Plan constitutes the authority to burn, pending approval of all required permits. Elements contained in the Prescribed Burn Plan are firm limits, but may be modified with adequate justification and the concurrence of the Refuge Manager. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Actions taken in compliance with the approved Prescribed Fire Plan will be fully supported, but personnel will be held accountable for actions taken which are not in compliance with the approved plan. Prescribed burns will not be conducted if the proposed burn is out of prescription.

The appropriate authorities, such as; the State of Montana, County Sheriff's Office, and responsible fire departments will always be notified by the Burn Boss prior to any prescribed burning. Private landowners adjacent to the proposed burn will also be notified. The required notifications will be listed in each burn plan.

A. Primary Objectives of the Prescribed Fire Program

The primary objectives of the prescribed fire Program are as follows:

1. Improve of forage production and rangeland quality for wintering elk.
2. Improve waterfowl habitat.
3. Maintain suitable resting, feeding, and nesting for migratory birds.
4. Remove of dead vegetation that hinders new growth.
5. Release nutrients to enrich the soil.
6. Promote the establishment of desirable grasses and forbs in monotypic stands of sagebrush.
7. Increase microbial activity by increasing soil temperatures.

B. Purpose

The use of fire is only one of many tools that will be used to manipulate vegetation to produce desired species composition and density.

The primary objective of prescribed burning on the Refuge is to increase forage production and improve rangeland quality on elk winter range. Fire can be used to eliminate the buildup of dense litter that accumulates over a period of time. Fire will stimulate new vegetative growth by reducing the accumulations of litter and releasing nutrients. On feed ground areas where large numbers of elk concentrate during the winter, fire speeds up the decomposition rate of the large feces buildup and may also play an important role in controlling some disease organisms.

Without periodic fire or other disturbance, aspen clones will degenerate and finally die-out. Fire will top-kill decadent stands of aspen and stimulate new growth.

Burning will remove accumulated mats of duff and litter and rapidly release

nutrients back to the soil and increase microbial activity by increasing soil temperature, and retard and/or remove competition by undesirable plant species that shade the ground.

C. Selection of Treatment Areas

Areas to be burned will be selected based on habitat improvement needs. Each area must be examined closely to determine its present condition and the future desired condition, and if fire is the method to make the change. Various research data on burning are available to determine fire effects on individual plant species and general habitats (Appendix L). The control of woody vegetation and noxious weeds in favor of more desirable plant species is also a possibility. Each situation must be examined for its own merits with the following criteria being used:

1. What is the purpose of the treatment or expected results?
2. Will fire produce the desired results or are there other methods to be considered?
3. What are the undesirable impacts of burning?
4. Do benefits of manipulation through fire outweigh undesirable impacts? Are there mitigation measures?
5. Can the treatment area be burned considering site location, personnel and equipment available?
6. Can the burn be done in a safe and timely manner?

The prescribed burn plan will contain all details regarding each individual burn site.

D. Responsibilities and Planning

Usually, prescribed burns will be conducted in the spring and fall. The Refuge Manager is responsible for identifying units or areas in need of treatment, and for developing resource and treatment objectives for those units/areas based on Refuge resource management goals and objectives. The Burn Boss is responsible for determining if prescribed fire can be utilized to meet the treatment objectives.

The Refuge Manager will develop a burn prescription and plan which will accomplish the desired objectives. All planned ignitions will be accomplished using qualified personnel.

Contingency planning is an integral part of the prescribed fire planning process, and begins with the first visit to the burn unit. It is important to identify in advance, circumstances or conditions that may require the implementation of the contingency plan. Each prescribed burn plan will include a section that thoroughly addresses the actions to be taken in the event a prescribed burn must be suppressed or managed as a wildfire.

The contingency plan will identify:

8. The individual(s) who has the authority to activate the contingency plan.
9. Clearly defined conditions (“trigger points”) that indicate the contingency plan should be activated.
10. A listing of those to be notified or contacted.
11. Who assumes the duties of the Incident Commander and what are the roles of others.
12. The location of values at risk and other resources requiring protection.
13. The preferred strategies and tactics.
14. The location of containment lines or natural fuel breaks outside the burn unit.
15. The location of water refill points, staged equipment, etc.
16. Contingency forces (Type, number, location).

A prescribed burn will not be implemented unless all contingency forces are confirmed as being on-site or in standby status, as specified in the plan.

E. Complexity.

Prescribed fires on the Refuge may vary from low to moderate complexity as determined by the Fish and Wildlife Service Complexity Analysis found in the Fire Management Handbook. Basic monitoring protocols are included in Appendix M.

F. Monitoring and Evaluation

1. Introduction

Past monitoring and evaluation of prescribed fires have been limited due to funding and staffing limitations. Pre-burn evaluation was limited to general photographs and/or qualitative evaluation of fuel conditions and green up conditions. Burn day evaluations documented weather (many times not on site) and limited documentation of fire behavior. Subjective measurements (visual) such as the percent of fuel consumed were also made. Post burn evaluation was limited to subjective qualitative estimates of species response and effectiveness in achieving objectives.

Monitoring is as important as the burn itself if the objectives are to be reached. The prescribed burn plan will spell out the monitoring protocols. The best way to monitor a prescribed burn is to use a standard method to document conditions before, during and after a prescribed burn, and use the same method on each unit or burn. Methods to consider include; vegetative transects, photo points, and weather and fire behavior monitoring and recording other pertinent data the day of the burn such as smoke dispersal, etc. If the objective is to alter vegetation composition,

robel readings and species make-up are important data to collect. The establishment of photo points will provide physical evidence to support data. The compiling of data will provide management with a clearer understanding of the conditions that must be present in order to achieve desired results.

Fire monitoring protocols for the Region or Service will be used at the National Elk Refuge (Appendix M), and will be identified in the burn plan. When the fire management program proposed by this plan is fully funded, a more quantitative monitoring program will be implemented. Protocols will be established to determine if burn objectives are being met and long-term monitoring will be conducted to determine vegetation responses.

2. **First Order Fire Effects Monitoring Program**

- a. **Environmental Conditions** will be recorded at the site periodically prior to ignition and hourly during the burn. Conditions to be evaluated include air temperature, RH, and wind speed and direction.
- b. **Fuel moisture(s)** will be measured or estimated using tables, charts, or other prediction system (BEHAVE).
- c. **Fire Behavior** such as flame length and rates of spread will be recorded.
- d. **Post fire effects** will be measured or estimated. These effects include scorch height, percent of area burned, percent of fuel consumed - based on fuel (time-lag) classification, amount of duff removed, etc.

G. **Potential Impacts**

An escaped prescribed burn going off Refuge onto adjacent property could have potential negative impact that could lead to adverse public opinion that could severely impact the prescribed burn program. To reduce the possibility of an escape, weather conditions and fire behavior will be closely monitored and adequate holding forces will be on the lookout for problems. Also, contingency and holding plans, which addresses how to control the escaped fire, must be developed as part of the prescribed burn plan. Smoke issues and other impacts to public health will be addressed and mitigation measures identified in each prescribed burn plan.

A successful prescribed program could have positive effects, as well. Sound fuel management practices, especially near the town of Jackson Hole and along Refuge boundaries could halt or reduce an advancing wildfire that originated outside Refuge boundaries.

H. Reporting and Documentation.

Individual prescribed burn plans will be the primary documents used to record prescribed burn information. The burn plan will be used to document personnel, assignments, costs, fire behavior, weather, and burn critique information. Prescribed burns will also be documented on DI-1202's and submitted to the Assistant Refuge Manager within three days after the completion of the project.

X. AIR QUALITY/SMOKE MANAGEMENT GUIDELINES.

The area is in compliance with the national air quality standards as established by the EPA. The management of smoke is incorporated into the planning of prescribed fires, and to the extent possible, in suppression of wildfires. Sensitive areas will be identified and precautions taken to safeguard visitors and local residents. Smoke dispersal is a consideration in determining whether or not a prescribed burn is within prescription.

The Refuge's fire management activities which result in the discharge of pollutants (smoke, carbon monoxide, particulate, and other pollutants from fires) are subject to and must comply with all applicable federal, State, and local air pollution control requirements as specified by Section 118 of the Clean Air Act, as amended 1990. The Wyoming Department of Environmental Quality (DEQ), Division of Air Quality, administers air quality program in Wyoming. The State requires that a permit be issued by the DEQ prior to burning. A permit application (Appendix Q) must be completed and submitted by electronic mail to KRAIRI@MISSC.STATE.WY.US. A hard copy of a SASEM run must be mailed to the DEQ at 122 W. 25th Street Cheyenne, WY 82002 .

Smoke from wildland fires is a recognized health concern for wildland firefighters. Incident commanders and Prescribed Burn Bosses must plan to minimize exposure to heavy smoke by incorporating the recommendations outlined in the publication Health Hazards of Smoke (Sharky 1997).

XI. FIRE RESEARCH AND MONITORING

As indicated in the previous section, the Refuge will collect data and monitor the success or failure of their burns to assure they accomplish objectives. A great deal of research relating to the effects of wildland fire have been conducted in the Greater Yellowstone Area.

The effects of fire on the Refuge's plants and animals need to be better understood. Through research and careful application of fire, the data collected can provide managers with a better understanding of the natural ecological effects of fire, and the information needed to refine prescriptions to meet resource objectives. Wildland fire related research will be conducted on an interagency basis with involvement of all partners, when

appropriate.

Fire behavior data will be collected on all fires occurring on the Refuge. This data, along with any information gathered through research studies, will be used to improve the effectiveness of the fire management program

XII. PUBLIC SAFETY

Public safety is a major factor in designing and conducting refuge operations. This is especially true during prescribed burns and wildfire suppression operations. All employees must think of safety in all aspects of the fire management program.

Firefighter and public safety will always take precedence over property and resource protection during any fire management activity. For the safety of the public, the fire scene will be kept clear of unauthorized people. The responsibility for managing public safety lies with the Incident Commander (IC) for wildland fire or Burn Boss for prescribed fire. Public safety considerations will be included as part of burn plans.

The greatest threat to public safety from Refuge prescribed fires is to people off refuge. The main concern is from smoke drifting across Highway 187, reducing visibility and causing automobile accidents. Wildfire can also be a threat to visitors that could become trapped by a fast-moving fire. Specific mitigation actions will be spelled out in Incident Action Plans or prescribed burn plans.

XIII. PUBLIC INFORMATION AND EDUCATION

Informing the public is an important part of the fire management program and the Fish and Wildlife Service mission. Information and education are critical to gaining public support for the Refuge's fire management program. There are several different aspects to this task.

A. Wildland Fire Suppression

During wildfire the Refuge Manager is responsible for providing fire information to the public. Also, the public must be kept apprised of burning conditions and the potential of wildfire occurrence. The Refuge Manager may delegate this responsibility to a Fire Information Officer, Public Information Officer, or other qualified individual.

B. Prescribed Fire

Informing the public is a vital component of the prescribed fire program. Areas that have been burned will present opportunities for the public to actually see the effects of fires, and offer staff members an opportunity to explain the purpose of the burns to the public. The following can be used to promote the prescribed fire program to the public:

1. Talk to local schools and students and groups that visit the Refuge.
2. Attendance at local volunteer fire department meetings.
3. Include prescribed fire messages in interpretive publications.
4. Personal contacts with bystanders during prescribed burns.

XIV. ARCHEOLOGICAL/CULTURAL/HISTORIC RESOURCES

Fire Management activities at the Refuge will be implemented in accordance with the regulations and directions governing the protection of cultural resources as outline in Departmental Manual Part 519, Code of Federal Regulations (36 CFR 800), the Archeological Resources Protection Act of 1979, as amended, and the Archeological and Historic Preservation Act of 1974. All fire management activities will be in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended.

Several old structures occur on the Refuge but only one falls under the jurisdiction of the National Historic Preservation Act. The Miller House, a homesteader's house located along the Elk Refuge Road in the southern portion of the Refuge, is the only historic structure on the Refuge listed in the National Register of Historical Places. The Miller Barn, located next to the Miller House has been nominated to the National Register of Historical places.

Eight archeological sites have also been identified on the Refuge. They include teepee rings, buffalo slaughter sites and encampments. With the exception of stone circles, the sites have been investigated.

No cultural overview has been completed for the Refuge as part of the CCP process.

Impacts to archeological resources by fire resources vary. The four basic sources of damage are (1) fire intensity, (2) duration of heat, (3) heat penetration into soil, and (4) suppression actions. Of the four, the most significant threat is from equipment during line construction for prescribed fires or wildfire holding actions (Anderson 1983).

The following actions will be taken to protect archeological and cultural resources:

- ! Files and records of cultural resources should be consulted by the staff when planning prescribed burns, developing pre-attack plans, and performing other preparedness actions. The potential for adverse impacts to cultural resources will be evaluated prior to prescribed burning and in the selection of fire suppression

strategies during wildfires.

- ! The Regional Fire Archeologist will be contacted during the development phase of the burn plan writing process when cultural resources are suspected or known to exist in the project area.
- ! The Wyoming State Historic Preservation Officer (SHPO) will be contacted by the Regional Fire Archeologist when it is known a planned management action may impact archeological or cultural resources. The SHPO has 30-days to respond. The Refuge will follow any programmatic archeological/cultural resources management plan that may be implemented in the future.
- ! Low impact wildfire suppression tactics (cold-trailing, use of foam/wet-water/water, use of natural and manmade barriers, change in vegetation, mowing, etc.) will be used to the fullest extent possible. Line construction for prescribed fire activities will follow the same principle. Maps indicating the known location of significant cultural resources will be consulted prior to laying out burn units, and whenever possible, before constructing fireline to halt the spread of a wildfire. Prescriptions for management ignited prescribed fires will take into account the presence of known cultural sites. Cooler fires with short residence time will be used in areas containing known cultural sites, whenever possible.
- ! Known surface sites will be marked, protected, and excluded from the burn, if possible. Foam will not be used in areas known to harbor surface artifacts.
- ! The use of mechanized equipment within the refuge must be approved by the Refuge Manager on a fire by fire basis, and the use these resources will be considered in the approval process for any planned management actions. When the use of heavy equipment is authorized, its use will be monitored.
- ! The location of sites discovered as the result of fire management activities will be reported by the Refuge Manager to the Regional Fire Archeologist.
- ! Rehabilitation plans will address cultural resources and will be reviewed by the Regional Fire Archeologist.

XV. ANNUAL FIRE PLAN REVIEW

The fire management plan will be updated as major policy decisions and land acquisitions are made. At a minimum, this plan will be reviewed once a year by the Assistant Refuge Manager to maintain the integrity of the plan. Amendments to the fire management plan itself will be made as needed by sending them to the Regional Office. Minor changes to the appendices, such as personnel changes, can be made at the Refuge and attached to the plan during this yearly review process without involvement of the Regional Office.

A. Wildfire

Wildfires will be critiqued by the IC and the results documented in the DI-1202. The Regional Fire Management Coordinator and/or Zone FMO will conduct formal critiques in the event of:

1. Significant injury, accident, or fatality.
2. Significant property or resource damage.
3. Significant safety concerns are raised
4. An extended attack is necessary.

B. Prescribed Fire

Prescribed fires will be critiqued by the Burn Boss and documented in the prescribed burn plan. The Regional Fire Management Coordinator and/or Zone FMO will conduct formal critiques in the event of:

1. Significant injury, accident or fatality
2. An escaped prescribed fire occurs
3. Significant safety concerns are raised
4. Smoke management problems occur

XVI. CONSULTATION AND COORDINATION

The Fire Management Plan will be made available to those that have expressed an interest or may be utilized for assistance under an MOU.

Consultation and coordination were conducted with the following agencies and organizations in the development of the Fire Management Plan and/or associated Environmental Assessment:

USDA Forest Service - Bridger-Teton National Forest
Department of Interior - Grand Teton National Park, Yellowstone National Park
Town of Jackson, Wyoming
Teton County, Wyoming
Wyoming State Forestry Division
Wyoming Game and Fish Department
Wyoming State Clearinghouse (All State of Wyoming agencies)
Wyoming Wildlife Federation
Wyoming Department of Environmental Quality
Jackson Hole Conservation Alliance

APPENDIX C.

WILDLAND FIRE SITUATION ANALYSIS

Incident Name:

Jurisdiction:

Date and Time Completed:

This page is completed by the Agency Administrator(s).

Section I, WFSA Information Page

- A. Jurisdiction(s): Assign the agency or agencies that have or could have fire protection responsibility, e.g., USFWS, BLM, etc.
- B. Geographic Area: Assign the recognized "Geographic Coordination Area" the fire is located in, e.g., Northwest, Northern Rockies, etc.
- C. Unit(s): Designate the local administrative unit(s), e.g., Hart Mountain Refuge Area, Flathead Indian Reservation, etc.
- D. WFSA #: Identify the number assigned to the most recent WFSA for this fire.
- E. Fire Name: Self-explanatory.
- F. Incident #: Identify the incident number assigned to the fire.
- G. Accounting Code: Insert the local unit's accounting code.
- H. Date/Time Prepared: Self-explanatory.
- I. Attachments: Check here to designate items used to complete the WFSA. "Other could include data or models used in the development of the WFSA. Briefly describe the "other" items used.

| I. Wildland Fire Situation Analysis | | |
|--|---------------------------|--|
| To be completed by the Agency Administrator(s) | | |
| A. Jurisdiction(s) | B. Geographic Area | |
| C. Unit(s) | D. WFSA # | |
| E. Fire Name | F. Incident # | |
| G. Accounting Code: | | |
| H. Date/Time Prepared _____ @ _____ | | |
| I. Attachments | | |
| - Refuge Matrix/Analysis * | _____ | |
| - Risk Assessment/Analysis * | _____ | |
| Probability of Success * | _____ | |
| Consequences of Failure * | _____ | |
| - Maps * | _____ | |
| - Decision Tree ** | _____ | |
| - Fire Behavior Projections * | _____ | |

| | | |
|---|-------|--|
| - Calculations of Resource Requirements * | _____ | |
| - Other (specify) * Required ** Required by FWS | _____ | |

This page is completed by the Agency Administrator(s).

Section II. Objectives and Constraints

- A. Objectives: Specify objectives that must be considered in the development of alternatives. Safety objectives for firefighter, aviation, and public must receive the highest priority. Suppression objectives must relate to resource management objectives in the unit resource management plan.

Economic objectives could include closure of all or portions of an area, thus impacting the public, or impacts to transportation, communication, and resource values.

Environmental objectives could include management objectives for airshed, water quality, wildlife, etc.

Social objectives could include any local attitudes toward fire or smoke that might affect decisions on the fire.

Other objectives might include legal or administrative constraints which would have to be considered in the analysis of the fire situation, such as the need to keep the fire off other agency lands, etc.

- B. Constraints: List constraints on wildland fire action. These could include constraints to designated wilderness, wilderness study areas, environmentally or culturally sensitive areas, irreparable damage to resources or smoke management/air quality concerns. Economic constraints, such as public and agency cost, could be considered here.

II.**Objectives and Constraints**

To be Completed by the Agency Administrator(s)

A. Objectives (Must be specific and measurable)*1. Safety*

- Public

- Firefighter

*2. Economic**3. Environmental**4. Social**5. Other***B. Constraints**

This page is completed by the Fire Manager and/or Incident Commander.

Section III. Alternatives

- A. Wildland Fire Management Strategy: Briefly describe the general wildland fire strategies for each alternative. Alternatives must meet resource management plan objectives.
- B. Narrative: Briefly describe each alternative with geographic names, locations, etc., that would be used when implementing a wildland fire strategy. For example: "Contain within the Starvation Meadows' watershed by the first burning period."
- C. Resources Needed: Resources described must be reasonable to accomplish the tasks described in Section III.B. It is critical to also look at the reality of the availability of these needed resources.
- D. Final Fire Size: Estimated final fire size for each alternative at time of containment.
- E. Estimated Contain/Control Date: Estimates of each alternative shall be made based on predicted weather, fire behavior, resource availability, and the effects of suppression efforts.
- F. Cost: Estimate all incident costs for each alternative. Consider mop-up, rehabilitation, and other costs as necessary.
- G. Risk Assessment - Probability of Success/Consequences of Failure: Describe probability as a percentage and list associated consequences for success and failure. Develop this information from models, practical experience, or other acceptable means. Consequences described will include fire size, days to contain, days to control, costs, and other information such as park closures and effect on critical habitat. Include fire behavior and long-term fire weather forecasts to derive this information.
- H. Refugeity: Assign the Refugeity rating calculated in "Fire Refugeity Analysis" for each alternative, e.g., Type II, Type I.
- I. A map for each alternative should be prepared. The map will be based on the "Probability of Success/Consequences of Failure" and include other relative information.

| III. Alternatives (To be completed by FMO / IC) | | | |
|---|--|--|--|
| | A | B | C |
| A. Wildland Fire Strategy | | | |
| B. Narrative | | | |
| C. Resources needed Handcrews Engines Dozers Airtankers Helicopters | _____ _____ - _____ _____ _____ _____ _____ _____ _____ | _____ _____ - - _____ _____ - - _____ _____ - - _____ | _____ _____ - - _____ _____ - - _____ _____ - - _____ |
| D. Final Size | | | |
| E. Est. Contain/ Control Date | | | |
| F. Costs | | | |

| | | | |
|---|--------------------|--------------------|--------------------|
| G. Risk Assessment - Probability of success - Consequence of failure | <hr/> <hr/> | <hr/> <hr/> | <hr/> <hr/> |
| H. Refugeity | | | |
| I. Attach maps for each alternative | | | |

This page is completed by the Agency Administrator(s), FMO and/or Incident Commander.

Section IV. Evaluation of Alternatives

A. Evaluation Process: Conduct an analysis for each element of each objective and each alternative. Objectives shall match those identified in Section II.A. Use the best estimates available and quantify whenever possible. Provide ratings for each alternative and corresponding objective element. Fire effects may be negative, cause no change, or may be positive. Examples are: 1) a system which employs a "-" for negative effect, a "0" for no change, and a "+" for positive effect; 2) a system which uses a numeric factor for importance of the consideration (soils, watershed, political, etc.) and assigns values (such as -1 to +1, - 100 to +100, etc.) to each consideration, then arrives at a weighted average. If you have the ability to estimate dollar amounts for natural resource and cultural values, this data is preferred. Use those methods which are most useful to managers and most appropriate for the situation and agency. To be able to evaluate positive fire effects, the area must be included in the resource management plan and consistent with prescriptions and objectives of the fire management plan.

Sum of Economic Values: Calculate for each element the net effect of the rating system used for each alternative. This could include the balance of: pluses (+) and minuses (-), numerical rating (-3 and +3), or natural and cultural resource values in dollar amounts. (Again, resource benefits may be used as part of the analysis process when the wildland fire is within a prescription consistent with approved Fire Management Plans and in support of the unit's Resource Management Plan.)

| IV. Evaluation of Alternatives | | | |
|--|---|---|---|
| To be Completed by the Agency Administrator(s) and Fire Manager / Incident Commander | | | |
| A. Evaluation Process | A | B | C |
| <i>Safety</i> Firefighter Aviation Public | | | |
| <i>Sum of Safety Values</i> | | | |

| | | | |
|---|--|--|--|
| <p><i>Economic</i> Forage Improvements Recreation Timber Water Wilderness Wildlife Other (specify)</p> | | | |
| <p><i>Sum of Economic Values</i></p> | | | |
| <p><i>Environmental</i> Air Visual Fuels T & E Species Other (specify)</p> | | | |
| <p><i>Sum of Environmental Values</i></p> | | | |
| <p><i>Social</i> Employment Public Concern Cultural Other (Specify)</p> | | | |
| <p><i>Sum of Social Values</i></p> | | | |
| <p><i>Other</i></p> | | | |

This page is completed by the Agency Administrator(s) and Fire Manager and/or Incident Commander.

Section V. Analysis Summary

- A. **Compliance with Objectives:** Prepare narratives that summarize each alternative's effectiveness in meeting each objective. Alternatives that do not comply with objectives are not acceptable. Narrative could be based on effectiveness and efficiency. For example: "most effective and least efficient," "least effective and most efficient," or "effective and efficient." Or answers could be based on a two-tiered rating system such as "complies with objective" and "fully complies with or exceeds objective." Use a system that best fits the manager's needs.

- B. **Pertinent Data:** Data for this Section has already been presented, and is duplicated here to help the Agency Administrator(s) confirm their selection of an alternative. Final Fire Size is displayed in Section III.D. Complexity is calculated in the attachments and displayed in Section III.H. Costs are displayed on page 4. Probability of Success/Consequences of Failure is calculated in the attachments and displayed in Section III.G.

- C. **External and Internal Influences:** Assign information and data occurring at the time the WFSA is signed. Identify the Preparedness Index (1 through 5) for the National and Geographic levels. If available, indicate the Incident Priority assigned by the MAC Group. Designate the Resource Availability status. This information is available at the Geographic Coordination Center, and is needed to select a viable alternative. Designate "yes," indicating an up-to-date weather forecast has been provided to, and used by, the Agency Administrator(s) to evaluate each alternative. Assign information to the "Other" category as needed by the Agency Administrator(s).

Section IV. Decision

Identify the alternative selected. Must have clear and concise rationale for the decision, and a signature with date and time. Agency Administrator(s) is mandatory.

| V. Analysis Summary | | | |
|--|----------|----------|----------|
| To be Completed by the Agency Administrator(s) and Fire Manager / Incident Commander | | | |
| Alternatives | A | B | C |
| A. Compliance with Objectives | | | |
| Safety | | | |
| Economic | | | |
| Environmental | | | |
| Social | | | |
| Other | | | |

| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

If WFSA is no longer valid, a new WFSA will be completed!

VIII. Objectives **Final Review**

The elements of the selected alternative were met on: _____ Date _____ Time _____

By: _____
 (Agency Administrator(s))

A GUIDE FOR ASSESSING FIRE COMPLEXITY

The following questions are presented as a guide to assist the Agency Administrator(s) and staff in analyzing the Complexity or predicted Complexity of a wildland fire situation. Because of the time required to assemble or move an Incident Management Team to wildland fire, this checklist should be completed when a wildland fire escapes initial attack and be kept as a part of the fire records. This document is prepared concurrently with the preparation of (and attached to) a new or revised Wildland Fire Situation Analysis. It must be emphasized this analysis should, where possible, be based on predictions to allow adequate time for assembling and transporting the ordered resources.

Use of the Guide:

1. Analyze each element and check the response "yes" or "no."
2. If positive responses exceed, or are equal to, negative responses within any primary factor (A through G), the primary factor should be considered as a positive response.
3. If any three of the primary factors (A through G) are positive responses, this indicates the fire situation is, or is predicted to be, Type I.
4. Factor H should be considered after all the above steps. If more than two of these items are answered "yes," and three or more of the other primary factors are positive responses, a Type I team should be considered. If the composites of H are negative, and there are fewer than three positive responses in the primary factors (A-G), a Type II team should be considered. If the answers to all questions in H are negative, it may be advisable to allow the existing overhead to continue action on the fire.

GLOSSARY OF TERMS

Potential for blow-up conditions - Any combination of fuels, weather, and topography excessively endangering personnel.

Rate or endangered species - Threat to habitat of such species or, in the case of flora, threat to the species itself.

Smoke management - Any situation which creates a significant public response, such as smoke in a metropolitan area or visual pollution in high-use scenic areas.

Extended exposure to unusually hazardous line conditions - Extended burnout or backfire situations, rock slide, cliffs, extremely steep terrain, abnormal fuel situation such as frost killed foliage, etc.

Disputed fire management responsibility - Any wildland fire where responsibility for management is not agreed upon due to lack of agreements or different interpretations, etc.

Disputed fire policy - Differing fire policies between suppression agencies when the fire involves multiple ownership is an example.

Pre-existing controversies - These may or may not be fire management related. Any controversy drawing public attention to an area may present unusual problems to the fire overhead and local management.

Have overhead overextended themselves mentally or physically - This is a critical item that requires judgment by the responsible agency. It is difficult to write guidelines for this judgment because of the wide differences between individuals. If, however, the Agency Administrator feels the existing overhead cannot continue to function efficiently and take safe and aggressive action due to mental or physical reasons, assistance is mandatory.

APPENDIX H.

STEP-UP PLAN

The Step-up plan will guide fire preparedness operations and use of emergency preparedness funding. The plan utilizes data from remote weather stations located within the Jackson Hole valley and maintained by the NPS. Daily information can be obtained by calling the Teton Interagency Dispatch Center at 739-3300.

NFDRS Fuel Model T,

| PREPAREDNESS ACTION | BURNING INDEX | | | | |
|---|---------------|------|-------|-------|-----|
| | 0-7 | 8-16 | 17-33 | 34-59 | 60+ |
| Maintain Radio Contact | X | X | X | X | X |
| Maintain Response Time of: (minutes) | 60 | 60 | 45 | 20 | 20 |
| Fire-ready engine at Refuge Headquarters | X | X | X | X | X |
| Carry PPE while on duty, wear nomex and boots | | | | X | X |
| Tour of duty changed at Manager's discretion | | | | X | X |
| Monitor Forest Service/NPS fire frequencies | | | | X | X |

| | | | | | |
|--|--|--|--|---|---|
| Emergency Pre-suppression/Severity Funding may be available for extended shifts and overtime | | | | X | X |
|--|--|--|--|---|---|

During the Memorial Day, Independence Day and Labor Day holidays move up to the next burning index break point because of the increased risk of human caused ignitions.

If burning index is 50 or greater and lightning is forecast, move up to next burning index break-point because of increased risk of lightning ignitions.

Emergency Pre-suppression and/or Severity funding can only be approved by the Regional Fire Management Coordinator.

APPENDIX B.

CURRENT EMPLOYEE QUALIFICATIONS

As of December 1999

| NAME | POSITION | QUALIFICATIONS |
|-------------------|--------------------------|----------------|
| Barry Reiswig | Refuge Manager | |
| Steve Brock | Assistant Refuge Manager | ENOP, FFT2 |
| Jim Griffin | ROS | |
| Fernando Escobedo | Maintenance | ENOP, FFT2 |
| Gus Johnson | Maintenance | |
| Kevin Painter | ORP | FFT2 |
| Al Ridgway | Bio-Tech | FFT2 |
| Chad Ridgway | Maintenance | FFT2 |
| Ann Blakley | Computer Specialist | Dispatcher |
| Pam Palmer | Refuge Assistant | Dispatcher |

ENGB - Engine Boss
ENOP - Engine Operator
FFT1 - Firefighter Type 1
FFT2 - Firefighter Type 2
T - Trainee

**APPENDIX I.
FIRE DISPATCH PLAN**

National Elk Refuge

Upon report of smoke or fire:

- I Record as much information as possible from the caller below.**
- II. Maintain log of all radio and telephone communication (log form attached).**

Initial information from reporting party:

- A. Name:
- B. Callback number:
- C. Location of smoke or fire (be specific):
- D. Access to fire:
- E. Color of smoke:

- F. Size of fire:
- G. Type of vegetation:
- H. Fire behavior:
- I. Improvements threatened:
- J. Anyone at the fire scene:
- K. See anyone in area or vehicles leaving area:

III. Check map for ownership/protection status.

IV. If fire is on Refuge or threatening the Refuge:

- A. After regular working hours use **Fire Personnel Directory** for contacting Refuge staff. Start with Refuge Manager and work down list till someone is contacted.
- B. During regular working hours:
 - 1. Notify Refuge Manager.
 - 2. Utilize clerk if available or use other Refuge staff as dispatcher.
 - 3. Select and dispatch an Incident Commander (should be qualified IC or the highest qualified firefighter available).
 - 4. Dispatch appropriate resources. Do not dispatch unqualified firefighters without approval of Refuge Manager.
 - 5. Notify Teton Interagency Dispatch Center. Advise them of Refuge response and resources sent from Refuge.
 - 6. If fire danger is high, request a spot weather forecast for the next 24 hours from National Weather Service. Ask them to use their best information and that we will call with on site weather observations as soon as possible. The forecast should include any predicted changes in temperature, humidity, wind direction, wind speed, barometric pressure, precipitation, and lightning activity.
 - 7. Remain on duty and dispatch further assistance as requested by IC.
- C. If fire is on Refuge but involves a structure:

1. Contact Jackson-Teton County Fire Department.
2. Structural firefighting is not the functional responsibility of FWS; however, Refuge personnel may assist in structure protection on an emergency basis to save human life. Refuge personnel may assist in protecting wildlands around the structure when such actions can be accomplished safely. Water or retardant chemicals may be applied to a structure from the outside in an effort to safeguard it from an advancing wildfire.

V. If fire is not on Refuge or threatening Refuge:

A. If mutual aid request is from a Cooperating Agency:

1. Take resource order information:
 - Nature of incident.
 - Location and access to fire.
 - What type and quantity of resources are needed.
 - When they are to report.
 - Radio Frequency and IC/Officer in Charge call sign
2. Inform cooperator that you will check what is available and call back ASAP (must be within 1 hour).
3. Notify Refuge Manager and get approval for dispatch. Refuge staff limited to fires within 4 mile protection zone during Staffing Class V.
4. Dispatch resources requested and approved by Refuge Manager. Additional resources can be obtained from other Refuges if needed and available (see regional dispatch plan in back of Fire Management Handbook).
5. Notify cooperator of what was dispatched and an estimated time of arrival.
6. Coordinate the filling of additional resource orders from the Cooperator.

B. If the Refuge is the first agency contacted and fire not on or threatening Refuge:

1. Notify appropriate agency (Jackson-Teton Fire Department, Forest Service, Park Service or State).
2. Dispatch resources if approved by appropriate agency and Refuge Manager.

3. Remain at scene until relieved by a representative of the agency who has fire protection responsibility for the fire.

C. Interagency dispatch request.

1. Take resource order information:
 - Nature of incident.
 - What type and quantity of resources are needed.
 - Reporting location.
 - Specific location of the incident.
 - Reporting time.
 - Travel instructions.
 - Resource order number and request number.
 - Agency responsible for incident.
2. Inform cooperator that you will check what is available and call back ASAP (must be within 1 hour).
3. Notify Refuge Manager and get approval for dispatch.
4. Dispatch resources requested and approved by Refuge Manager. Additional resources can be obtained from nearby Refuges if needed and available (see also Region 6 Wildland Fire Mobilization Plan).
5. Notify cooperator of what was dispatched and an estimated time of arrival at reporting location.

2. Contact Teton Interagency Dispatch Center (739-3300) to order resources.
3. When notified that an order has been filled and that resources have been dispatched:
 - a. Record info - source, order number, eta, etc.
 - b. Notify IC of ETA
 - c. Track resources to make sure they arrive. If they do not meet their ETA contact Teton Interagency Dispatch Center.
4. When resources have been released or demobilized:

All demobilization will be coordinated through Teton Interagency Dispatch Center.

FIRE DIRECTORY

**NATIONL ELK REFUGE
FIRE PERSONNEL DIRECTORY - 1999**

FIRE REPORTING OR ASSISTANCE REQUEST:

| NAME | WORK PHONE | HOME PHONE |
|---|-----------------|------------|
| Barry Reiswig Refuge Manager | 733-9212, X-223 | 734-0045 |
| Steve Brock Refuge Operations Specialist | 733-9212, X-224 | 734-6021 |
| Jim Griffin Maintenance Supervisor | 733-9212, X-227 | 733-7177 |
| Fernando Escobedo Heavy Mobile Equip. Mechanic | 733-2072 | 739-3087 |

APPENDIX J.

**NATIONAL ELK REFUGE
COMMUNICATION FREQUENCIES**

VHF RADIO

| OWNER | Refuge MODE | TRANSMIT | RECEIVE |
|-----------------------|--------------------|-----------------|----------------|
| Refuge 1 | 1 | 172.450 | 172.450 |
| Refuge 2 | 2 | 171.750 | 172.450 |
| TCSO | 3 | 155.415 | 155.415 |
| TCSO rpt | 4 | 154.950 | 154.415 |
| Mutual Aid | 5 | 154.875 | 154.875 |
| Wyoming Game and Fish | 6 | 154.785 | 154.785 |
| NPS | 7 | 171.675 | 171.675 |
| NPS rpt | 8 | 172.425 | 171.675 |
| BTNF | 9 | 169.125 | 169.125 |

| | | | |
|------------|----|---------|---------|
| HWY Patrol | 10 | 155.445 | |
| TCEMA rpt | 11 | 154.085 | 156.015 |
| TCEMA | 12 | 156.015 | 156.015 |

APPENDIX E.

DELEGATION OF AUTHORITY

National Elk Refuge
Jackson, Wyoming

As of (time) , (Date) , I have delegated authority to manage the (Fire Incident Name) , (Fire Number) , National Elk Refuge, to Incident Commander (Name) and his/her Incident Management Team.

As Incident Commander, you are accountable to me for the overall management of this incident including it's control and return to local forces. I expect you to adhere to relevant and applicable laws, policies, and professional standards. While the suppression of the fire is your primary task, you are expected to do so in a manner that provides for the safety and well being of involved personnel. Consideration for the needs of local residents and communities is essential for successful management of the incident.

I am assigning (name) as the line officer representative to act as liaison and provide any help you need. (S)he is authorized to speak for me in the event a decision is needed.

My specific considerations for management of this fire are:

1. Ensure the safety of firefighters, visitors, and neighbors.
2. Protect private and Refuge property to the extent possible.
3. Minimize damage to environmental resources
4. Key resource considerations are: protecting rare, threatened, and endangered species; preserving as much wildlife habitat as possible; avoiding wildlife entrapment situations; and limiting degradation of the Refuge's aesthetic values.
5. Restrictions for suppression actions are no earthmoving equipment (dozers, discs, plows, graders) without approval of the Refuge Manager.
6. Manage the fire cost-effectively for the values at risk.
7. Provide training opportunities for U. S. Fish and Wildlife personnel where possible in

order to strengthen our organizational capabilities.

_____ (signed) _____ (date)
Project Leader
APPENDIX M.

RECOMMENDED FIRE MONITORING STANDARDS

REGION 6

The following are the recommended standards to be used when planning, implementing, and evaluating prescribed burns. These should be viewed as minimum values to be monitored and the information contained in this check list incorporated into a monitoring record sheet.

Planning and Preparation

Environmental Conditions Prior to the Burn

| | |
|---------------------------------------|---|
| _____ Photo Points Established | |
| _____ Fuel | |
| _____ Model(s) | |
| _____ Loading | (By Size Class) |
| _____ % Cover | (Type/Model) |
| _____ Continuity | |
| _____ Crown ratio | |
| _____ Depth of Fuel Bed | |
| _____ Other | |
| _____ Air Temperature | (Maximum - Minimum to develop trends) |
| _____ Relative Humidity | (Maximum - Minimum to develop trends) |
| _____ Wind Speed and Direction | (Eye-level/20 Foot) |
| _____ Fuel Moisture | |
| _____ Dead Fuel Moisture | (Use of Fuel Sticks and/or Drying Ovens highly recommended) |
| _____ Live Fuel Moisture | (Fuel Models 2,4,5,7,10) |
| _____ Soil Moisture (Dry, Moist, Wet) | |
| _____ Drought Indicator | (Track One or More) |

Execution***Environmental Conditions During the Burn***

- _____ Date/Time
- _____ Air Temperature (Every 30 minutes)
- _____ Relative Humidity (Every 30 minutes)
- _____ Wind Speed and Direction (Eye Level) (Every 30 minutes)
- _____ Cloud Cover

- _____ Fuel Moisture (Indicate How Determined: Calculated, Actual)
 - _____ Dead Fuel Moisture (Using above values, calculate every 30 minutes utilizing Tables and Worksheets, Nomograms, BEHAVE, etc.)
 - _____ Live Fuel Moisture (Fuel Models 2,4,5,7,10 - Collect immediately prior to the burn and evaluate later)

Fire Behavior

- _____ Flame length (Head, Flank, Backing)
- _____ Rate of Spread (Forward, Flank, Backing)
- _____ Resistance to Control
- _____ Spotting Distance

Smoke/Air Quality

- _____ Mixing/Dispersion (Good, Fair, Poor)
- _____ Trajectory of Column (Surface/Upper Level)
- _____ Duration (Active Burning/Smoldering)
- _____ Problems

Note: It is recommended that photos be taken to document smoke dispersal.

Post Burn

First Order Fire Effects

- _____ Photo Point
- _____ Percent of Area Burned
- _____ Percent of Fuels Consumed (By Fuel Loading Size Class, when possible)
- _____ Percent of Thatch/Duff Consumed
- _____ Scorch Height
- _____ Mortality

Note: The information in the first two categories will be used to determine the amount of particulate matter produced, and may/will be used by State Air Quality Regulators.

APPENDIX N.

National Elk Refuge Fire Equipment

| Item | Year Purchased | Percent of Fire Funding | Have | GVW | Need | GVW |
|--|-----------------------|--------------------------------|-------------|------------|-------------|------------|
| Engine Module(s) heavy (500-1000 gal) medium (200-400 gal) light (50-150 gal) | | | | | | |
| Slip-on unit(s) | | | | | | |
| Water Tender - 200 gallon | | | | | | |
| Portable Pump(s) Standard float-a-pump | | | | | | |
| Power Saw(s) | | | | | | |
| Mower(s) | | | | | | |
| Tractor(s) | | | | | | |
| Grader(s) | | | | | | |
| Plow Unit/Disk | | | | | | |
| ATV(s) | | | | | | |
| Other List | | | | | | |

| Other Equipment Available for Fire Suppression or Prescribed Fire Operations Not Fire Funded |
|---|
| |
| |
| |
| |
| |
| |

APPENDIX O.

| TYPE 6 Wildland Fire Engine Stocking List | | | |
|--|---|--------------------------|----------|
| Category | Item Description | NFES # | Quantity |
| Fire Tools & Equipment | Combination Tool | 1180 | 1 |
| | Shovel | 171 | 2 |
| | Pulaski | 146 | 2 |
| | Backpack Pump | 1149 | 2 |
| | Fusees(case) | 105 | 0.5 |
| | Foam, Concentrate, Class A (5-gallon) | 1145 | 1 |
| | Chain Saw | | 1 |
| | Chain Saw Tool Kit | 342 | 1 |
| | Portable Pump | | * |
| | Drip Torch | 241 | 1 |
| | Medical | First Aid Kit, 10-person | 68 |
| Body Fluids Barrier Kit | | 640 | 1 |
| General Supplies | Flashlight, General Service | 69 | 1 |
| | Chock Blocks | | 1 |
| | Tow Chain or Cable | 1856 | 1 |
| | Jack, hydraulic (comply w/GVW) | | 1 |
| | Lug Wrench | | 1 |
| | Pliers, Fence | | 1 |
| | Food (48 hour supply) | 1842 | 1 |
| | Rope/Cord (feet) | 1041 | 1 |
| | Sheeting, plastic, 10' X 20' | 1287 | 1 |
| | Tape, Duct | 71 | 1 |
| | Tape, Filament (roll) | 222 | 2 |
| | Water (Gallon/person)water cooler | 943 | 1 |
| | Bolt Cutters | | 1 |
| | Toilet Paper (roll) | 142 | * |
| | Cooler or Ice Chest | 557 | * |
| | Hand Primer, Mark III | 145 | * |
| | Hose Clamp | 46 | 1 |
| | Gaskets (set) | | 1 |
| | Pail, Collapsible | 141 | 1 |
| Hose Reel Crank | | * | |
| Safety | Fire Extinguisher (5 lb.) | 2143 | 1 |
| | Flagging, lime green (roll) | 258 | * |
| | Flagging, yellow w/black stripes (roll) | 267 | * |
| | Gas Safety Can (5-gallon) | 1291 | * |
| | Reflector Set | | * |
| Vehicle & Pump Support | General Tool Kit (5180-00-177-7033/GSA) | | 1 |
| | Oil, Automotive, quart | | 2 |
| | Oil, Penetrating, can | | 1 |
| | Oil, Automatic transmission, quart | | 1 |

| TYPE 6 Wildland Fire Engine Stocking List | | | |
|--|---------------------------------------|--------|----------|
| Category | Item Description | NFES # | Quantity |
| | Brake Fluid, pint | | 1 |
| | Filter, Gas | | 1 |
| | Fan Belts | | 1 |
| | Spark Plugs | | 1 |
| | Fuses (set) | | 1 |
| | Tire Pressure Gauge | | 1 |
| | Jumper Cables | | 1 |
| | Tape, electrical, plastic | 619 | 1 |
| | Tape, Teflon | | 1 |
| Radio | Portable | | 1 |
| | Mobile | | 1 |
| | Batteries (for portable radio) | | 2 |
| Hose | Booster (feet/reel)100' rolls | 1220 | 2 |
| | Suction (length, 8' or 10') | | 2 |
| | 1" NPSH (feet)100' rolls | 966 | 3 |
| | 1 ½" NH (feet)100' rolls | 967 | 3 |
| | ¾" garden 50' rolls | 1016 | 6 |
| | 1 ½" NH, engine protection (feet) | | 20 |
| | 1 ½" NH, refill (feet) | | 15 |
| Nozzle | Forester, 1" NPSH | 24 | 2 |
| | Adjustable, 1" NPSH | 138 | 2 |
| | Adjustable, 1 ½" NH | 137 | 3 |
| | Adjustable, ¾" NH | 136 | 2 |
| | Foam, ¾" NH | 627 | 1 |
| | Foam, 1 ½" NH | 628 | 1 |
| | Mopup Wand | 720 | 1 |
| | Tip, Mopup Wand | 735 | 2 |
| | Tip, Forester nozzle, fog | 903 | * |
| | Tip, Forester nozzle, straight stream | 638 | * |
| Wye | 1" NPSH, Two-Way, Gated | 259 | 1 |
| | 1 ½" NH, Two-Way, Gated | 231 | 2 |
| | ¾" NH w/Ball Valve, Gated | 739 | 4 |
| Adapter | 1" NPSH-F to 1" NH-M | 3 | * |
| | 1" NH-F to 1" NPSH-M | 4 | 1 |
| | 1 ½" NPSH-F to 1 ½"NH-M | 7 | 1 |
| | 1 ½" NH-F to 1 ½" NPSH-M | 6 | * |
| Increaser | ¾" NH-F to 1" NPSH-M | 2235 | 1 |
| | 1" NPSH-F to 1 ½" NH-M | 416 | 1 |
| Coupling | 1" NPSH, Double Female | 710 | 1 |
| | 1" NPSH, Double Male | 916 | 1 |
| | 1 ½" NH, Double Female | 857 | 2 |
| | 1 ½" NH, Double Male | 856 | 1 |
| Reducer/Adapter | 1" NPSH-F to ¾" NH-M | 733 | 3 |
| | 1 ½" NH-F to 1" NPSH-M | 10 | 4 |

| TYPE 6 Wildland Fire Engine Stocking List | | | |
|--|---|--------|----------|
| Category | Item Description | NFES # | Quantity |
| | 2" NPSH-F to 1 ½" NH-M | 417 | * |
| | 2 ½" NPSH -F to 1 ½" NH-M | 2229 | * |
| Reducer | 1 ½" NH-F to 1" NH-M | 9 | 1 |
| | 2.5" NH-F to 1 ½" NH-M | 2230 | 1 |
| Tee | 1" NPSH-F x 1" NPSH-M x 1" NPSH-M w/cap | 2240 | 2 |
| | 1 ½" NH-F x 1 ½" NH-M x 1" NPSH-M w/cap | 731 | 2 |
| | 1 ½" NH-F x 1 ½" NH-M x 1" NPSH-M w/valve | 230 | 2 |
| Valve | 1 ½" NH-F, Automatic Check and Bleeder | 228 | 1 |
| | ¾" NH, Shut Off | 738 | 5 |
| | 1", Shut Off | 1201 | 1 |
| | Foot, w/strainer | | 1 |
| Ejector | 1" NPSH x 1 ½" NH x 1 ½" NH, Jet Refill | 7429 | * |
| Wrench | Hydrant, adjustable, 8" | 688 | 1 |
| | Spanner, 5", 1" to 1 ½" hose size | 234 | 1 |
| | Spanner, 11", 1 ½" to 2 ½" hose size | 235 | 2 |
| | Pipe, 14" | 934 | 1 |
| | Pipe, 20" | | 1 |
| Personal Gear (Extra Supply) | File, mill, bastard | 60 | * |
| | Goggles | 1024 | 2 |
| | Hard Hat | 109 | 1 |
| | Head Lamp | 713 | 1 |
| | Gloves | | * |
| | First Aid Kit, Individual | 67 | 1 |
| | Fire Shirt | | * |
| Engine | Fireline Handbook | 65 | 1 |
| | Belt Weather Kit | 1050 | 1 |
| | Binoculars | | 1 |
| | Map Case w/Maps | | 1 |
| | Inventory List, engine | | 1 |

*Items listed with no minimums but are carried by engines as an option

Cache and Individual Items. Includes items that are issued to individuals. Balance of items will be stored in cache. These Items are in addition to Engine supplies.

| Category | Item Description | NFES # | Quantity for 5 person cache | Quantity for 10 person cache |
|--------------------------|------------------|--------|-----------------------------|------------------------------|
| Fire Tools and Equipment | Combination Tool | 1180 | 3 | 6 |
| | Shovel | '0171 | 3 | 6 |
| | McLeod | '0296 | 3 | 6 |
| | Pulaski | '0146 | 3 | 6 |

| Category | Item Description | NFES # | Quantity for 5 person cache | Quantity for 10 person cache |
|----------------------|--|--------|-----------------------------|------------------------------|
| | Backpack Pump | 1149 | 3 | 6 |
| | Foam Concentrate, Class A (10 gallon/engine) | 1145 | 20 | 40 |
| | Drip Torch | '0241 | 6 | 12 |
| Individual Equipment | Rations (12 meals/box) | 1842 | 1 | 2 |
| | Fire Shelter w/case and liner | '0169 | 6 | 12 |
| | Hard Hat | '0109 | 6 | 12 |
| | Head Lamp | '0713 | 6 | 12 |
| | Goggles | 1024 | 6 | 12 |
| | Packs, Personal Gear | 1855 | 6 | 12 |
| | Line Gear | 1372 | 6 | 12 |
| | Personal First Aid Kit | '0067 | 6 | 12 |
| | Sleeping Bag | '0022 | 5 | 10 |
| | Water Bottles | '0038 | 24 | 48 |
| | Tent, Individual | '0077 | 5 | 10 |
| | Nomex Shirt (3/person+20% per size) | | 18 | 36 |
| | Nomex Pants (3/person+20% per size) | | 18 | 36 |
| | Leather Gloves(2/person+20% per size) | | 12 | 24 |
| | Ear Plugs(200/box) | 1027 | 1 | 1 |
| | | | | |

APPENDIX K.

FIRE COOPERATORS

| AGENCY | NAME/TITLE | PHONE NUMBER |
|------------------------------------|---|----------------------|
| Wyoming State Division of Forestry | Dana Stone District Forester | 787-6148 |
| Teton Interagency Dispatch Center | | 739-3300 |
| Grand Teton National Park | Len Dems Fire Management Officer | 739-3310 |
| Bridger-Teton National Forest | Wade Burleson Fire Management Officer | 739-5580 |
| Teton County Fire Department | Ken Sutta - Fire Chief | |
| National Elk Refuge Refuge | Barry Reiswig Refuge Manager | 733-9212 734-0045 |
| | Steve Brock Refuge Operations Specialist | 733-9212 734-6021 |
| | Jim Griffin Refuge Operations Specialist | 733-9212 733-7177 |

APPENDIX P.

FIREFIGHTER EQUIPMENT LIST

Minimum Needs For Interagency Assignment

GOVERNMENT ISSUE:

| ITEM NAME: | #: | NFES#: | GSA #: | PRICE: |
|--|-----------|---------------|--|----------------|
| Personal Gear Pack (red) (each) | | 1 1855 | 8465-01-141-2321 | \$44.07 |
| Sleeping Bag (optional) | 1 | 0022 | 8465-01-119-5562 | \$61.06 (each) |
| Web Gear/Line Pack (yellow) (each) | 1 | 1372 | 8465-01-169-3996 | \$53.43 |
| Headlamp (AA battery) | 1 | 0713 | (available from NIFC only) | \$8.50 (each) |
| Extra AA Batteries (24 pack) | | 8 0030 | 6135-00-985-7845 | \$4.99 |
| Goggles (each) | | 1 0300 | 4240-01-292-2818 | \$4.84 |
| Or Safety Glasses (each) | | 0475 | 4240-01-292-2816 | \$3.70 |
| Ear Plugs (box of 200 pr.) | | 3pr. 1027 | 4240-00-137-6345 | \$16.58 |
| Leather Gloves | 1 | 1293-7 | See attached sheets for size/price information | |
| Fire Shelter with Poly. Liner & Case (each set) | 1 | 0169 | 4240-01-121-8698 | \$39.26 |
| Canteens, 1 Quart w/cover (each) | | 4 0038 | 8465-01-062-5854 | \$2.58 |
| Individual First Aid Kit | 1 | 0067 | 6545-00-656-1092 | \$8.70 (each) |
| Nomex Shirt & Pants | | 3 sets | See attached sets for size and price information | |
| Compass (each) | | 1 1814 | 6605-00-553-8795 | \$12.07 |
| Fireline Handbook (each) | | 1 0065 | (available from NIFC only) | \$2.85 |
| Fireline Handbook Supplement | 1 | 2165 | (available from NIFC only) | \$0.51 (each) |
| Safety Helmet with Chin strap | 1 | 0109 | 8415-01-055-2265 | \$9.00 (each) |
| Leather Boots, Minimum 8" high with non-skid lug soles (boots MUST be leather, no rubber, gore tex ect., they MUST be a minimum of 8 inches high, and have hard vibram lug soles (no smooth or soft soles allowed). Refuges are authorized to spend up to \$200.00 per employee for required fire boots. Make sure employees have broken in the boots prior to dispatch!) | | | Available from local vendors | |
| Small Signal Mirror (each) | | 1 1138 | 6350-00-261-9772 | \$5.19 |
| Parachute Cord, Nylon (This comes in a 700 yard roll (SL), I have one and can send you whatever you need!) | 50' | 0533 | 4020-00-240-2146 | \$63.98 (SL) |
| Meals, Ready To Eat (MRE) (box) | | 1 1842 | 8970-00-149-1094 | \$73.01 |
| (Packaged 12 MRE's per box) | | | | |
| Tent, 2 Person (optional) (each) | | 1 0077 | (available from NIFC only) | \$91.92 |
| Flagging, orange (RO) | | 1 2398 | 9905-00-194-9698 | \$0.73 |
| Insect Repellent | 1 | 0705 | 6840-01-003-9589 | \$1.06 (BT) |
| Blanket, Space | 1 | 1114 | 7210-00-935-6667 | \$4.58 (each) |

EMPLOYEE RESPONSIBILITY (red bag): **Bring sufficient quantities to last for a 21 day detail**

Socks, Shorts, Sweatpants
Underwear (100% cotton if possible)
T-shirts (always wear one under your Nomex shirt while on the fireline, 100% cotton only)
Bandanas
Rain Coat/Poncho
Warm Jacket, heavy sweatshirt or similar item
Tennis Shoes
Toilet kit and small towel
Sheet of plastic or ground cloth/tarp
Watch
Pocket Knife
Money, at least \$50.00 in cash
Medication if required
Personal items (hygiene)

OPTIONAL BUT HIGHLY RECOMMENDED ITEMS:

Alarm Clock, Sunscreen, Chapstick, Foot Powder and Moleskin, Extra Glasses or Contacts and Sunglasses
Wool Hat and Gloves, Extra Boot Laces, Books and other Reading Materials, Deck of Playing Cards, Notebook,
Stamps and Letter Writing Supplies & Phone/Address Book

OTHER RULES AND SUGGESTIONS:

1. Any clothing you plan to wear on the fire line must be made of natural fibers such as cotton and wool. Do not use synthetic fiber clothing as these materials have a much lower ignition temperature and will melt causing much more severe burns.
2. You are limited to a total of 65 pounds maximum weight of gear in your red bag (45) and line pack (20), keep your canteens empty until you arrive at the incident check-in area.
3. Travel in Nomex shirt/pants and boots to reduce pack weight.
4. Save a clean change of clothes for the return trip, or pack one non-Nomex shirt and a pair of jeans. If you can fit it in, a pair of shorts and sweat pants will be very nice to have for time spent in fire camp.
5. Pack everything in plastic bags! All toiletry items should be in Zip Loc bags and clothes in garbage bags. You never know where your red bag will be stored while you are away on the fire.
6. Clearly label your personal gear bag (red pack) and line gear with your name and home unit address/phone number. All gear looks the same in a fire camp.
7. Do not bring valuable personal items such as camera's and tape players. If they are lost or stolen you may not be compensated for them. Inexpensive or disposable camera's work just fine.
8. If you find you can not get everything into your two bags that you need, leave your sleeping bag behind. You can usually pick one up in fire camp.
9. Carry your line gear (yellow pack) on the plane as carry on luggage. This way you will be ready for fireline duty even if your red bag gets lost on the way.

APPENDIX F.

Job-Related Work Capacity-Tests for Wildland Firefighters

Background Studies of wildland firefighting clearly show the link between fitness and work performance. Fit workers can do more work with less fatigue, and still have a reserve to meet unforeseen emergencies. They perform better in a hot environment, and recover faster from adverse firefighting conditions like long shifts and reduced rest. In short, fitness is the most important factor in work capacity.

Since 1975 Federal Agencies have used a 5-minute step test and an alternative 1.5 mile run test to screen candidates for wildland firefighting. In 1994 the Missoula Technology & Development Center (MTDC) began a review of work capacity testing alternatives. MTDC conducted a comprehensive job task analysis and extensive laboratory and field studies of candidate tests. The result is a family of job-related field tests.

| Work Category | Test | Distance | Pack | Time |
|---------------|------------|----------|--------|--------|
| Arduous | Pack Test | 3 Miles | 45 lbs | 45 min |
| Moderate | Field Test | 2 Miles | 35 lbs | 30 min |
| Light | Walk Test | 1 Mile | none | 16 min |

Pack Test The test consists of a 3 mile hike with a 45 pound pack (fire-suppression water bag) over level terrain. A time of 45 minutes, the passing score for the test, approximates a step test score of 45 (ml/kg.min), the established standard for wildland firefighters. The test is a valid, job-related test of the capacity for arduous work, defined as: "Duties involve field work requiring physical performance calling for above average endurance and superior conditioning. These duties may include an occasional demand for extraordinarily strenuous activities in emergencies under adverse environmental conditions and over extended periods of time. Requirements include running, walking, climbing, jumping, twisting, bending, and lifting more than 50 pounds; the pace of work typically is set by the emergency condition." The energy cost of the test is similar to that demanded on the job. The Pack Test is correlated to measures of aerobic and muscular fitness, as well as performance in field tasks such as working with hand tools, or carrying loads over rough terrain. The duration of the test insures the capacity to perform prolonged arduous work under adverse conditions, with a reserve to meet emergencies.

Field Test A 2 mile hike with a 25 pound pack in 30 minutes, approximates a step test (max V02) score of 40. A job-related test of work capacity designed for those with moderately strenuous duties: "Duties involve field work requiring complete control of all physical faculties and may include considerable walking over irregular ground, standing for long periods of time, lifting 25 to 50 pounds, climbing, bending, stooping, squatting, twisting, and reaching. Occasional demands may be required for moderately strenuous activities in emergencies over long periods of time. Individuals usually set their own work pace.

Walk Test This one mile walk test approximates a step test score of 35 is a test to determine

the ability to carry out light duties: "Duties mainly involve office type work with occasional field activity characterized by light physical exertion requiring basic good health- Activities may include climbing stairs, standing, operating a vehicle, and long hours of work, as well as some bending, stooping, or light lifting. Individuals almost always can govern the extent and pace of their physical activity."

Instructions

The Pack Test is a 3 mile hike with a 45 lb. pack over level terrain. Field studies show . that performance on the pack test is significantly related to performance of firefighting tasks, including line construction with hand tools. Studies conducted at the University of Montana Human Performance Laboratory indicate that the energy cost of the test is similar to the cost of firefighting tasks. A score of 45 minutes on the Pack test approximates a Step Test Score of 45 (ml/kg-min). Because of its length, the Pack Test is an excellent indicator of sustained work capacity. Scores on a flat course are highly related to performance on a hilly course. And performance on the Pack Test is significantly related to vascular fitness, including measures of upper and lower body strength. The Pack Test is: job-related, safe, inexpensive, and easy to administer. It is a valid, reliable, and objective measure of work capacity that does not adversely impact workers on the basis of gender, ethnicity, age, height, or weight. **(These instructions apply to the Field and Walk Tests).**

The course

Course must be essentially level and have a firm, relatively smooth walking surface. Course length (3 miles) must be accurate: double-check measurements. Use a measuring wheel or a calibrated bicycle computer. Vehicle odometers are not sufficiently accurate.

Loop or out-and-back courses are preferable. Avoid one-way courses where unfavorable conditions (wind, grade) are not offset. A moderate grade (2-3%) is acceptable if the course starts and finishes at the same place. Have lap counters available for multi-loop courses. Use course monitors when needed.

Candidates must be informed of the course layout (use a map or sketch of the course). Use distance markers (e.g., at 1 or 1.5 miles) to aid candidates. Use hazard and traffic makers as needed.

Equipment

Packs: The 5 gallon backpack pump water bag (NSN8465-01-321-1678, cost \$35.23) used in test development is recommended: The number required will depend on the number of candidates to be tested simultaneously. If other packs are used the test administrator must insure the correct weight (45 lbs).

Pack liners: (NSN8465-01-321-1679, cost \$6.51): Have at least one extra liner for each pack.

Canteens:(NSN8465-00-102-6381, cost \$0.43): Use up to 2 in pack pocket to obtain proper

weight (45 +/- 1/2 lbs).

Safety Vests/Route Markers: As needed.

Distance Markers: Use mile and mid-point markers so candidates can maintain proper pace.

Stop watches: Utilize 2 watches to provide back-up timing.

Vehicle: Bicycle or other vehicle to monitor candidates on the course.

Radios: As needed for monitoring and safety.

Scale: An accurate hanging style spring scale is recommended for weighing packs.

Forms: **PAR-Q** health screening questionnaire and an informed consent form (Appendix F). Data collection form (should include: site, date, conditions, test administrator, and columns for name, gender, age, height, weight, Pack Test and other scores - step test, 1.5 mile run, etc.).

Test Administration

One person can administer the test when:

The administrator is a trained First Responder (American Red Cross) or equivalent.

The timer can monitor the course.

The safety/med evacuation plan can be executed.

Five or fewer people are being tested at one time.

Candidate safety and compliance with test requirements can be assured.

For larger groups or when course monitoring is difficult, a 2 to 3 person team should be used.

Testing Tips

Fill packs the night before to check for leaks (use plumber's Teflon tape to stop leaks in threaded fitting).

Weigh bags before test. Check weight after the test if necessary. Note: Bags are used without trombone pumps.

Group or staggered starts can be used. Many candidates will benefit from the support provided by a group start.

Environment: Administer the test in moderate environmental conditions; do not test new recruits when the temperature is high or when the temperature and humidity combine to create high heat stress conditions (see heat stress chart); if necessary, test early in the day to avoid high temperature /humidity combinations; avoid high winds that may affect performance.

Hydration: If the weather is hot, encourage candidates to drink fluids prior to the test, and provide fluid replacement mid way in the course. Candidates may carry a water bottle.

Altitude: Use this chart to adjust for test~.administered at elevations above 4,000 ft.

Table 1: Altitude Corrections for Work Capacity Tests*

| Altitude | Pack Test | Field Test | Walk Test |
|------------|-----------|------------|-----------|
| 8-9,000 ft | 90 sec | 60 sec | 30 sec |
| 7-8,000 ft | 75 | 50 | 25 |
| 6-7,000 | 60 | 40 | 20 |
| 5-6,000 | 45 | 30 | 15 |
| 4-5,000 | 30 | 10 | 10 |

* Add correction to required test time (e.g., Pack Test at 6-7,000 ft, add 60 seconds to test standard (45 min) for altitude adjusted standard of 46 n-dn.

The altitude adjustment assumes that the candidate has had an opportunity to acclimate to the altitude of the test site. If a candidate doesn't meet the required standard, even with the adjustment, he or she should be encouraged to train at the altitude and retake the test.

Instructions for Candidates

In advance of test: Distribute confidential PAR Q physical activity readiness questionnaire so candidates can decide if they should seek medical advice before taking the test. Have candidates read and sign an informed consent form.

Clothing: Candidates may select the clothing worn during the test. "T" Shirts and shorts are acceptable. Footwear that provides ankle height support, such as hiking boots or ankle height sport shoes, is required for the Pack and Field tests, and recommended for the walk test.

Safety: Brief candidates on the test, the course, safety considerations, and accommodations. Tell candidates to terminate the test if they experience major physical problems or discomfort, or feel the need to terminate for any reason.

Pace: Demonstrate to candidates how they should hike (power walk) the course as fast as possible without jogging. The heel of one foot must make contact before the opposite toe leaves the ground. jogging or running will invalidate the test and require a retest.

Accommodations: Candidates may use gloves or other padding to make the pack more comfortable. A candidate-provided walking staff may be used during the test.

Hydration: If weather is hot, tell candidates to drink plenty of fluids prior to the test. Candidates may elect to carry a water bottle, but the extra weight will not be counted as part of the pack weight.

Essentials of Good Testing

- *An accurately measured flat course with good surface.
- * Proper weight packs. Use the specified water bags and verify pack weight with a calibrated scale. If alternative packs are used encourage candidates to adjust them properly.
- * Duplicate and accurate timing. Give candidates split times along the course (e.g., at one mile or the mid point - 1.5 mile for Pack Test).
- * Candidates should be rested and well informed about the course and the need to maintain a fast pace.
- * Favorable environmental conditions. Avoid adverse conditions.
- *Complete the PAR Q physical activity readiness questionnaire and sign an informed consent form.

Safety

A locally developed safety/med evacuation plan must be prepared for the course.

Test administrator(s) must be familiar with the safety plan.

A trained and qualified American Red Cross First Responder (or equivalent) who knows the symptoms of physical distress and appropriate first aid procedures must be on site during the test.

Avoid use of roads and intersections ' where traffic is a problem ' or concern. When using roads, use traffic control devices and traffic controllers in hi-visibility vests as needed.

Require candidates to read and sign the PAR Q health screening questionnaire and an informed consent form.

Check to see that candidates are wearing proper (above ankle) footwear.

Encourage candidates to stretch and warm up prior the test.

Do not test tired or injured individuals, or test during conditions that could compromise health or safety.

Monitor candidates to identify those having difficulties and encourage them to terminate the test if necessary.

Encourage fluid intake and replacement and provide fluids in route when . heat stress conditions (temperature/humidity) exist.

At the mid-point, terminate those who are substantially behind the required pace (22.5 minutes

for 1.5 miles) and/or are having difficulty maintaining the pace. Candidates cannot jog or run to make up time.

Encourage a cool down with an easy walk after the test. Monitor the recovery of candidates who appear exhausted or distressed.

Recommend several weeks of training before retaking the test.

Training for the Pack Test

Begin at least 4 to 6 weeks before you report for duty. Train by hiking or power walking, using the ankle height footwear you will use in the test.

- Hike a 3 mile flat course without a pack. When you can cover the course in less than 45 minutes;
- Add a pack with about 25 pounds to your training hikes;
- Increase the pack weight until you can hike 3 miles in 45 minutes with a 45 pound pack. Also:
 - hike hills (w pack) to build leg strength and endurance
 - jog the flat course (w/o pack) to build aerobic fitness
 - hike/jog over distance for stamina
 - engage in cross-training (mountain biking, weight lifting).

Finally, do job-specific tasks and training to become work hardened for the coming season. Wear work boots on extended hikes. Work with hand tools to prepare trunk and upper body muscles for prolonged work. Work hardening insures that the hands, feet, muscles, tendons and ligaments used on the job are tough and ready to go.

APPENDIX G.

PAR Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

| YES | NO |
|-------|-------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

| IF YOU ANSWERED YES TO ONE OR MORE QUESTIONS |
|--|
| Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered yes. XYou may be able to do any activity you want - as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice. XFind out which community programs are safe and helpful for you. |

| IF YOU ANSWERED NO TO ALL QUESTIONS | DELAY BECOMING MUCH MORE ACTIVE: |
|---|---|
| If you answered NO honestly to <u>all</u> PAR-Q questions, you can be reasonably sure that you can: Xstart becoming more physically active - begin slowly and build up gradually. This is the safest and surest way to go. Xtake part in a fitness appraisal - this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. | Xif you are not feeling well because of a temporary illness such as a cold or fever - wait until you feel better; or Xif you are or may be pregnant - talk to your doctor before you start becoming more active. |
| | PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan. |

Informed Use of the PAR-Q The Canadian Society for Exercise Physiology, Health Canada and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

You are encouraged to copy the PAR-Q but only if you use the entire form

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction.

Name:

Signature: _____

Date:

Signature or Parent _____
or Guardian (for participants under the age of 18)

Witness:

APPENDIX L.**FIRE EFFECTS ON SELECTED SPECIES (TAKEN FROM FEIS)**

| SPECIES | FIRE ECOLOGY/ADAPTATION |
|--|---|
| Achillea millefolium (western yarrow) | Generally increases after fire of low to moderate intensity. Resprouts from extensive rhizomes. |
| Agropyron cristatum (crested wheatgrass) | Minimum leafy material transfers little heat below surface. Rapid regrowth of tillers following fire. |
| Ambrosia psilostachya (western ragweed) | Top killed by fire but rhizomes survive. Considered an increaser post fire. |
| Artemesis cana ssp. cana (silver sagebrush) | Mortality directly related to fire intensity and season. Fall burning and higher intensity fires increase mortality. Resprouts after most fires and is considered moderately tolerant of fire. |
| Artemisia nova (black sagebrush) | Plants are readily killed by most fires. Re-establishment occurs through off site seed sources. General will not carry a fire. |
| Artemesia spinescens (bud sage) | Plants killed by fire. Would be nearly impossible to carry fire due to lack of fuels. |
| Artemisia tridentata ssp. tridentata (Wyoming big sagebrush) | Plants killed by most fires. Re-establishment through on site seed and off site sources.. |
| Artemisia tridentata ssp. vaseyana (mountain big sagebrush) | Plants killed by most fires. Re-establishment through on site seed and off site sources. |
| Artemisia tridentata ssp. wyomingensis (Basin big sagebrush) | Plants killed by most fires. Re-establishment through on site seed. Seed in surface layer stimulated by low intensity fires. |
| Atriplex canescens (fourwing saltbush) | Reported as tolerant of fire. Sprouts vigourously after fire and quickly recovers to pre-burn levels. Low volitization rate, very difficult to burn. |
| Atriplex confertifolia (shadscale saltbush) | Low volitization rate, very difficult to burn. |
| Atriplex gardneri (Gardner's saltbush) | Low volitization rate, very difficult to burn. Very low fuel load. |
| Bromus inermis (smooth brome) | Tolerant of fire when dormant due to extensive rhizomes. Mortality increases with fire intensity and during active growth. |
| Bromus tectorum (cheatgrass) | Frequent fire favors cheatgrass. Annual reproducing by seed quickly re-establishes post fire. |
| Calamagrostis canadensis (bluejoint reedgrass) | Generally survives most fires through extensive rhizomes. Fires of high intensity which cause high soil temps. kill rhizomes. |
| Carduus nutans (musk thistles) | Biennial plant colonizes disturbed sites through wind dispersed seed. If plant can be burned before seed development, it may prevent additional seed dispersal. Difficult to burn before plant dies and disperses seed. |
| Centaurea repens (Russian knapweed) | May be top killed by fire, but sprouts from rhizomes and re-established from seed. |
| Cirsium arvense (Canada thistle) | Survives most fires through perennating buds located on underground roots. Also re-establishes through seed. |

| SPECIES | FIRE ECOLOGY/ADAPTATION |
|--|---|
| Cornus sericea (red-osier dogwood) | Sprouts from roots and stolons. Considered semi-tolerant of fire. Light fires which partially remove duff stimulate germination of buried seed. |
| Elaeagnus commutata (Silverberry) | Reportedly tolerant of fire and readily resprouts from rhizomes following fire.. |
| Eleocharis palustris (common spikerush) | Plants survive fire through extensive rhizomes. Postfire production is generally higher. Soils are generally moist, however drought may cause fire to burn into organic matter and kill plants. |
| Elymus elymoides (bottlebrush squirreltail) | Rapid combustion of folilage with little downward heat transfer makes the plant tolerant of fire. Damage has been reported when burned during May and when successive years of growth accumulate increasing fire loads. |
| Elytrigia repens (quackgrass) | Tolerant of fire when dormant. May be injured severely if burned while actively growing. |
| Festuca idahoensis (Idaho fescue) | Considered fire sensitive and is severely damaged by summer and fall fires due to its growth form of a fine dense tuft. |
| Grindella squarrosa (curlycup gumweed) | Top killed by fire, but quickly re-established after a fire. |
| Halogeton glomeratus (halogeton) | Burning does not appear to control halogeton as it readily re-invades sites. |
| Juncus balticus (baltic rush) | Plants survive fire through extensive rhizomes. Postfire production is generally higher. Soils are generally moist, however drought may cause fire to burn into organic matter and kill plants. |
| Lepidium latifolium (perennial pepperweed) | Survives by sprouting from underground tap root and rhizomes. |
| Leymus cinereus (Basin wildrye) | Considered adapted to fire. Coarse stems insulate perennating buds. Burning during plant dormancy encourages rapid recovery |
| Oryzopsis hymenoides (Indian ricegrass) | May be slightly damaged by higher intensity fires. Low culm density reduces charring below the soil surface. |
| Phalaris arundinacea (reed canarygrass) | Fire top kills plant, but resprouts from extensive rhizomes. |
| Phleum pratense (timothy) | Generally well adapted to fire. Fire may stimulate the production of reproductive tillers. |
| Poa pratensis (Kentucky bluegrass) | Tolerant of fire when dormant. Mortality increase when plant is actively growing. |
| Poa secunda (Sandberg bluegrass) | Relatively fire resistant due to low fuel loads and its rapid maturation. |
| Populus angustifolia (narrowleaf cottonwood) | Reported to sprout after low intensity fires, however several studies indicate even mature trees killed by cool fires. Fire should not be used where maintenance of mature cottonwoods is desired. |
| Rhus trilobata (skunkbush sumac) | Generally sprouts vigorously from root crown and rhizomes following fire. Crown width and overall coverage often increase following fire. |
| Ribes aureum (Golden currant) | regeneration probably favored by low to moderate intensity fire because germination of soil-stored seed is generally enhanced by scarification in Ribes spp. |
| Rosa woodsii (Wood's rose) | Moderately tolerant of fire and usually favored by low intensity fires, as root crowns and rhizomes survive. |

| SPECIES | FIRE ECOLOGY/ADAPTATION |
|---|---|
| Salix bebbiana (Bebb willow) | Sprouts vigourously from the basal stem following fire. Quick hot fires maximize sprouting. |
| Salix exigua (sandbar willow) | Sprouts from roots after fire. High fuel and soil moisture content reduces fire ignition and spread. |
| Salsola kali (Russian thistle) | No data on effects. Can spread fire by rolling. |
| Sarcobatus vermiculatus (black greasewood) | Resprouts readily following fire. Small fuel loads limit burning to extreme conditions in most sites. |
| Scirpus validus (soft-stem bulrush) | Sprouts from rhizomes following fire. Fire increases protein content in Scirpus acutus. |
| Shepherdia argentea (Silver bufaloberry) | Fair tolerance to fire in dormant state and can sprout from root crown after fire. |
| Solidago missouriensis (prairie goldenrod) | Good tolerance to fire when dormant. |
| Sporobolus airoides (alkali sacaton) | Clumped growth habit and loose coarse culms limit heat transfer into the root crown, allowing most plants to survive fire. |
| Stipa comata (needle-and-thread) | Can be severely damaged by fire. Re-establishes through seed. |
| Tamarix ramosissima (saltcedar) | Considered to be fire adapted. High fule moisture and salt content make ignition difficult. Increase flowering and seed production after fire. |
| Typha latifolia (cattail) | Quickly regrows from rhizomes after fire. Mosaic burns may enhance habitat for some species. Manipulation of water levels pre and post fire have provided control of cattail at some sites. |

Appendix Q: Wyoming Air Quality Permit

Wyoming Department of Environmental Quality (DEQ) request for open burning permit application submission information.:

The name, address, and telephone number of the person submitting the application;

The type of business or activity involved;

A description of the proposed equipment and operating practices, the type, quantity, and composition of wastes to be burned, and the expected composition and amount of air contaminants to be released into the atmosphere;

The schedule of burning operations;

The exact location where open burning will be used to dispose of such waste;

Reasons why no method other than open burning can be used for disposal;

Evidence that the proposed open burning has been approved by any fire department which may have jurisdiction. Upon approval of the application by the Division of Air Quality, the person may proceed with the operation without being in violation of Subsection (b)(i).

A permit application is available on line at
<http://www.crh.noaa.gov/cys/firewx/OpsPlan/cysopla.htm#SPOTF>