

FIRE MANAGEMENT PLAN
FOR
RAINWATER BASIN
WETLAND MANAGEMENT DISTRICT
Kearney, Nebraska

Recommended by: _____ Date _____
Project Leader,
Rainwater Basin Wetland Management District

Reviewed by: _____ Date _____
Prescribed Fire Specialist,
Mountain-Prairie Region

Concurred by: _____ Date _____
Regional Fire Management Coordinator,
Mountain-Prairie Region

Concurred by: _____ Date _____
Geographic Associate Regional Director,
Nebraska/Kansas/Colorado/Utah

Approved by: _____ Date _____
Regional Director,
Mountain-Prairie Region

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I. INTRODUCTION

In 1962, the U.S. Fish and Wildlife Service (FWS) began acquiring waterfowl production areas in the Rainwater Basin. The Rainwater Basin Area (RWB) encompasses parts of 17 south-central Nebraska counties covering approximately 4,200 square miles and contains over 3,900 irregularly distributed fresh water wetlands (Figure 1). The Rainwater Basin Wetland Management District (RBWMD), headquartered in Kearney, Nebraska, administers 59 Waterfowl Production Areas (WPA's) and includes the McMurtrey Refuge. Additionally, 4 other non-basin areas composed of riparian and prairie grassland habitat, are managed by the Service. A total of 24,033 acres are managed of which 12,712 are wetland and 10,511 are upland. The Wetland Management District is managed as part of the National Wildlife Refuge System.

The RWB is the primary spring staging site for waterfowl in the Central Flyway. Nearly the entire population of mid-continent snow geese, 90% of the mid-continent population of white-fronted geese, 50% of the continental population of mallards and 30% of the continental population of pintails use the RWB. An estimated 7-9 million ducks use the basin every spring. Waterfowl biologists believe no other midway stopover between wintering grounds and nesting grounds can replace the combination of wetlands and grainfield in close proximity found in south-central Nebraska. The importance of the complex, particularly to waterfowl, is incalculable.

When the midcontinental spring migration routes of ducks, geese and cranes are plotted on a map, a distinctive hourglass shape emerges with a broad expanse of breeding grounds at the top, a broad expanse of wintering grounds at the bottom and a narrow constriction at the center—a 150-mile-wide band across the central Platte River Valley and the heart of the Rainwater Basin.

Fire Management Planning in the Fish and Wildlife Service became a priority after four significant events. The first two events were fatalities to Service employees in Georgia at Okefenokee NWR in 1979 and Merritt Island NWR in Florida in 1981. Third major event was the Yellowstone Fires of 1988 whereby policy was established requiring all federal wildland agencies develop Fire Management Plans, except where Regional Directors allowed waivers excluding some FWS units. The last major event was the death of 14 firefighters in Colorado in 1994. The Secretaries of Agriculture and Interior made it policy that all federal wildland agencies with burnable vegetation develop Fire Management Plans that meet certain criteria. No exceptions or waivers will be allowed.

This Fire Management Plan is written to help achieve resource management goals and objectives as defined in the Station Purposes, Mission, Goals, and Objectives and as addressed in the Environmental Assessment of Alternatives for Management of Upland Habitats on the Rainwater Basin Wetland Management District (Appendix A & B). 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 RWB land management goals. This plan will be evaluated and updated in future years as required by changes in policy, management actions, and priorities.

U.S. Fish and Wildlife Service policy requires that an approved Fire Management Plan must be in place for all of 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. This plan updates the May 13, 1983 Rainwater Basin Wetland Management District Fire Management Plan and meets that commitment.

This Fire Management Plan describes fire management programs, activities and methods that will be undertaken by the U.S. Fish and Wildlife Service in meeting the wildfire suppression objectives and fire management strategies which utilize prescribed fire to attain the habitat environmental effects of fire management in relation to district resources, the local environment, as well as impacts to the public, adjacent landowners and surrounding communities.

II. COMPLIANCE WITH FISH AND WILDLIFE SERVICE POLICY

Rainwater Basin Wetland Management District was established for management of upland habitats to restore and maintain habitats to meet wildlife objectives. Establishing orders are to provide habitat for migratory birds under the provisions of the Migratory Bird Conservation Act (16 U.S.C. 715d) and the Migratory Bird Hunting and Conservation Stamp Act (16 U.S.C. 718c). In addition, wetlands of the Nation are to be conserved in order to maintain the public benefits they provide and to help fulfill international treaty obligations for migratory birds.

- A. This plan meets National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) compliance. An Environmental Assessment (EA) of Alternatives for the Management of Upland Habitats, including Fire Management, was completed in May 1994 and is on file. A new EA will not be completed for prescribed fire due to new regulations published in the Federal Register (62 FR 2375) January 16, 1997. The

II. COMPLIANCE WITH FISH AND WILDLIFE SERVICE POLICY

new regulation categorically excludes prescribed fire when used for habitat improvement purposes and conducted in accordance with local and State ordinances and laws. Wildfire suppression actions and prescribed fire are both categorically excluded, as outlines in 516 DM 2 Appendix 1.

B. The U.S. Fish and Wildlife Service (Service) policy requires that all Service lands with burnable vegetation develop a Fire Management Plan that details 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 Rainwater Basin Wetland Management District.

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

D. Federal Laws, Regulations and Authorities relating to the Fire Management Program 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 USC 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.

II. COMPLIANCE WITH FISH AND WILDLIFE SERVICE POLICY

5. Departmental Manual (620 DM 1 (April 10, 1998)) . Defines Department of Interior Fire Management Policies.
6. U.S. Fish and Wildlife Service Manual, 621 FW 1-3, Fire Management (February 7, 2000. Defines Fish and Wildlife policies based on Departmental Manual 620 DM.
7. U.S. Fish and Wildlife Service Wildland Fire Management Handbook (December 28, 2000). 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).

III. DESCRIPTION OF WETLAND MANAGEMENT DISTRICT

A. General Description

Mixed grass prairie historically covered the western half of the RWB and tallgrass prairie the eastern half of the area. Virtually all the RWB is intensively farmed for irrigated corn production. The few exceptions are wooded farm sites, road ditches, riparian areas and state/federal wildlife areas.

The RWB Area (Figure 1.) is characterized by flat to gently rolling loess plains formed by deep deposits of silt-loam soils. The area has numerous closed basins in the upper portions of the larger watersheds of the Little Blue and Big Blue Rivers in the eastern RWB Area and smaller creek systems in the western RWB Area.

Wetlands in the area are playas, and were formed by the wind. Depressional areas developed impermeable clay layers from fine clay particles being transported to the areas during peak runoff events.

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It is estimated that there were originally 4,000 wetland basins covering 100,000

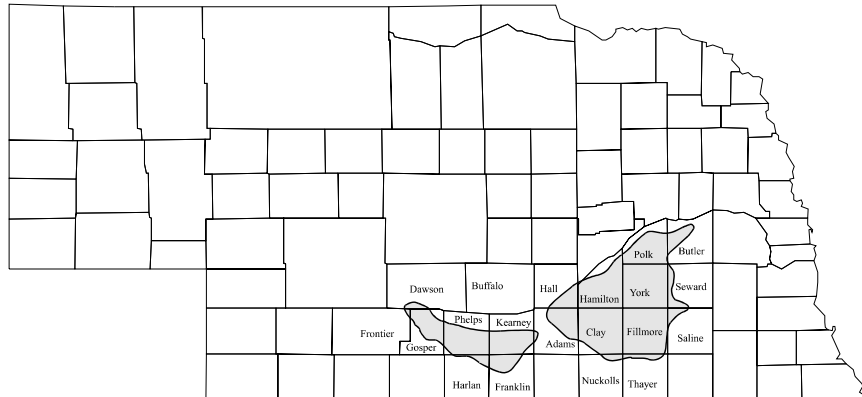


Figure 1. Rainwater Basin Wetland Management District. See Appendix for detailed county maps.

acres at the time of European settlement. Large scale drainage by agriculture beginning in the early 1900's and continuing to the present day has resulted in a loss of 91% of the original wetlands and a loss of 78% of the original wetland acreage (Gersib et al, 1990).

B. Topography and Soils

Physiographically, the area is within the Central Loess Plains. The topography is flat to gently rolling with elevations ranging from 2500 foot in Phelps County in the west to 1500 in Fillmore County in the east. Soils are predominantly wind deposited silty-clay loam (Loess).

The Rainwater Basin area is characterized by gentle to rolling loess plains formed by deep deposits of silt loam soils. Recent geological studies by Starks (1984) and Krueger (1986) indicate that winds began reshaping the landscape during a period of arid or semi-arid conditions some 20,000 to 25,000 years ago. Similar conditions and some further reshaping may have occurred 5,000 to 7,000 years ago and again 3,000 to 4,000 years ago. Wetlands were carved out by these winds, the wind created characteristic ridges along south sides of depressions.

Water accumulation in the depressions resulted in the downward movement of clay particles forming a dense clay lens 6 to 72 inches thick. When wet, this lens forms a barrier nearly impervious to water movement.

Wetland soils are generally broken into four types. The soil under the most permanent water regime is the Massie soil. Seasonally flooded wetlands are generally associated with the Scott soil. Temporarily flooded wetlands are associated with the Fillmore soil. Butler soils, which are considered hydric

III. DESCRIPTION OF WETLAND MANAGEMENT DISTRICT

because of inclusions of the three previous soil types are usually only flooded during extreme high water periods. Generally, Butler soils are farmed in most years.

C. Climate

The climate is characterized by long, hot summers and cold, dry winters. Conditions are seldom average. The extremes, or deviations from the mean, are essential parts of the climate. Average annual precipitation within the RWB Area ranges from 21 inches in Gosper County in the west to 29 inches in Butler County in the east. Generally, 70% to 80% of all annual precipitation falls during the months of April through September. Temperatures commonly range from 105 to -20 F annually. Prevailing winds are southerly from May through October, and from the north and northwest for the remainder of the year.

Local afternoon severe thunderstorms, often with tornadoes and severe winds, are common during spring and summer months.

D. Vegetation

The major plant communities found throughout the RWB WMD are grassland and wetlands. Private land cropland is the major land use. What was once tall grass prairie is now fence-row to fence-row cropland. The intensively used irrigated farm land produces abundant crops of corn, sorghum, soybeans, winter wheat, and alfalfa. New federal acquisitions of land are almost always cropped at the time of purchase.

Uplands on Waterfowl Production Areas (WPA's) have been planted to native warm season grasses. Major species include big bluestem, Indiangrass, switchgrass, little bluestem, side oats and blue grama. Cool season grasses which commonly invade from surrounding areas are Kentucky bluegrass and smooth brome. Some grasslands have occasional brush clumps of wild plum occurring in them. The overall objective of management is to keep the grassland in a healthy condition with vigorous growth and abundant cover. Grassland habitats are the preferred habitat of migratory birds and the threatened and endangered species which use the area.

In recent years efforts have been increased to restore the native forb or herbaceous plants which are largely missing from restored prairie. These species were completely eliminated by farming. Handpicking of species such as compass plant, purple prairie clover, yellow coneflower, leadplant, etc. and incorporating them in seed mixes is being conducted.

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RWB wetlands are generally large, 100 to 700 acres, and shallow, 1' to 3' of water. They are generally dominated by emergent wetland vegetation over most of the acreage. These wetlands commonly dry out during hot summer months, creating ideal conditions for emergent plant growth. Common plant species are smartweed, spikerush, arrowhead, and wild millet.

Semi permanent wetlands represent a small portion of the total wetland area. Deeper zones are open water and the more shallow zones are composed primarily of hardstem bulrush, river bulrush, common cattail and occasionally small amounts of floating pondweed.

Riparian woodland, vacant farmsites, wooded wetland margins, and planted shelterbelts are present on some WPA's. Deciduous trees that are most abundant are cottonwood, green ash, honey locust, slippery elm, and boxelder. The most common evergreen is eastern red cedar. If allowed to flourish these species can invade grasslands and choke wetland edges enough to seriously degrade use by migratory wetland birds.

E. Fire Behavior

Data and descriptions for the following fuel models obtained from [Aids To Determining Fuel Models For Estimating Fire Behavior](#) (Anderson 1982), and "Behave: Fire Behavior Prediction and Fuel Modeling System" (Version 4.1).

Fuel Model 1 - shortgrass. Fire spread is governed by the fine, very porous, and continuous herbaceous fuels that have cured or nearly cured. Fires are surface fires that move rapidly through the cured grass and associated material. Fuel loads average 0.74 tons/acre with a fuel bed depth of one foot.

Fire behavior in this fuel model is directly related to fine fuel moisture and windspeed. Rates of spread can reach 446 chains/hour and flame lengths of 10' with a fine dead fuel moisture of 3% and midflame windspeed of 10 mph. Spot fires are generally not produced because fuels are consumed rapidly.

Fire fronts tend to become irregular as topography, fuel loads, wind, or natural barriers speed up or slow movements. Depending on windspeed, resistance to control is low to moderate.

Fuel Model 3 - tallgrass. Fire in this model is the most intense of grass fuel models and displays high rates of spread under the influence of wind. Wind may drive fire into the upper heights of the grass and across existing barriers. Fuel loads consist of fine and course dead fuels average 3.0 tons/acre with a fuel bed depth of 2.5 feet.

Rates of spread can reach 387 chains/hour and flame lengths of 25' with a fine

III. DESCRIPTION OF WETLAND MANAGEMENT DISTRICT

dead fuel moisture of 3% and midflame windspeed of 10 mph. Short range spotting (500') is common. Resistance to control is very high to extreme.

F. Wildlife

The most widely recognized wildlife use of the RWB Area is by spring migrating waterfowl. The RWB is the major spring staging area for waterfowl in the Central Flyway with tremendous concentrations during late February, March and early April. Approximately 3 million snow geese, 375,000 Canada geese, and 500,000 white-fronted geese use the area during March. Concentrations of 200,000 to 500,000 geese have been observed in recent years on the larger WPA's including Funk, Harvard, Johnson, Smith, and Mallard Haven.

Populations of mallards and pintails arrive in late February. An estimated 7-9 million ducks pass through the area. Later arriving species of prominence include green-winged and blue-winged teal, northern shoveler, gadwall, widgeon, redhead, scaup, ring-necked ducks, and smaller numbers of canvasback, bufflehead, and ruddy ducks.

Fall migration use is much less than spring use with peak population levels only 1/4 or less of spring numbers.

Approximately 15-30 whooping cranes are observed on WPA's during April and again in October. They generally migrate in small groups composed of one to three families consisting of 2 to 11 individuals. RWB wetlands are the second most frequently used spring migration habitat and the third most frequently used fall migration habitat in the Central Flyway (Jobman, 1989).

Over 100 bald eagles visit WPA's during mid-February through March. They generally concentrate on RWB wetlands with large concentrations of waterfowl. Individual WPA's often have 10 to 20 eagles on them.

Other more infrequent endangered species sightings include peregrine falcons, piping plover, and the interior least tern. These species spend only short time periods during migration in the area and are rarely sighted.

The white fringed prairie orchid, the American burying beetle, and the Eskimo curlew are believed to have been present in the Rainwater Basin area but have been extirpated.

Use by shorebirds during spring and fall migration is believed to be significant to continental populations of these species. Late April through May drawdown conditions create ideal habitat for populations of Baird and pectoral sandpipers, dowitchers, longbilled curlews, Wilson's phalaropes, and lesser yellowlegs. During late summer and early fall months these species again pass through and

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are most apparent on disked moist soil managed areas, flooded cornfields, or other locations where bare soil and water are present.

Wading birds are common spring and summer inhabitants on wetlands. Snowy, great, and cattle egrets are common along with smaller numbers of white faced ibis, black crowned night herons, green herons, black terns and other species. Some nesting populations of these species occur but no significant colonial nesting colonies are known.

A total of 257 species of birds use the RWB WMD. Neotropical migrants, grassland nesting short-distance migrants, resident songbirds and game birds, and raptors are represented. Because of the intense farming practices, WPA's and Nebraska Game and Parks Commission Wildlife Management Areas are the only significant habitat for these species to use as nesting, migration, or winter cover.

Mammals present are those which are commonly associated with prairie grasslands. Populations of both white-tailed and mule deer are present. Beaver, muskrat, mink, coyote, red fox, badger, striped skunk, and weasel are present on many areas. Small game populations of prairie dogs, fox squirrel, cottontail and jackrabbits are also present. In addition to the larger species ground squirrels, mice, kangaroo rats and other prairie rodents are common on WPA's.

Common reptile species include snapping turtles, bull snakes, garter snakes, and box turtles. Common amphibians are northern chorus frogs, leopard frogs, bull frogs, and salamanders.

G. Improvements

Most managed areas have permanent fences and water pumping stations. In addition, the FCC Area and McMurtrey WPA contain permanent buildings.

H. Cultural Resources

No historical, architectural, archaeological, or other significant cultural resources are known to be present on the Basin Wetland Management District. Most WPA's have not had detailed archaeological investigations conducted. There has been no evidence indicating significant resources exist. Smith WPA in Clay County was found to have been used by Indian tribes as a camping and hunting area. That is the only American Indian historic evidence found on any area. No pioneer-aged buildings or other more recent historical or archaeological evidence has been found.

No museum quality artifacts or documents exist in files or office locations.

I. Rainwater Basin Fire Environment and History

The RWB Area is predominantly an intensive row-crop farming region. For this reason, late spring fires are the easiest to control because surrounding fields have been worked and brome dominated road ditches are generally "greened up" enough to burn slowly. Early spring fires are of next greatest ease. Mid-fall fires are the most difficult because surrounding fields have standing corn in them until mid to late October. Wildland fire occurring later than October will result in little winter cover available for wildlife.

Fires were historically an important environmental factor in the area. It is estimated that fires occurred an average of every 4-7 years per site, with frequency being greatest in the tall grass prairie. This assumed fire frequency is based on work by Ryan (1986) and Higgins et al (1986) which indicated that a fire frequency of every 2-5 years probably occurred on the tall grass prairie prior to European settlement. Fire frequency is believed to be greatest in the eastern part of the prairie and less frequent westward. Wright and Bailey (1980) state that "prescribed fire frequency should not be more often than 5-8 years in a 20 inch precipitation zone but can be as often as 1 to 3 years in a 35 to 40 inch precipitation zone".

Fire frequency was historically greatest in August and September when temperatures are very warm and rainfall is generally sparse.

The absence of fires results in areas reverting from native warm season grasses to non-native cool season grasses or forest. Invasion may be relatively rapid, with some sites becoming 70% forested in less than 20 years.

Wildfire occurrence is relatively infrequent with fire records showing a total of 9 wildfire burning 840 acres from 1977 thru 1997. (Appendix C) Most wildland fires at Rainwater Basin Wetland Management District are planned ignitions with 94 burns over the past twenty years burning 10,496 acres. Old records from 1969 to 1982 show ten wildfires that burned a total of 1,073 acres (Appendix D, 1983 FMP). No prescribed fire statistics are available.

The primary fire season is split between fall and spring. The fall fire season begins soon after killing frosts occur which result in large amounts of dead standing vegetation. Fire danger remains high until snow or cool, wet weather occurs. Prevailing weather during winter is from the west and northwest and fall and winter are generally the driest portions of the year. The spring fire season begins in late winter when warm weather begins and the vegetation dries out. Fire danger may remain high throughout spring until vegetation growth is well underway (usually early June). Specific fire seasons include: Fall - Oct. 15 thru Dec. 10, and Spring - April 1 thru June 15.

J. Air Quality and Smoke Management

The Rainwater Basin is blessed with excellent air quality. The area is largely rural with no significant manufacturing emissions or land forms which create winter inversions. Winds are common and mixing occurs readily on most days. Localized visibility problems with blowing dust or smoke from prescribed fires can at times occur and cause poor visibility within a mile of the source. No significant local concerns exist about air quality.

K. Water Resources

Water for wetlands comes from a variety of sources. The most common and natural source is rainfall and the resulting runoff from the surrounding watershed. Peak runoff periods are in spring from snow melt and from heavy summer rain showers. In most cases the surrounding uplands are heavily farmed and drainage ways often have numerous reuse pits that capture some runoff water before it reaches wetlands. In some areas wetlands will receive almost no runoff unless storms exceed 2-3 inches of rainfall.

Throughout the entire basin area the major supplemental water source is well water. Underground wells supplied by water from the Ogallala aquifer are the major irrigation source for most private landowners and for the majority of larger wetlands on WPA's. The district has a total of 29 wells which supply water to 20 WPA's.

Wetlands improve water quality by filtering out agricultural chemicals and nutrients. A one-acre wetland can serve as a nitrogen trap for 100 acres of cropland. In addition, wetlands are important to groundwater supplies. Small wetlands, as well as the most frequently cropped wetlands, can recharge or contribute to local groundwater supplies.

L. The Role of Fire on Rainwater Basin Wetland Management District

1. Vegetation and Fuels (FMIS Fire Effects)

Grasslands are burned primarily to manipulate vegetation and enhance biological productivity and diversity of specific organisms. The use of fire will help reach wildlife management objectives. Fire will be used to retard invasion of undesirable species and open up overgrown areas, and reduce vegetative litter. Manipulation of grassland plant communities provide optimum plant vigor, growth, and density. Without manipulation, the grasslands become stagnant and decadent.

Fire is an important tool, especially in areas where uplands would revert to a forest community. Increased use of fire would cause a gradual decline of forested areas on WPA's. A healthy grassland community would more effectively compete with non-native plants and favor native prairie wildlife over forest wildlife. The grassland/wetland community would enlarge and be composed of a wider variety of successional stages, and possibly add additional species.

Fire will also be an important grassland management tool. It will be used to remove accumulations of mulch and dead plant material in order to expose the soil surfaces to sunlight and increase early spring soil temperature needed for plant growth.

The absence of fire results in areas reverting from native warm season grasses to non-native cool season grasses or forest. Invasion may be relatively rapid, with some sites becoming 70% forested in less than 20 years.

Manipulation of marsh vegetation provides the optimum interspersion of open water and stands of emergent vegetation. Without manipulation, wetlands may become overgrown with vegetation and have a reduced value to waterfowl

2. Wildlife (FMIS Fire Effects)

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

Endangered species would be benefitted by increases in suitable habitat.

Hunting and bird watching opportunities would increase slightly on some WPA's and significantly on those which are currently only minimally managed

Increases in the frequency of fire would reduce the frequency of grazing on uplands.

Timing of fire has profound effects on wildlife. Early spring fires may provide courtship display areas or early green food. Late fires may destroy bird nests.

Wetland fires are sometimes used to remove old plant litter, especially cattails. Removal may invigorate growth and create a more dense stand for nesting rails or yellow-headed blackbirds or facilitate marsh disking which is used to provide habitat for shorebirds and many species of waterfowl.

3. Air Quality

Air and water quality would remain largely unchanged.

Particulate 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. Smoke effect can be mitigated by burning with wind and unstable atmospheric conditions to loft smoke and dissipate most ground level smoke.

The management of smoke is incorporated into the planning of prescribed fires. The majority of fuels are fine and create little smoke as these fuels are consumed rapidly. Air quality in the Wetland Management District area is usually very good. The presence of smoke must be expected from any type of burn, but smoke will not be an air quality problem. Visibility along roads located adjacent to the boundary of the District may be temporarily affected by smoke.

Open burning permits are required by the State of Nebraska. The permit is issued in accordance with Nebraska Statute 81-520.01. Air quality regulations may necessitate an additional permit from the Department of Environmental Control. Phone (402) 471-2186.

Nebraska Statute 81-520.01 is a "Statewide open burning ban; waiver; permit". The fire chief of a local fire department or his or her designee may waive an open burning ban under his or her jurisdiction when conditions are acceptable to the chief.

4. Soils

Given adequate soil moisture, fire generally increases vegetative growth

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and plant reproduction. Plants are often greener, larger, and more vigorous. 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 mid-summer.

Upland soils are dominated by silt loam classified soils. They are generally fertile soils with moderate permeability and are highly productive. Most uplands are not considered highly erodible because of the gently sloping topography and the heavy nature of soil. Fire will only be beneficial.

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.

5. Fire Management Impacts

The management of wildland fire involves both the suppression of wildfire and the planned ignition of wildland fire under controlled conditions

III. DESCRIPTION OF WETLAND MANAGEMENT DISTRICT

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Rural Volunteer Fire Departments (RVFD) maintain jurisdiction over all open burning within their respective districts. Currently, RVFD's typically are the first to be called to respond to a wildfire, and generally extinguish all wildfires that are burning. Most RVFD's are located at such a distance, that response time would not be adequate to contain a wildland fire within Service boundaries.

Prescribed burning is conducted under strict guidelines outlined in an approved Prescribed Burn Plan. The use of wildland fire as a management tool will decrease the accumulation of organic litter and standing and/or down woody fuels. This would allow for easier suppression of wildfires and reduce the likelihood of an escape off of Service lands. Additionally, this would also allow habitat management objectives to be met for these units.

Impacts due to smoke are mitigated by following the prescription outlined in the Prescribed Burn Plan. The prescription is designed to allow adequate lifting and dispersal of smoke over sensitive areas and for the notification of local residents. Under certain circumstances, visibility on roads may be impaired for short periods of time. This can be mitigated by placing warning signs and if warranted, flaggers ahead of the smoke warning drivers and directing traffic. It is likely that the smell of smoke may be apparent in the immediate vicinity for the duration of the

prescribed burn.

IV. FIRE MANAGEMENT OBJECTIVES

Operating Statements, operational plans, Executive Orders, and laws pertaining to National Wildlife Refuge system lands include objectives which pertain to fire management.

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, public and private property, and natural and cultural resource values. Service policy and the Wildland Fire Policy and Program Review direct an agency administrator to use the appropriate management response 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).

The mission of the Rainwater District is to protect, restore, and manage wetlands and prairie grassland habitat in support of the North American Waterfowl Management Plan; provide resting, nesting, feeding, and staging habitat for waterfowl and other migratory birds; protect endangered and threatened species and their habitats, restore the natural flora and fauna (as practical) for tall-grass prairie ecosystems; and increase public opportunities for outdoor recreation and environmental education.

Specific management objectives are found in Rainwater Basin Wetland Management District and Sandhills Habitat Office Station Purposes, Mission, Goals, and Objectives. The Station Objectives are:

- <to enhance wetland habitat for millions of migratory birds which concentrate in southcentral Nebraska during spring and fall migration.
- <to improve habitat for the propagation and protection of endangered species, especially whooping cranes, least tern, and piping plover.
- <to reestablish plant abundance and diversity associated with tall-grass and mid-grass prairie ecosystems.
- <to expand wetland conservation through partnerships with other agencies, private

organizations, and landowners.

<to provide opportunities for public participation in a wide range of outdoor recreation and interpretation activities

Service objectives state that the Service will take an active role in suppressing and preventing FWS wildfire. Fire will be used as a management tool when it has been proven to be the most cost effective or the only way to achieve District objectives.

A. General

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

1. Fire is a part of National Wildlife Refuge program.
2. Wildfire has the potential for negative impacts 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 to minimize resource damage.
5. Rapid rates of spread and fire suppression response time could pose suppression problems and increase the likelihood of escape onto adjacent lands.

Fire management objectives (standards) are used in the planning process to guide in determining what fire management responses and activities are necessary to achieve land management objectives.

It is the intention of the fire management program to support the management objectives and operational goals of the District by protecting resources and habitats from the undesirable effects of uncontrolled wildfire. The fire management program will also include the use of prescribed fire to restore and enhance district habitats, promote natural diversity and manipulate wetlands to promote primary operational goals of increasing the production of waterfowl.

B. Fire management goals for the Rainwater Basin Wetland Management District:

1. Protect life, property, habitat, and other resources from unwanted fire.

IV. FIRE MANAGEMENT OBJECTIVES

2. Prescribed wildland fire will be used as a management tool to accomplish management goals and objectives to restore and maintain healthy upland and wetland grassland communities.

C. Fire management objectives for Rainwater WMD are:

1. Firefighter and public safety is the priority objective of the program.
All Fire Management activities will reflect this commitment.
2. To protect human life, property, natural/cultural resources, real property both within and adjacent to Fish and Wildlife Service administered lands from those fires which start on FWS lands.
3. Safely suppress all wildland fires using strategies and tactics appropriate to safety considerations, values to be protected, management objectives, and in accordance with Service policy.
4. Suppress cool season grass invasion.
5. Minimize the cost and impact of suppression activities.
6. To invigorate desirable plant species and improve nutrition of vegetation to be used by wildlife.
7. Manage all forms of wildland fire (wildfire, wildland fire, and prescribed fire) to achieve identified management goals.
8. Prevent unplanned human-caused ignitions.
9. Restore and rehabilitate resources lost or damaged by fire or suppression activities.
10. Manage all wildland fire using the Incident Command System.
11. Promote an interagency approach to managing fires on an ecosystem basis.
12. Organize and maintain a fire management capability with adequate equipment, qualifications, fitness, and training to facilitate a safe and efficient prescribed burning and suppression program.
13. Encourage research to advance understanding of fire behavior, effects, ecology, and management.
14. Integrate fire management with all other aspects of resource

management.

15. Aggressively investigate all human-caused wildfire.
16. Remove vegetation cover to facilitate disking of wetlands and weed spraying and grassland interseeding on uplands.
17. Educate the public regarding the uses of fire within the Prairie ecosystem.

V. FIRE MANAGEMENT STRATEGIES

The Service will take aggressive suppression action on all wildland fires consistent with fire fighters' and public safety and resources to be protected.

All wildfires will be suppressed using the Appropriate Management Response concept, commensurate with values at risk. Strategies employing a range of suppression options will be considered. Minimum impact suppression techniques (MIST) will be used where and when appropriate.

A Wildland Fire Situation Analysis (WFSA) will be prepared to govern suppression actions for all fires when it is determined that initial attack efforts will be unsuccessful. The appropriate action will include high intensity direct efforts or lower intensity indirect

V. FIRE MANAGEMENT UNITS

efforts. These levels of response are consistent with land use objectives, and will be executed to minimize suppression cost and resource damage.

Table 1: 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 the 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. 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 the 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 threaten 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 and 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.

The basic fire management strategy for the District will be to control wildfire to achieve specific resource management objectives. 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, also all-out direct suppression actions may be too costly and often ineffective until the fire reaches existing barriers. In these cases indirect strategy will be employed utilizing natural and human-made features as wildfire control points.

A. Strategies

Strategies are as follows and will be employed to meet refuge fire management objectives:

1. All wildfires will be managed using the appropriate management response concept. Resource benefits derived from fire will not be a

consideration when determining the appropriate management response. All management actions will be in accordance with Service policy. 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 threatened resources. It may be necessary to employ an indirect strategy utilizing existing control barriers.

2. Prescribed fire will be used to manipulate degenerated grasslands and help open up wetlands.
3. Suppress all unplanned ignitions in a safe and cost effective manner consistent with resources and values to be protected. Minimum impact strategies and tactics will be used when possible.
4. Conduct all fire management programs in a manner consistent with applicable laws, policies, and regulations.
5. Develop a monitoring program to evaluate and guide the

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V. FIRE MANAGEMENT UNITS

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6. Maintain agreements with local fire suppression agencies for the purpose of cooperating in the suppression of fires on lands within and adjacent to the District boundaries. At present, no agreements exist. A comprehensive agreement (Nebraska Fire Agreement) is being developed which is expected to meet the needs of the District. Agreements with individual fire suppression agencies will

be developed if the statewide agreement does not meet the station's specific needs.

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.

7. Evaluate and rate all plant community sites, in priority order, as to both short-term (five year) and long-term needs for fire to meet above objectives. Consider both the optimum and minimum fire timing, frequency, and intensity for each site, as well as resource objectives, limited personnel/equipment, climatic and other environmental variations, and costs.
8. From results from item 7 above prepare a five year plan which indicates what areas and the number of acres which should receive prescribed fire each year. This information can be utilized to determine direct or indirect strategies when suppressing unplanned ignitions.
9. Evaluate all fire equipment, personnel training and fitness, and operating plans annually, prior to fire season, to determine needs.
10. Hire a biologist, or make refuge operations specialist (ROPS) position more available by hiring another person to assist ROPS, to develop recommendation to guide prescribed fire program to meet above identified goals and objectives.
11. Develop a strategy, based on information obtained by a biologist or other prescribed fire program evaluator, to enable conducting a prescribed fire program necessary to meet above identified goals and objectives. This includes the acquisition of necessary staff and equipment.
12. Prepare some general news releases describing the prescribed fire program and role of fire in the prairie ecosystem. Send news release to area newspapers prior to the prescribed fire season. Also incorporate role of fire in prairie ecosystems in future

brochures and on information kiosks.

B. Constraints

Constraints on the refuge fire management strategies include the following:

1. Adequate funding and staffing.
2. Smoke management must be considered for any prescribed burn and will be addressed in all prescribed burn plans.
3. All wildland fires occurring on the District will have suppression resources on them until mopped-up and declared safe to demobilize.
4. The use of heavy equipment, such as dozers, in and around critical areas must have approval of the Manager or designee.
6. Heavy equipment (dozers, discs, plows, and graders) will not be used for fire suppression except in life threatening situations without the express approval of the Project Leader or his/her designee.
7. Prescribed burning in areas where threatened, endangered, and candidate species exist will not be conducted if the prescribed fire will be detrimental to the species or any adverse impacts cannot be mitigated, Section 7 clearance will be secured, as appropriate.
8. The use of prescribed fire to achieve management objectives must be conducted in a cost effective manner.
9. 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. Rationale

Rationale behind fire management strategies are:

1. An abundance of wind, often exceeding 20 mph for hours at a time, enables prairie fires to spread rapidly. Consequently, Agreements must be maintained with local fire districts and cooperators for their wildfire suppression activities so that assistance can be sought in the event the district staff cannot contain the fire or is unaware of its existence until reported by the local fire department after they have taken action.

Local fire departments are quick to extinguish grassland fires and most wildfire are over before the FWS is even aware a fire occurred.

2. It may be necessary to reduce fuel loading in some areas for fire

safety reasons to reduce the risk from wildfire damage and to keep fire from spreading off site. Grassland ecology an

V. FIRE MANAGEMENT UNITS

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V. FIRE MANAGEMENT UNITS

hazardous fuels are commonly associated with privately owned tree belts and adjoining farm dwellings. Planned burning reduces the

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D. Impacts of Drought and Regional and National Preparedness

Neither organic soils or a deep duff layers which can be affected by drought are present to contribute to unexpected burning conditions. Drought has minimal effect on the grass fuel models since the fuels are light and are not as adversely affected by long term drying. However, period of drought can greatly affect woody species and impact fire behavior and resistance to suppression. For that reason the Palmer Drought Index, and the Keetch-Byram Drought Index will be monitored at a minimum on a weekly bases throughout the year. Both are available on the Internet at <http://www.boi.noaa.gov/fwweb/fwoutlook.htm>. The Refuge fire staff can also contact the Custer Interagency Dispatch Center (605-673-9300) during periods of high fire danger to track indices and anticipate possible fire activity.

If the Palmer Drought Index is -2.0 to -3.9 and/or the KBDI is 501 to 600 or higher, the need for additional personnel and equipment to safely conduct the prescribed burn will be considered and the burn plan modified, as appropriate. If the KBDI is greater than 601 or the Palmer Drought Index is -4.0 or higher prescribed burns will be postponed until conditions moderate.

Large scale fire suppression activities occurring in various parts of the country can have an impact on local fire management activities. For example, resources may be limited to implement prescribed fire activities because the closest available resources may be assigned to fire suppression duties or Refuge personnel may be involved as well. Regional drought conditions may also tie-up local resources that would normally be able to assist with Refuge fire management activities. It may be necessary to go out of Region to get the resources needed to staff the Refuge engine during periods of extreme drought

or high fire danger.

The Refuge is in the Rocky Mountain Area. During National and Regional Planning Levels IV and V, it is necessary to receive approval from the Regional Fire Management Officer and the concurrence of the Rocky Mountain Area Coordination Group to conduct prescribed burns during PL IV and the National Coordination Group during PL V.

Local fire departments issue burn permits to conduct a prescribed burn. Prolonged periods of drought often prompts local fire departments to issue burn bans in their respective districts. If a local burn ban is in effect, then no prescribed burning in that district will be conducted until such time as the ban is lifted and a burn permit can be secured.

VI. FIRE MANAGEMENT UNITS

The Rainwater Basin WMD is composed of 63 distinct tracts of land. These areas range in size from 20 acres to 2,000 acres. A more detailed size description of the areas is found in Table 2.

Table 2. Tracts of land by acreage size.

Area Acreage	Number of Areas
0 - 99	13
100 - 499	32
500 - 999	10
1000+	7

The smaller areas are generally treated as one unit while the larger areas are composed of multiple units. Units are generally defined by permanent natural boundaries such as roads, fields, and streams. During high water years wetlands are often used as unit boundaries. Units have also been defined by grazing and haying activities.

Permanent management units do not exist but after a closer study of prescribed fire needs is conducted, as described in the above section, it may be desirable to create permanent units. The main advantage of permanent units is that they would more easily justify the construction of permanent fire breaks. They would also allow employees to document aspects of fire control which future fire crews could learn from.

The main disadvantage of permanent units is that some areas are impractical to burn as a distinct unit except during unanticipated and infrequent events such as high water. Another disadvantage of permanent units is that they have the potential of reducing structural diversity of the area through the creation of "hard" edges.

Rainwater Basin WMD will be considered one Fire Management Unit (FMU) for both wildland fire suppression and prescribed burning. Wildfire occurring on the District will be initial attack by qualified employees utilizing FWS fire suppression equipment. Additionally, Memorandum of Understanding for suppression activities must be developed with the appropriate State of Nebraska Fire Districts to insure they are meeting our objectives.

If a wildfire cannot be controlled with initial attack forces the unit will utilize a decision making process, a Wildland Fire Situation Analysis (WFSA), that evaluates alternative management strategies against selected environmental, social, political, and economic criteria. This is not anticipated to occur within the district as a fire of this magnitude would escape our boundaries and become the responsibility of one of the rural fire

districts.

Fire management units (FMUs) are areas within the refuge that have common fire management strategies. These are areas that have similar characteristics and require similar efforts in fire protection or prescribed fire. Wildfires will be managed using the appropriate management response concept. Direct attack will generally be the most effective control strategy, except during periods of drought and extremely high wind when rates of spread are too high and indirect attack is necessary.

Control strategies will be accomplished with a variety of hand tools including backpack sprayers, shovels, rakes, etc. Engines are the primary initial attack resource on the Refuge because of the predominance of fine fuels and access roads

A. FMU Strategies

1. FMU #1. Rainwater Basin Wetland Management District

The full range of fire suppression strategies will be used in this unit. They will vary depending on burning conditions, location of the fire, time of year, safety, cost, wind, smoke problems, political concerns, and current and predicted weather.

- 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 should be dispatched and the Incident Commander will determine additional needs.
- b. Main method of controlling unwanted wildfire will be direct attack. The use of existing barriers will be used to control fires where direct attack is not feasible.
- c. When backup forces are needed for extinguishment of a fire the local fire department for that particular area will be contacted for assistance. The determination for outside assistance will be made at the discretion of the Incident Commander; 1) when it is immediately obvious that the fire will not be able to be controlled with the forces present, 2) spot fires across control can be contained, or 3) private property, additional resources, or structures are threatened.
- d. Whenever wildfire is reported on the Refuge, each employee at the fire scene should take immediate action and do the following:
 - (1) Warn or evacuate people who may be in danger.
 - (2) Suppress the fire, if possible or call for necessary

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up.

- (3) Try to prevent fire from spreading until help arrives.
- e. Indirect attack may be necessary to ensure low impact suppression tactics are employed so as not to cause irreversible suppression damage .

B. Safety considerations:

Firefighter and public safety is the first priority. Persons engaged in fire suppression are exposed to a high risk environment. Fish and Wildlife Service must reduce risk to protect human life and enhance performance. Major improvements can be accomplished by insuring employee job knowledge and personal fitness. Land Management Agencies have developed training and physical standards which must be met before engaging in prescribed burning and fire suppression. Controlled certification is an essential ingredient which identifies that standards were met. This directly effects employee safety, work performance, and agency liability.

- a. Public traffic will be prevented from accessing the area.
- b. Weather will be watched carefully, especially in unstable conditions when fire behavior can be very high. Suppression crew must be kept appraised of weather conditions and potential fire behavior.
- c. Crews will be briefed on the strategy and tactics to be used, expected fire behavior, historic weather and fire behavior patterns, impacts of drought, live fuel moisture, escape routes and safety zones, and radio frequencies to be used.
- d. All refuge personnel performing fire management jobs will meet appropriate training, experience, and qualification requirements for incident assignments according to FWS policy and NWCG 310-1 and DOI Incident Qualification and Certification System.
- e. All fire suppression and prescribed burn personnel will be equipped with approved personal protective equipment (PPE).
- f. Crews will maintain communications amongst themselves, cooperators, and with dispatch.
- g. All Fish and Wildlife Service personnel assigned to fireline duties will complete annual refresher training and meet physical standards as outlined below:

Annual Refresher Training

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.

All personnel involved in Fire Management activities are required to annually complete fire management refresher training 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 and other courses are available that 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.

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 rating. Firefighters participating in Prescribed Burns must achieve and maintain a Moderate rating. Information found in Appendix H 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 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. 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.

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 position are required to have an annual physical examination before taking the test.....

VII. FIRE MANAGEMENT RESPONSIBILITIES

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

A. Preparedness

In order to meet requirements for emergency preparedness, the refuge can enter into agreements with local fire departments for fire suppression activities.

The Complex will maintain all necessary fire tools, minor equipment and supplies to provide for normal unit strength. All equipment shall be stored and properly maintained and all appropriate fire training needs of the refuge staff provided for. The pumper units will be maintained in a ready state at all times to respond to wildland fire. The Complex will require that all permanent staff engaged in wildland fire suppression and prescribed burns meet all physical fitness and training qualifications as stipulated for the position they are filling.

All actions are employed to insure protection of refuge resources, including refuge personnel safety.

B. Fire Management Officer

Rainwater Basin does not have a dedicated Fire Management Officer. Fire Management responsibilities fall under the direction of the Assistant Manager. Primary wildland fire management responsibilities are:

1. to provide initial attack fire suppression capability and ensure all wildland wildfire receive some type of initial attack response.
2. conduct prescribed fire activities in support of refuge habitat management programs.
3. establish appropriate fire related agreements/contracts and ensure they are reviewed and updated on an annual basis.

VII. FIRE MANAGEMENT RESPONSIBILITIES

4. monitor results of wildland and prescribed fires to assure they are meeting established objectives.
5. update fire management and associated plans (dispatch, training, etc.).
6. continue to develop "red-carded" firefighters for prescribed and wildland fire, trained and equipped to accomplish the fire management program.
7. assure fire equipment is in a ready state.
8. annually administer the physical fitness test ("Pack Test") and ensure only those who have passed may participate in wildland fire management activities.
9. ensure that employees are physically able and fully qualified to safely accomplish their assigned fire management work.
10. ensure sufficient collateral duty firefighters meeting Service standards are available for initial attack and prescribed burns.
11. provide and enforce the use of personal protective equipment.
12. ensure Work-Rest guidelines are followed.
13. ensure that a Wildland Fire Situation Analysis is completed on all fires that escape initial attack requiring outside assistance for suppression.
14. ensure incoming personnel and crews are briefed prior to fire assignments.
15. prepares annual proposal regarding which areas and size of area to burn and reasons for prescribed fire.
16. prepares or oversees preparation of prescribed fire plans.

C. Project Leader

The Project Leader for Rainwater Basin WMD is the primary line officer responsible for all aspects of the fire management program. He/she is responsible for overall safety and occupational health program and ensures all refuge operations are conducted in a safe manner. He/she approves the fire management plan, reviews and approves prescribed burn plans, makes fire assignments, and ensures effective cooperative relations within the District and adjoining land owners. He/she ensures that the fire management program is

VII. FIRE MANAGEMENT RESPONSIBILITIES

carried out in accordance with Fish and Wildlife Service policies, regulations and guidelines. All Refuge staff must assist with the overall implementation of the fire management program.

D. Maintenance Supervisor

The Maintenance Supervisor is responsible for the proper maintenance and repair of all firefighting equipment and vehicles to be used for suppression of wildfire and for conducting prescribed burns. Supervises and trains assigned fire crew.

E. Administrative Assistant

The Administrative Assistant will see that records of names, addresses and telephone numbers of additional fire suppression resources are kept up to date and readily available. The position will also act as dispatcher during prescribed fire and suppression activities.

F. Station Fire Management Team

This team has the primary responsibility for fire suppression and prescribed fire on the Rainwater District. Fire management team members are responsible for maintaining their equipment and physical condition, following instructions, and making appropriate decisions based on their knowledge and training.

VIII. WILDLAND FIRE PROGRAM

A. Fire Prevention

Virtually all wildfire in the Rainwater Basin WMD are human caused. Most wildfire are started accidentally as a result of equipment use. Human caused fires generally occur during drought periods or dry periods which occasionally occur in spring but generally occur in the late summer or early fall.

The objective of the wildfire prevention program is to reduce the threat of unwanted human caused fires through visitor and employee education.

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 done around burn units not bordered by other defensible barriers. These barriers will vary in size and type. The requirements will be included in the individual prescribed burn plan.

Vehicular travel is restricted on WPA's except on public right-of-ways. Parking lot areas are mowed to prevent vehicular caused fire. A few WPA neighbors maintain mowed breaks on government ground during times of heightened fire risk.

B. Fire Season

The prescribed fire season occurs from late February through mid-May and from mid-August through early November. The wildfire season can occur any time during the growing season during drought periods but generally occurs during March through April and again during September through October.

C. Fire Behavior

Wildfire behavior is variable depending on the burning conditions as reflected by the Burning Index (BI) or Energy Release Component (ERC). Burning index of 80 or greater in Rainwater Basin fuel types can experience very high to extreme burning conditions where direct attack is normally not feasible. When fuels are dry they are very flammable and can burn very rapidly. Windy conditions with low humidity is capable of creating head-fire flame heights in excess of 20' which move swiftly and are capable of crossing existing barriers.

D. 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 or utilized on prescribed burns. Employees not meeting these requirements may assist in support capacities, but are not permitted on the fire line.

Annual fire readiness requires personal protective equipment for each employee assigned fire fighting duties. This equipment will be issued yearly prior to the first fire. Also, all fire fighting equipment, such as engines, must be ready prior to the first burn each year.

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

E. Pre-attack Plan.

Pre-attack consists of having fire fighting equipment and personnel fire ready prior to the beginning of each fire season. Assure Agreements with local fire districts and cooperators are current.

F. Step-up Plan

Because of the lack of occurrence of unplanned wildland fires no step up plan will be developed. Planned ignitions will outline the particular needs of the prescribed burn project and include the adequate amounts of equipment and personnel to accomplish that job.

G. Suppression.

Service policy requires the Refuge to utilize the Incident Command System with firefighters meeting Service qualification requirements for fires occurring on Service property and mutual aid fires. Mutual aid resources will report to the Incident Commander (IC) and receive their duty assignment, and will be the first priority for release. 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, appropriate procedures will be followed to acquire them as outlined in agreements.

H. 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:

- G All trash will be removed.
- G Firelines will be refilled and waterbars added if needed.
- G Hazardous trees and snags cut and the stumps cut flush.
- G Disked firelines should be compacted as soon as possible to preserve the living root stock of natives grasses.
- G Overturned 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:

- G **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 completing emergency stabilization activities may be completed after the fire is declared out.

- G **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 use to begin the rehabilitation process if other funding is committed to continue the rehabilitation throughout the life of the project (beyond the initial 3 years of Emergency Rehabilitation funding). Major facilities are repaired or replaced through supplemental appropriations of other funding.

- G 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 refuge manager is responsible for preparing all ESR Plans. In order

to be funded, ESR Plans must meet resource management objectives and be approved by the Project Leader and the Regional Director.

I. Records and Reports.

A fire report (DI-1202), will be filled out by the refuge and submitted to the Zone FMO at Quivira National Wildlife Refuge for input into the Fire Management Information System (FMIS) within 10 days of the fire being declared out. The narrative portion of the DI-1202 will address the specifics of the fire, actions taken and outcomes from those actions. Also, include a list of expenses and items lost/stolen as part of the report. A formal review will be conducted on all serious injuries and losses of significant resources.

J. Detection

Neighboring landowners, visitors, and local residents are depended upon to report wildfire since our district covers such a large area. It would be rare for refuge employees to be the first to detect a wildfire.

However, there may be an occasion 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.

K. Wildland Fire Use for Resource Benefit

Wildland fire use to achieve resource management benefit is not an accepted part of the station fire program. District staff are too far removed from the area and wildfire is of such brevity that not enough time is available to manage them. Management will be determined by the method chosen to suppress the fire, either direct or indirect attack.

L. Severity and Emergency Presuppression Funding

Severity funding is different from Emergency Presuppression funding. Emergency Presuppression 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 presuppression funds may be used to rent or preposition additional initial attack equipment, augment existing fire suppression personnel, and meet other requirement of the Step-up Plan.

Emergency Presuppression 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 lower or a Keetch-Byram Drought Index of 600 or greater and a long-range forecasts calling for below average precipitation and/or above average temperatures. Drought Indices can be located at: <http://www.boi.noaa.gov/fwxweb/fwoutlook.htm>.

IX. PRESCRIBED FIRE MANAGEMENT

Rainwater Basin WMD annually conducts 7-12 prescribed fires. Fires generally range in size from 160 to 320 acres, but occasionally fires as small as 80 acres and as large as 640 acres are conducted.

Currently, fire is used on native prairie, restored prairie, tame grasslands, DNC, and emergent marsh vegetation. It is planned to continue the use of fire in a similar manner except, ideally the amount of acreage receiving prescribed fire should be two to three times as great to accomplish the recommended frequency necessary to restore and maintain grasslands composed of native grasses. As stated earlier, in this plan, additional funding and FTE are required to meet this objective.

Areas are currently burned on average of once every 16 years, respective to current acres burned and total Rainwater Basin WMD acreage. Actually, some areas are not burned at all, or very infrequently, and have reverted to forest and/or cool season grasses while other areas have been selected to receive greater management and are burned once every 3-7 years.

The approved Prescribed Fire Plan constitutes the authority to burn, pending approval of all required documents. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Prescribed burning plan conditions established in the plan are firm limits. 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. Also, after a prescribed burn is ignited and later becomes out of prescription, it will be extinguished.

The appropriate authorities will be notified by the Burn Boss prior to any prescribed burning. The required notifications will be included in each burn plan.

The need for prescribed fire based on specific management goals and the respective fire frequency necessary are as follows in Table 3.

A. Primary Objectives of the Prescribed Fire Plan

- G Maximize waterfowl maintenance during the spring migration.
- G Maximize production of waterfowl and upland nesting game.
- G Establish, maintain, and improve the grassland plant communities.

Table 3. Prescribed fire frequency recommendations

Item	Fire Frequency
Maintain vigor of grassland	3 - 7 years
Progress new native grass seed planting	3 - 4 years after
Reduce vigor of non-native grasses and trees	1 - 3 years
Remove cover of wetland/grassland to facilitate disking/grass planting/weed spraying	Variable depending on many factors

B. Purpose

Prescribed fire will be used as a habitat management technique to manipulate grassland and marsh vegetation to meet the above mentioned objectives. The use of fire is the most efficient means of accomplishing the desired objectives.

Prescribed fire can be used on grasslands to achieve the most desirable plant composition, plant vigor, and height/density of the stand. Waterfowl and upland game production will be maximized under those conditions and range condition will be high.

Prescribed fire will also be used on marsh vegetation to achieve the optimum ratio of open water to vegetation. Spring waterfowl maintenance will be maximized under those conditions.

C. Selection of Treatment Areas

The 63 distinct tracks of land administered by this office are scattered across a 17 county area and each is subdivided into numerous sub-units or management purposes. Fire will be used from time to time on portions of most areas, however, it is impossible to delineate each management unit to be burned until

annual fall surveys are taken or until the five year plan which indicates what areas and number of acres receive prescribed fire has been completed.

Areas to be burned will be selected based on habitat improvement needs. Each area must be examined closely to determine its present condition, the desired changed condition, and if fire is the method to make the change. Various research data on burning is available to determine fire effects on individual plant species and general habitats. 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 or expected results?
2. Will fire produce those results or are there other methods to be considered?
3. What are the undesirable impacts of burning?
4. Do benefits of manipulation outweigh undesirable impacts?
5. Can the treatment area be burned considering site location, personnel and equipment on hand?
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. Evaluation of Treatment Areas

The best way to monitor a prescribed burn is to document conditions before, during and after the fire. The establishment of photo points will provide physical evidence to support data. Hundreds of photopoints are currently on file which date back to 1978, documenting all grassland management techniques. These photopoints are taken prior to burning, grazing, and haying. Follow-up photo's are taken in early fall to show the full growing season results from the treatment.

Robel readings are taken on a few selected areas. These will be done to the extent possible with staff limitations dictating the amount accomplished each year. Robel readings are currently on file which date back to 1978.

Nest dragging is currently done on a limited basis. When information can be gained from a specific circumstance, the area will be drug the year prior to burning and then at least one year afterward.

Fall vegetation surveys are made at the time that photopoints are taken. Notes are taken on habitat conditions, wildlife and proposed management for the next year.

At the end of each burn a permanent record is made for filing which includes all pertinent information about the burn as well as the objectives, post burn aspect, weather, fire behavior, etc.

Marsh burns are documented by ground and aerial photographs. Waterfowl census is taken each spring for a comparison of use before and after treatment.

The burn plan is as important as the burn itself if the objectives are to be reached. The compiling of data will give a total burn picture to build experience and correct mistakes.

E. Treatment Specifications

The specific treatment for each burn will be formulated in the prescribed burn plan.

F. Safety

Safety of service personnel is of the utmost priority when conducting prescribed burns. Safety is promoted through proper training, providing a safe work environment, and supplying all necessary safety equipment and personal protective equipment (PPE) as outlined in the Fish and Wildlife Fire Management Handbook.

All employees involved in the burn will receive a briefing prior to conducting the burn.

G. Responsibilities and Planning

The Assistant 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. He/she prepares annual proposal regarding which areas and size of area to burn and reasons for prescribed fire to occur. He/she also prepares or oversees preparation of prescribed fire plans.

The Burn Boss is responsible for determining if prescribed fire can be utilized to meet the treatment objectives. Prescribed fire is just one of a combination of tools (fire, manipulation, etc.) which will be considered. All planned ignitions will be accomplished using qualified personnel.

The majority of personnel involved in a prescribed burn will be Service firefighters because local VFD's, by their very nature, often do not have adequate personnel available to assist with prescribed fire operations. The Burn Boss or his

designee will check on availability when securing the burn permit, but adequate contingency forces will be specified in the plan and will be on site prior to ignition. If local VFD members were part of the contingency forces and are not available, and substitute resources from other departments are not available, the burn will be postponed until such time as adequate forces are available.

The chance of a prescribed fire escaping onto adjacent private property is significantly reduced if the guidelines outlined in an approved prescribed burn plan. However, in the event of an escape, the **Contingency Plan** that is included as a component of the Prescribed Burn Plan will be activated. The Contingency plan generally states:

G The Burn Boss will declare an escape a wildfire if:

It is immediately obvious that the resources on the fire will not be able to control the slop-over.

Slop-overs are not contained within 15 minutes by on-site resources using direct attack tactics.

Private property, resources, or structures are threatened.

G The Burn Boss will notify the Project Leader as soon as possible that the burn has been declared a wildfire.

G In the event a prescribed burn is declared a wildfire, the Burn Boss will become the Incident Commander until relieved by a higher qualified Incident Commander.

G Ignition may be stopped as soon as it is prudent, and designated onsite resources will conduct initial attack using direct attack tactics whenever possible. In the event direct attack tactics are not effective, preidentified secondary control lines such as plowed field edges or adjacent roads will be used.

G In the event suppression efforts are ineffective and a residence or structure is located between the fire and the secondary control line, the local VFD having jurisdiction will be notified by calling 911 on the portable telephone located in the Burn Boss's truck. The cell phone in the Burn Boss's truck will be the primary means of communication with responding forces and will be monitored.

H. Complexity.

Prescribed fires on the RBWMD may vary from low to moderate complexity and will be assessed using Region 6 complexity rating guide. Most prescribed fires, if not all, will be of low complexity with individual criteria, such as air quality, smoke management, fuel types, etc., addressed in the burn plan.

I. Potential Impacts.

Adjacent fuels are best described as a fragmented agricultural landscape. Adjacent fuels change from year to year and season to season. Typically however, they are made up of light to heavy corn, soybean, wheat, or sorghum stubble from the time the grains cure and are harvested in September and October to the spring planting in April and May. The lightest fuels may carry fire only under extreme conditions. The heaviest fuels may carry fire on most days. Most adjacent fuels will not carry a fire from green-up in May until mid to late summer in early September. Roads are located on nearly every section line, and will typically stop advancing fire except under extreme conditions. Additionally, moderately scattered farmhouses, barns, and outbuildings usually surrounded by a windbreak are found. Small towns averaging 1,000 people or less are found across the District.

Escaped prescribed burn going off refuge onto adjacent property could have potential negative impact. To mitigate escapes, weather variables and control lines will be monitored and included in the burn plan. Also, a backup plan, which addresses how to control the escaped fire, must be developed as part of the prescribed burn plan.

Local residents generally feel that grassland fires are destructive. They see fire as a threat to property as well as a detriment to nature. Local fire departments are quick to extinguish grassland fires.

In some cases, smoke may enter adjacent farmsteads. A remote chance exists for fire to spread by airborne cinders to nearby building sites or shelterbelts. Government owned property on the WPA's may be damaged by fire. Wooden fence posts, parked machinery, and pumping station equipment are examples.

J. Reporting and Documentation.

Individual prescribed burn plans will be the primary document used to record prescribed fire information. Burn plans document personnel, costs, fire behavior, weather, and burn critique information. Prescribed burns will also be documented on DI-1202's and submitted to the Zone FMO 10 days after completion of the project.

X. AIR QUALITY/SMOKE MANAGEMENT GUIDELINES

The management of smoke is incorporated into the planning of prescribed fires. Sensitive areas including residences and roads are identified and precautions taken to safeguard visitors and local neighbors. Smoke is not expected to present a health

X. AIR QUALITY/SMOKE MANAGEMENT GUIDELINES

hazard to people who come in contact with it. Generally smoke should be well dissipated prior to its reaching any areas of habitation.

In general, air quality of the area is good. The management of smoke will be incorporated into the planning of prescribed fires. Prescribed burning must comply with state air pollution regulations. Smoke from prescribed fires can at times occur and cause poor visibility within a mile of the source.

No significant local concerns exist about air quality.

XI. FIRE RESEARCH AND MONITORING

The refuge will continue to collect data and monitor the success or failure of their burns to assure they accomplish objectives. Weather conditions are recorded and will be utilized to establish future successful/ideal burning results.

The effects of fire on the District's plants and animals, needs to be better understood. Through research and careful application of fire, 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.

Fire behavior data will be collected on all fires occurring on RBWMD. 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

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

The greatest threat to public safety is entrapment by fast moving fire fronts. Of particular concern are sportsmen/visitors which may be present in the area of the fire, and neighbors who initiate their own suppression actions without proper training, equipment, or communication. Station staff will attempt to keep all fire scenes clear of people except for Service firefighters and any resources requested from cooperators.

XIII. PUBLIC INFORMATION AND EDUCATION

XIII. PUBLIC INFORMATION AND EDUCATION

Informing and educating the public regarding wildlife management 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 programs. There are several different aspects to this task.

A. Wildland Fire Suppression

During wildfire the IC 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. This will be done on a local basis when necessary.

B. Prescribed Fire

Prescribed fire public information will be dealt with as part of the prescribed fire plan. 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 visitors.

XIII. PUBLIC INFORMATION AND EDUCATION

The following actions will be used to educate and inform the public regarding the prescribed fire program:

1. Press releases
2. Contact with prescribed fire observers
3. Placing prescribed fire management information on information kiosks and brochures

XIV. ARCHEOLOGICAL/CULTURAL/HISTORIC RESOURCES

There is only one known archeological, cultural, and historic resource site and it is located underground. Fires should have no impact on any undiscovered resources that may exist because these sites would also likely be underground. One possible threat to these resources would be from the use of earth-moving equipment. The use of earth-moving equipment on undisturbed sites is always coordinated with the state archeologist.

XV. ANNUAL FIRE PLAN REVIEW PROCESS

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 individual on the complex with fire responsibility 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.

District staff recognize that Fire Management is an evolving mission within the Service and is committed to evolving with advances in fire management so that staff and resources are afforded the best available protection. Accomplishment of this goal will require periodic review of the fire management operations as described below:

A. Wildfire Critiques

All wildland fires will be critiqued by the Incident Commander, although the critiques of most fires will be short and informal. The Project Leader in conjunction with the Zone Fire Management Officer will conduct formal critiques in the event of the following:

1. Significant injury or accident
2. Significant property or resource damage
3. Significant safety concerns are raised.

4. Extended attack of more than one day
5. Fire shelters were deployed

A formal report documenting each review will be prepared.

B. Prescribed Fire Critiques

Prescribed fires will be critique by the Burn Boss and documented in the prescribed burn plan. The Project Leader in conjunction with the Zone FMO will conduct formal critiques in the event of:

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

C. Fire Related Fatalities

Fire related fatalities will be investigated by an Interagency Team under the Memorandum of Understanding between the Department of Interior and Agriculture. The investigation will be coordinated by the Branch of Fire Management at the National Interagency Fire Center in Boise, Idaho.

XVI. CONSULTATION AND COORDINATION

The Fire Management Plan was prepared after informal consultations with Refuge staff and cooperators. Copies of the approved Plan will be provided to the Zone FMO, Regional Fire Management Coordinator, and interested cooperators.

XVII. FIRE EQUIPMENT AND NORMAL UNIT STRENGTH (NUS)

Presently, the Refuge does not have an authorized Normal Unit Strength (NUS) of equipment and supplies required to maintain the fire management program. Appendix F contains a list of recommended supplies and equipment.

XVIII. LITERATURE CITED

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XVI. CONSULTATION AND COORDINATION

APPENDIX EFire management team members and their qualifications

Position	Qualifications	Fitness Level	Name
Refuge Manager	FFT2	Moderate	Gene Mack
Asst Manager	ENOP, RXB3. FFT2, EMT	Arduous	Vacant
Maintenance Supervisor	ENOP, FFT2	Moderate	Duane Huber
Administrative Ass't	None	N/A	Sue Huber
Staff Biologist	FFT2	Arduous	Jeff Drahota

Maintenance	ENOP, FFT2	Moderate	Rusty Lammert
Maintenance	FFT2	Arduous	Steve Karel
Range Technician (fire)	FFT2	Arduous	Robin Balaban
Range Technician (fire)	FFT2	Arduous	Jeff Runge
Range Technician (fire)	FFT2	Arduous	Vacant
Biological Technician	ENOP, RXB3. FFT2, EMT	Arduous	Floyd Truetken

APPENDIX F

Minimal list of equipment and supplies for Rainwater Basin WMD

Quantity	Description
1 ea.	500 to 2000 gallon tender with fold-a tank, Mark III pump and 100 feet of fire hose
2 ea.	Type 6 200 gallon Wildland Fire Engine
7 ea.	Flappers
5 ea.	McCleods
3 ea.	Backpack pumps (fedco)
5 ea.	Drip torches
5 ea.	Pulaskies
5 ea.	Shovels
10 ea.	Fire pants (various sizes)
10 ea.	Fire shirts (Various sizes)
10 pairs	Leather gloves
10 ea.	Goggles
10 ea.	Ear plugs
10 ea.	Hard hats and liners
10 ea.	Fire shelter & case(2 practice, 5 regular)
10 ea.	Canteen 1 quart w/cover
5 ea	Hand held radios
2 ea.	Belt weather kit
10 ea.	Day Pack (Yellow pack)
1 case	Fusees (10 min.)
6 ea.	Chainsaws

Each firefighter is required to have the following personal safety equipment supplied from the cache:

Goggle	Fire Shirt
Leather Gloves	Fire Shelter
Ear plugs	8' High Leather Boots(employee)
Fire Pants (1 pair)

APPENDIX G

Memorandum of understandings with local fire suppression agencies

Currently, no memorandums of understandings exists with local fire suppression agencies. A comprehensive statewide agreement is being developed. It is our expectation that the Nebraska Fire Agreement will meet the needs of this District. If in the event it does not, individual memorandums of understanding will be developed with appropriate fire suppression agencies.

APPENDIX H (COUNTY MAPS)