

FIRE MANAGEMENT PLAN

QUIVIRA NATIONAL WILDLIFE REFUGE

UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE MOUNTAIN-PRAIRIE REGION (R-6)

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The Technical Fire Management Project: “Quivira National Wildlife Refuge; An Assessment of Area Fire History, Resource Management Practices and Prescribed Burning Costs with Resulting Prescribed Fire Strategy Determinations” has been inserted at the end of this Fire Management Plan (FMP). It will serve as the chief address to the FMP’s prescribed fire section and as the prescribed fire guide for the Refuge.

FIRE MANAGEMENT PLAN (FMP) QUIVIRA NATIONAL WILDLIFE REFUGE

I. INTRODUCTION

The Department of the Interior Manual, Part 620 DM-1, requires all refuges with burnable vegetation have a written FMP. This plan fulfills that requirement, replaces the January 27, 1986 revision of the March 1984 FMP and provides the guidance necessary for managing fire to achieve the resource management objectives of the Quivira Refuge.

As mandated by the National Environmental Policy Act (NEPA) the Fish and Wildlife Service has adopted procedures to integrate public involvement into the fire management planning process. An Environmental Assessment (EA) with a Finding of No Significant Impact, signed by the Regional Director on September 9, 1994, has been completed for the management of upland habitats at the Quivira National Wildlife Refuge (Appendix I-A). A signed Compatibility Determination with a “compatible” determination accompanies the EA. Wildland and prescribed fire management objectives are clearly addressed in this assessment. The EA was designed to evaluate alternative actions for preserving the integrity of native grasslands and other upland habitats. The “Integrated Management Plan Alternative” was the preferred/selected alternative and provides that all management actions be conducted in accordance with a prescribed plan, written in advance of the management activity, that would evaluate all management tools available to obtain desired results. Regulations published in the Federal Register (62FR2375) January 16, 1997, categorically excludes prescribed fire when conducted in accordance with local and State ordinances and laws. Wildfire suppression and prescribed fire operations are both categorically excluded, as outlined in 516 DM2 Appendix 1. Copies of this plan have been circulated to cooperators and other interested parties.

The following statutes authorize and provide guidance for the implementation of this plan:

1. Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C. 594)
2. Economy Act of June 30, 1932 (47 Stat. 417; 31 U.S.C. 1535)
3. Taylor Grazing Act of June 28, 1934 (48 Stat. 1269; 43 U.S.C. 315)
4. Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66; 42 U.S.C. 1845 a/b, 1856a)
5. National Wildlife Refuge System Administrative Act of 1966 as amended (80 Stat. 927; 16 U.S.C. 1601)
6. Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C.

- 2201)
7. Wildfire Suppression Assistance Act of 1989 (P.L. 100-428, as amended by P.L. 101-111, April 7, 1989)
 8. Department of Interior Department Manual, 620 DM-1, Wildland Fire Management (April 10, 2000)
 9. United States Fish and Wildlife Service Wildland Fire Management Handbook (December 2, 2000)
 10. United States Fish and Wildlife Service Manual, 621 FW1-3, Fire Management (February 7, 2000)

II. COMPLIANCE WITH FISH AND WILDLIFE SERVICE POLICY

A. PURPOSE:

Establishment of the Quivira National Wildlife Refuge was approved by the Director of Fish and Wildlife on August 12, 1953. On May 3, 1955 the Migratory Bird Conservation Commission approved the establishment and authorized the processing of purchase agreements. Acquisition of 21,820 acres was completed in 1969, and an additional 116.5 acres were transferred from Farmers Home Administration in 1992 to bring the total acreage to 21,936.5.

The purpose of station establishment was to manage the upland habitats of the area in the most effective and biologically sound manner for the purpose of achieving stated wildlife objectives. The purpose of the refuge, as designated by the Migratory Bird Conservation Act, is "...for use as an inviolate sanctuary, or for management purposes, for migratory birds" (16 U.S.C. + 715d). Management of the Refuge uplands is needed to provide habitat for threatened and endangered species, migratory birds and resident wildlife.

The mission of the Quivira National Wildlife Refuge is "to provide and maintain the continued existence of a diverse, stable and healthy ecosystem which will support a wide variety of wildlife. Emphasis will be directed towards habitat for wintering migrating waterfowl and endangered species" (USDI, 1989).

B. MANAGEMENT GOALS AND OBJECTIVES:

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. The Fire Management Plan is a detailed program of action to implement the fire management program at Quivira National Wildlife Refuge.

Upland management for the broad range of migratory birds other than waterfowl requires a very diverse strategy. Indigenous migratory birds evolved with a very dynamic grassland system. This system was primarily driven by short, and often intense, periods of disturbance and defoliation by large herbivore grazing, wildfire and trampling with varying periods of rest. This provided a diverse plant and animal community and a mosaic of successional stages and habitat conditions (Owens and Myres, 1973). These varying habitat conditions provided for the differing needs of a variety of migratory birds and appear to have caused a greater diversity of avian species (Wiens, 1976).

Goal 1. Preserve, restore and enhance federally and state listed threatened and endangered species and the habitats upon which they depend.

Objectives:

1. Provide safe, healthy habitat for bald eagles, peregrine falcons and piping plovers that use the refuge at various times of the year.
2. Provide needed feeding and secure nesting areas for the interior least tern.
3. Carry out requirements of the Whooping Crane Recovery Plan as they pertain to Quivira.

Goal 2. Provide for the life requirements of waterfowl and other migratory birds occurring within Quivira NWR by maintaining a healthy and diverse variety of habitats.

Objectives:

1. Support up to 15,000,000 duck-use-days during the spring and fall migration periods.
2. Support up to 300,000 white-fronted goose-use-days annually.
3. Support up to 1,000,000 Canada goose-use-days annually.
4. Support up to 250,000 Sandhill crane-use-days annually.
5. Support up to 500,000 shorebird-use-days annually.

Goal 3. To preserve, restore and enhance a natural diversity of flora and fauna, representative of a healthy ecosystem, which will provide for the life requirements of resident wildlife.

Objectives:

1. Maintain a diversity of habitats which have natural communities of high complexity and

stability.

2. Protect the Comanche Archeological Site and preserve the intrinsic historical/cultural values present.
3. Preserve, restore and enhance habitat present within the Santana Research Natural Area, managing to achieve the ecological qualities for which the area was designated.

Goal 4. To heighten an awareness and understanding of man's role in the natural world and promote a sense of stewardship for the land and wildlife resources.

Objectives:

1. Provide the public with recreational and educational opportunities by utilizing refuge resources and management practices as learning tools.
2. Provide and maintain aesthetically pleasing vistas so that the public may enjoy their outdoor experience on the refuge.

Management of upland habitats at Quivira is vital to achieve the stated goals and objectives of the refuge. Uplands provide nesting and roosting habitat for thousands of waterfowl, shorebirds, songbirds and raptors each year. Uplands provide feeding areas for many species of migratory birds as well as year round life requirements for resident wildlife including white-tailed and mule deer, coyotes, wild turkey, bobwhite quail, prairie chicken and a multitude of non-game wildlife. These species not only reflect a healthy upland environment, but also represent the biodiversity of the prairie ecosystem.

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

The primary goal is to provide for firefighter and public safety, property, and natural resource values. Service policy and the Wildland Fire Policy and Program Review direct an agency administrator to use the appropriate management 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) outlined previously.

The specific goal of upland habitat management at Quivira is a diverse plant community consisting of native vegetation capable of supporting migratory and resident wildlife. Since the prairie grasses evolved under pressure from grazing herbivores and wildfire, Quivira is presently utilizing a system of high intensity, short duration cattle grazing combined with prescribed

burning, haying/cutting and cooperative farming to mimic these factors and achieve this goal (Savory, 1988; Higgins, 1989).

Fire is a natural, historical and critical process which has been instrumental in the shaping and maintenance of the prairie ecosystem, recycling nutrients and reducing accumulations of dead fuel material. Proper management of the refuge habitats is essential for meeting the previously listed objectives and Service biodiversity mandates. Along with grazing, fire is the primary tool available to resource managers for vegetation and wildlife habitat management. Additionally, fire is identified in the EA as one of the many tools available to assist in the accomplishment of these management objectives. Implementation of this FMP will enable resource managers to utilize prescribed fire for the most effective management of these resources and wildland fire to be suppressed in the safest, most efficient and cost effective manner.

Although not all effects of uncontrolled wildfire are negative, many potential negative effects do exist; particularly for surrounding private properties. Regardless of where they occur, wildfires can burn vegetation that is used by wildlife for nesting and resting cover, forage and protection, and can cause damage to improvements and sensitive areas. Many short term wildland fire effects to refuge habitats may be serious while long term effects prove to be positive, but this will likely not be true for surrounding private properties where fires can cause disastrous economic consequences. Since the area's economy is dominated by farming and ranching, fire protection/suppression is a very high priority. Fires escaping the refuge could have considerable negative economic and political implications.

Considering the above consequences, it is the policy of this refuge to suppress all wildfires in order to minimize their negative effects, and to utilize prescribed fire to maximize fire's benefits to the ecosystem and to help reduce the undesirable negative effects of unnaturally high fuel accumulations that occur with the absence of fire.

C. VALUES AT RISK:

- Two staff houses with associated garages and out-buildings
- Headquarters facility
- Maintenance shop
- Environmental education center
- Bunkhouse facility
- Fuel distribution facility with two exterior 1000 gallon fuel tanks
- Four storage buildings
- Eight exterior 500-1000 gallon propane tanks
- 21 oil/gas wells with associated tank batteries and propane tanks (six leases, eight companies)
- Six grazing allotments on 12,000 acres with 990 head of cattle (six permits, five permittees)
- 1100 cooperative farming acres (three cooperators)
- Santana Research Natural Area (347 acres)
- Comanche Archeological Site. Placed on the National Register in September of 1978

- Rattlesnake Creek bridge
- Four longspan nature trail bridges
- Four public information kiosks
- One fishing pier
- Two public photo blinds
- One handicapped hunting blind
- Refuge information signs
- Weather station

See the Quivira property list, Appendix III-I.

D. FIRE MANAGEMENT IMPACTS

Quivira N.W.R. has entered into Memorandum of Understanding (MOU) agreements with the three Rural Volunteer Fire Departments that have protection responsibility for lands directly adjacent to the refuge. These departments include Stafford County Rural Volunteer Fire Department, Rice County Rural Volunteer Fire Department and Reno County District 6 Rural Volunteer Fire Department. The MOU's entered into between Quivira NWR and each of these departments is similar in format. The purpose of these agreements is to provide adequate wildland fire protection and wildland fire suppression within and adjacent to the boundaries of Quivira NWR. Each entity in the MOU shall furnish, at its own expense, firefighting equipment and labor for the suppression of fires covered in the agreement. In addition Quivira NWR will assist with wildland fire suppression on lands surrounding the Refuge, not covered by this agreement when deemed practical by the Refuge Manager.

The majority of the land directly adjacent to Quivira NWR is agricultural based, either livestock grazing and/or cultivated crop ground. In addition, some of this land is leased as or primary use is for private hunting reserves. The influx of migratory waterfowl during state regulated hunting seasons and abundance of native wildlife species (white-tail deer, Bobwhite quail) makes Quivira NWR and adjacent lands productive sport hunting venues. A wildland fire occurring on or adjacent to Quivira NWR during or just prior to a hunting season may adversely effect hunting opportunities. Inversely a wildand fire or prescribed fire implemented on these same lands at the right time of year may dramatically increase hunting production. Any losses to revenue received from hunting leases that may occur as a result of a wildfire would be minimal compared to potential loss of domestic livestock forage or crops. Although recovery time generally is short term in the light fuels surrounding the refuge. A wildland fire which removes available forage from a pasture or grazing allotment just prior to being made available to domestic livestock potentially could result in large finical loss. Livestock producers would be forced to find available pasture land until forage recovered in burned area. Land available to lease for grazing on short notice generally is limited. Losses may be two fold. Lands available for grazing both on and off Quivira NWR are at times leased to livestock producers. If these lands are unavailable due to recent wildland fire then both leasee and leaser may suffer finical loss.

Potential for loss of crop lands is generally limited. A very short time frame exists in which

these crops may be adversely affected by wildland fire. This time period would be just prior to harvest when crops have cured. Winter wheat is the primary crop on lands within and adjacent to Quivira NWR. The time frame in which these crop would be threatened by a wildland fire is the month of June. Unless the area is in a severe drought fuel conditions would not generally support a large, fast moving wildfire. Warm season grasses are in a growing phase and cool season grasses are just beginning to go dormant.

Prescribed fires are common land management practices for lands on and adjacent to Quivira NWR. Properly implemented prescribed fires on Quivira NWR managed lands pose little negative impact on adjacent lands and residents. Hazards associated with smoke from the prescribed fires are addressed in individual burn plans. Utilizing correct wind direction, lifting and other smoke management techniques will minimize impact of smoke. Although the area surround Quivira NWR is considered rural individual residences are present immediately adjacent to the refuge boundary. The closest community, Raymond, is located 6 miles northeast of Quivira NWR. Two other communities are located 8 miles west, Hudson, and 8 miles south, Zenith. If smoke management prescriptions are met as outlined in the individual burn plans little to no affect should be noted in adjacent communities. Public use on Quivira NWR may at times be hampered due to prescribed fires or wildland fires. Refuge roads and public use areas adjacent to burn units are from time to time closed to protect public and refuge firefighters. However, usually these areas are closed only for one day or portions of one day. Prescribed fires, or controlled burns, on private lands adjacent to the refuge have historically proven to be a major risk to refuge manage lands. In the 36 year time period from 1960 through 1996 53% of the wildland fires reported on Quivira NWR were human caused accounting for 93% of the acres burned. Private field burning accounts for the bulk of this acreage (38% or 13,947.1 acres).

The make up and use of adjacent lands minimize threat of a large extended attack wildland fire. The once endless sea of grass associated with early settler accounts of the Great Plains region is now fragmented with crop fields, grazed pasture lands, road ways and other man made barriers.

The other major land use on and adjacent to Quivira NWR is oil and natural gas wells. Potential exists for these units to be threatened and damaged during a prescribed fire or wildland fire. Available records, however, do not indicate any losses or damage to pumping sites or storage facilities during a wildland fire. The quick moving fires associated with fuel models of the Great Plains seem not to impact these sites long enough for them to sustain damage.

The state of the wildland/urban interface on Quivira NWR and adjacent lands can best be described as a mixed interface. Large tracts of wildland with structures and improvement intermixed sporadically throughout. There are four communities ranging in population from less then 10 to 1,500 people in a range of 4 to 12 miles from Quivira NWR. The fragmentation of the wildlands, as previously described, and light fuels of this region, may assist in reducing potential threat of wildland fire to these communities. Greatest threat may be lack of personnel. As most of the area surrounding Quivira NWR, including the communities mentioned, rely on volunteer firefighters for protection. Local VFD's are at times limited in their response due the very nature of their organization. If local VFD's respond to one fire call, there may not be adequate personnel available to respond to a second fire. The MOU's Quivira NWR has entered into may alleviate this potential concern. Qualified refuge firefighters may respond to a wildland fire with in the lands protected by local VFD's when requested which will free up personnel to second fire.

III. DESCRIPTION OF STATION AND FIRE EFFECTS

A. GENERAL:

The Quivira National Wildlife Refuge is located in the central Great Plains in central Kansas. It consists of 20,656.5 acres in northeast Stafford County, a 640 acre section of Reno County on the southeast side of the refuge and a 640 acre section of Rice County at the far northeast end of the refuge for a total of 21,936.5 acres. See maps in Appendices III-A and III-B.

Elevation at the Refuge Headquarters is approximately 1790 feet. Major habitat types include: 14,013 acres of upland (64% of the land base); 6,470 acres of wetland (30% of the land base); 1,129 acres of cropland (5% of the land base) and 324.5 acres of administrative sites (1% of the land base). The refuge is 11 miles long, north & south, two to five miles wide, east & west and is interlaced with county, township and refuge system roads that provide access to much of the area.

1. History:

Early inhabitants of the area were the Quiviran Indians who cultivated corn, beans, melons, gourds, pumpkins and squash. This cultivation had little effect on the overall prairie ecosystem. The Indians hunted the abundant buffalo, rabbits, wild turkey, prairie chickens and waterfowl. Grasslands were grazed intensely by buffalo, but only for a short duration due to their inherent vast-range migration.

The first white settlers in the area were ranchers who held large tracts of land. In the 1880s more settlers arrived and the ranches became smaller. Large cattle drives gave way to fenced beef production and crop farming. The homesteading of the grasslands brought about changes to the prairie. These changes included the introduction of exotic plant and animal species, many of which are having an effect on the environment today. The planting of shelterbelts for erosion control introduced eastern red cedar and other tree species which, with no control, invade the grasslands. Agriculture has reduced the grasslands to remnants of prairie habitat surrounded by monotypic croplands in various stages of growth. Cattle ranching has changed grassland species composition and year-round grazing has reduced the physical structure of plant communities.

Currently, upland management on the refuge includes extended rest periods and prescribed fire on grasslands, cooperative and force account farming and cattle grazing. Prior to implementing the current management system, the refuge uplands were either under-stocked and over-grazed or over-rested. Rest was the primary management tool used in the early years. Livestock grazing was used very lightly and with little regard to timing. Very little prescribed burning was conducted. These early-year management practices, over an extended period of time, created conditions that allowed invader species such as eastern red cedar, Russian olive and sand plum to encroach the grasslands and introduced or invading species of grasses such as Japanese brome and crested wheatgrass to overtake native species (Nielsen, 1992).

2. Land Use:

Former landowners had over 3,000 acres under cultivation. Some of these fields had very marginal production levels and were subjected to wind erosion. Grasslands were overgrazed. Throughout the federal acquisition period, the less productive agricultural land was returned to grass and the more abused grassland was withdrawn from grazing use.

Current land use includes three cooperative farming agreements for 1,079 acres of cultivated fields in a wheat-sedan-milo-summer fallow rotation. Cooperators leave 1/3 of their crop in each field annually for wildlife food plots. The refuge also plants and maintains 50 acres in wildlife food plots annually. In addition to the cooperator use, five permittees utilize 12,238 acres of grassland for 5,180 total animal unit months (cattle) of grazing. See Appendix III-C for names, addresses and phone numbers of farming cooperators and grazing permittees, and Appendices III-D and E for maps of agricultural plots and grazing cells, respectively.

Limited third party/outstanding rights oil and gas production activity is present on the refuge. The mineral reservations have expired on most of the refuge lands. Currently, seven oil/gas producers operate 21 wells on refuge land. All but six of these wells are concentrated within four sections of land, making observation, inspection and protection less difficult. See Appendix III-C for names, addresses and phone numbers of oil & gas producers and Appendix III-F for a map of Refuge oil & gas production sites.

Public use is limited to daylight hours. The refuge is utilized by local and other organized groups for environmental education throughout the year. Wildlife photography and observation also occurs year-round. A hunting program is conducted on 8000 acres, and all refuge waters are open to fishing. Over 30,000 visitors are recorded annually.

3. Topography, Water Resources and Land Features:

The refuge area is generally a flat, or nearly level, to gently rolling landscape with stabilized sand dunes occurring in various locations. Relief is mainly provided by stream channels and the natural elevational differences between the wetlands and uplands with an elevational fall of about six feet to the mile from southwest to northeast across the area.

Two predominate Quivira land features are ancient saline basins known as the Big and Little Salt Marshes. The Little Salt Marsh contains approximately 950 acres when full. The Big Salt Marsh contains about the same surface area, but encompasses about three times as much area in saline mud flats, shallow marsh and wet meadow.

The salinity of the Little Salt Marsh has decreased in recent years as a result of flushing action by Rattlesnake Creek. The Big Salt Marsh is the source for Salt Creek which enters the Rattlesnake Creek at the north end of the refuge.

The general drainage of the area is from southwest to northeast. Rattlesnake Creek, the primary source of water for the refuge, is a meandering type of stream with old abandoned channels. It is now primarily confined to a rather deep channel except during periods of extremely high water. It enters the southwest side of the refuge directly into the Little Salt Marsh. Gravity forces the water to flow through 22 miles of canals with water control structures and into and/or through 32 manageable water impoundments to the north/northeast. The impoundments may be dry in late summer because of insufficient water supply or they may be drawn down periodically for vegetation control. There are several small intermittent drainages which flow into the Big Salt Marsh on a seasonal basis.

Fed predominately by groundwater, streamflows in Rattlesnake Creek have been in a continuous decline since the early 1970s (Sophocleous and McAllister, 1990). Much of this decline can be attributed to increased irrigation development within the watershed (Wilson, 1991).

In the area of Quivira, late Permian “red beds” (bedrock formations) yield poor quality water that rises upward and increases the salinity levels of the aquifer. The water is highly mineralized and contains excessive concentrations of chlorides (Young, 1992).

4. Climate:

Climate of the area is mild and classified as dry, subhumid (Dodge, et al, 1978). Temperature extremes range between -10 F and 105 F. Only a few days each winter will produce subzero temperatures, while summer temperatures of 90 F or higher occur on the average of 52 days per year. Temperatures occasionally exceed 100 F, but very rarely exceed 110 F. The average last killing frost date is April 18 and the first killing frost date is October 18 with an average growing season of about 185 days.

The refuge lies along the transition boundary between the rain shadow of the Rocky Mountains and the warm, moist air currents of the Gulf of Mexico. Rainfall depends on the interaction of these two air masses (Sophocleous and Perkins, 1992). Annual precipitation varies between 13 and 41 inches, with a long term average of 24 inches per year. It rains an average of 74 days per year in Stafford County. Roughly 75% of the precipitation falls during the growing season between April and September. Average annual net evaporation for the Quivira area is 36-37 inches (Kansas State Board of Agriculture, 1984). Evaporation rates and precipitation reach their highest levels during the summer months (Latta, 1950). Severe weather such as strong thunderstorms with heavy rains and hail are not uncommon, especially during mid-summer. Heavy lightning activity with strong winds often accompany these storms. Small but intense storm cells with spotty rainfall in localized areas are common. Dry lightning is not uncommon, especially during drought years, and tornadoes may be associated with any of these storms. Floods are common but rarely result in extensive damage. Snowfall averages 20 inches per year yet seldom results in any substantial accumulation.

Prevailing winds are from the south, although northerly winds are common throughout the winter months. Average wind velocities are moderately strong in all seasons and reach their maximums during the spring. Wind erosion of sandy or otherwise exposed soils is a constant threat.

National Weather Service records of the Quivira area show conditions of high to extreme fire danger during all months of the year. All months demonstrate regularly repeated weather patterns with high fire dangers during consecutive day periods. Wind, dry fine fuels and low relative humidities have contributed to these high ratings. During periods of extended severe drought, such as the spring of 1996, state-wide burn bans have been implemented.

See Appendix III-G for a 5-year percentage compilation of average annual wind directions at three locations in central Kansas.

5. Geology of the Area:

The refuge lies entirely within the Arkansas River Lowlands, Great Bend Prairie Region (Sophocleous and McAllister, 1990) and is within the “sand prairie” region of Kansas (Kuchler, 1974).

6. Vegetation:

The Quivira area is in the Upper Austral Life Zone. Prior to settlement the area was contained within the “sea of grass” of the “Great American Desert”. There were no trees, even along the streams. Timber plantings were a means of homesteading for early settlers. The sand dunes bordering the refuge on the north and west were active at the time of settlement. These dunes now support cottonwood trees and a fair cover of grasses and annual weeds.

Native grasslands of the area are predominately composed of big bluestem (Andropogon gerardi), little bluestem (Andropogon scoparius), switchgrass (Panicum virgatum) and Indiangrass (Sorghastrum nutans). Other common grass species include sand lovegrass (Eragrostis spp.), inland saltgrass (Distichlis stricta), prairie cordgrass (Spartina pectinata), prairie sand reed (Calamovilfa longifolia) and western wheatgrass (Agropyron smithii). Included in the grassland habitats are various forbs which are utilized by wildlife.

In regard to shrub and tree plantings, Quivira managers have planted trees and shrubs to serve as shelterbelts and to visually screen areas around maintenance and residence buildings. There are also several shelterbelts remaining from old homesites acquired with the refuge. The shelterbelts are allowed to remain on the refuge to increase habitat diversity. The principal native shrub, sand plum (Prunus angustifolia), was important to native wildlife and settlers. Currently, sand plum is being managed to decrease encroachment in the uplands while allowing select patches to exist for habitat diversity.

Croplands exist within the Quivira landbase. Refuge cooperators farm 1079 acres on a rotational basis. Crops are winter wheat, milo (grain sorghum), and summer fallow. Summer fallow is planted to cowpeas when possible to compete with weed growth and to nitrogen enrich the soil. There are nine small (50 acres total) strips of cropland in the central portion of the refuge that are force account planted to experimental crops for potential use in future refuge farming.

There are no known endangered plants present on the refuge. Plant surveys have been conducted

and will continue. There are two species of plants which are considered noxious weeds by the county and require control measures; field bindweed and hoary cress. Control measures used include mechanical, chemical and biological methods.

7. Soils:

Most of the refuge is underlain with highly mineralized strata. Soils range from dark, heavy sandy clay to light, coarse sand. In the heavy soil areas, capillary action tends to draw salt upwards to the surface creating "alkali spots". The parent material consists of partly weathered rock and unconsolidated deposits of silt, sand and gravel of the early Pleistocene age. Recent alluvium is the parent material for soils formed on flood plains and in the Big and Little Salt Marsh (Dodge et al, 1978).

Most soils in the area are highly erodible, particularly by the wind, when unvegetated. To protect the soil, prescribed fires are carried out during times of the year that will result in a relatively fast vegetative recovery, usually between mid-February and mid-May. Wildfires that occur between October and January can be devastating to soil stability, particularly if the fires burn large upland areas that are naturally exposed to the highest windspeeds of the central Great Plains.

8. Values on and Adjacent to the Quivira Refuge:

As mentioned in Section III, part 2, Land Use, Quivira has more than 30,000 visitors annually. These visitors come, literally, from all over the world. The primary purpose of refuge visitation is to experience the outdoor setting and wildlife the area has to offer. For this reason, much of the refuge's value can be attributed to the wildlife that either permanently or temporarily reside within and/or adjacent to its boundary.

Quivira Refuge is utilized by 252 species of birds characteristic of both eastern and western North America. The location of the refuge, in the central Great Plains, is the reason it is a major stop-over for migratory birds in the Central Flyway. Predominate waterfowl species include mallard, northern pintail, green and blue-winged teal, Canada and white-fronted geese.

The refuge is used by large numbers of shore birds, marsh and water birds. For this reason the refuge has been designated by the Western Hemisphere Shorebird Reserve network as a site of regional importance. The sandhill crane population often exceeds 50,000 during migrations. Over 2000 pelicans use the refuge during summer and fall. Passerine species are common nesters and migrants on the refuge. Many of these birds require upland habitat which is available on the refuge.

Thirty-six species of mammals are found on the refuge. The most visible of these are white-tailed deer, coyotes, black-tailed prairie dogs and raccoons. Beavers, muskrats, opossums, fox, cotton-tailed rabbits, fox squirrels, mink and bobcats are some others. In addition, there are 57 species of reptiles and amphibians known to exist on the refuge.

Huntable populations of bobwhite quail and ring-necked pheasants are also present, adding to the visitor use days during the fall and winter hunting seasons.

Quivira Refuge is surrounded by private land that is primarily utilized as grazing and/or cultivated farm ground. One other use is a private hunting preserve, where the landowner has leased his ground to hunters and manages it for waterfowl and white-tailed deer production. Since the primary income in this area is agriculture related, these private lands are of great value to the owners. See private lands map, Appendix III-H.

9. Cultural, Archeological and Historical Resources:

Cultural resources on the refuge are protected under the Historical Preservation Act of 1966, as amended (16 U.S.C. 470). Every effort will be made to protect all known, suspected or newly discovered sites. Postburn maps for wildfire and prescribed fire burn areas will be provided to the Regional Archeologist.

The Comanche Archeological site, located on the west edge of the refuge, is registered in the National Register of Historic Places by the Kansas Historical Society. Materials found at the site have been described as 14th century Native American and date back to between 1200 and 1700 A.D. This area requires protection from disturbance. No other historic or prehistoric resources have been identified on the refuge.

The Regional Archeologist will be consulted during the planning phase of any proposed project and will determine the need for a cultural resource inventory in consultation with the Kansas Historic Preservation Office.

A portion of the upland habitat of Quivira has been designated as the Santana Research Natural Area. This 347 acre area was originally set aside to serve as an example of native bluestem prairie. Stabilized sand dunes and a 15 acre century-old cottonwood timber claim are present within this area.

10. Endangered Species:

Endangered species are a primary concern in the formation of all upland management plans. All management actions must be determined to either enhance or have no effect on endangered species utilizing the area. Any action that will affect endangered species will require a section 7 Intra-service consultation as per the Endangered Species Act of 1973 (16 U.S.C. 1531-1543).

The wetlands and adjacent prairie of Quivira provide habitat for four endangered species; whooping cranes, interior least terns, peregrine falcons and piping plovers.

The entire refuge has been designated critical habitat for the endangered whooping crane.

Whooping cranes require secure resting and feeding areas. On a single day in 1993, 19 whooping cranes were recorded using the refuge and a total of 47 were tallied on the refuge during the fall of 1996.

Interior least terns and piping plovers use large areas of open and unvegetated cover for nesting and feeding areas. A nesting colony of over 30 pairs of interior least terns use the salt flats on the north end of the refuge.

Thirty to 45 bald eagles use Quivira throughout the winter months and up to five peregrine falcons use the refuge during the spring and fall. Both use Quivira as feeding areas and thus respond to the presence or absence of prey species, such as ducks and shorebirds. Proper application of prescribed fire is critical to the maintenance and enhancement of habitat for these species.

11. Socio-Political-Economic Aspects:

The local economy of Stafford, Reno and Rice counties is predominately agricultural based. Wheat and milo are the two dominate crops and cattle ranching is also common in the area. The refuge was and still is a popular area for waterfowl hunting, a use that is also important to the local economy. An aggressive wildland fire prevention, suppression and prescribed fire program is necessary to prevent the potential losses from uncontrolled fire and to maintain, restore and enhance both the wetland and upland habitats through the use of properly planned and executed management-ignited fire.

12. Value of Improvements:

Wildfire damage to improvements both on and off the refuge is a primary concern. While developments can generally be protected from fire damage, dispersed improvements are at greater risk of damage by severe or large fires. A list of all capital improvements with values can be found in Appendix III-I.

B. HISTORICAL/ECOLOGICAL ROLE OF FIRE AND FIRE FREQUENCY:

The prairie grasslands evolved with large grazing animals, drought and periodic fires. Wildfire is one of the primary natural forces that created and kept the native prairie lands intact. Historic records describe huge prairie fires started by lightning or man, either accidentally or deliberately. Fire size prior to human intervention ranged from mere spots to millions of acres when conditions were favorable for large fire growth. Fires burned millions of acres because there were few natural fuel breaks and no suppression. Whether or not a fire would ignite and sustain itself would depend on fuel, weather and topographic conditions at the time and place of ignition. If sustained by favorable conditions, then fire size, intensity and duration would depend on these conditions throughout time. Research has determined a presettlement fire frequency (natural return interval) of 3 to 10 years for the central Great Plains (Kruse, 1989). The natural fire frequency of the Quivira region is estimated to be about 5 years.

Highest fire occurrence is exhibited during the lightning season which generally starts in April and runs through September, although lightning is known to occur during most months in central Kansas. Almost all lightning storms are accompanied by winds and rain. The rain often causes any fire starts to go out. As would be expected, dry lightning fire responses are more common than when rain accompanies the lightning, and responses resulting in suppression are more common in drought years.

Fires occurring outside the lightning season do not occur with the same frequency, but tend to be more severe with high potential for escape and threat to life, property and resources. This is primarily due to the seasonal curing of fuels and high average wind speeds during that time. Spring fires occurring after dry, open winters tend to be the most severe. These conditions have produced several large disastrous fires in the area. Private field burning, railroad sparks and pyromania have been the primary historical cause of these fires.

Although natural ignitions are less likely to occur during late winter or early spring, those that do can be very difficult to suppress due to the high rates of spread and intensities produced by the extreme fuel and weather conditions at that time of year. Fires that occur during the hot summer months are subject to more moist prairie grassland fuels if normal precipitation has occurred.

Today, agriculture and cattle production are the economic industry of central Kansas. Local area residents place a high value on suppressing any fires which may threaten economic production by the premature removal of vegetation used for grazing, soil stabilization and crop production. Landowners frequently burn ditches in the fall or spring, CRP lands in the spring, alfalfa fields to control weeds in the spring and wheat stubble in the early summer. The use of fire as a vegetative management tool is becoming more understood and utilized by area landowners and refuge permittees in recent years.

C. QUIVIRA FIRE HISTORY:

As stated in other parts of this plan, wildfire was an integral part of the formation and maintenance of the prairie grasslands of Quivira. Official records of wildfire occurrence and prescribed fire ignitions have been kept on-station since 1960. It is interesting to note that wildfires have been recorded in every month at Quivira, but April 15 through September 15 is considered the fire season due to the fuel and weather characteristics of that period. A more thorough analysis of the fire season and fire behavior associated with seasonal changes can be found in Section VIII, Wildfire Program.

Appendices III-J through III-S provide a statistical analysis of the Quivira Refuge wildfire and prescribed fire history from 1960 through 1996.

The Technical Fire Management Project “Quivira National Wildlife Refuge; An Assessment of Area Fire History, Resource Management Practices and Prescribed Burning Costs with Resulting Prescribed Fire Strategy Determinations”, which is part of this Fire Management Plan, contains researched fire history information of the Refuge and the Central Great Plains.

D. FIRE EFFECTS:

Fire is a natural part of the prairie ecosystem, serving to recycle nutrients and reduce the accumulation of dead woody material. Since the vast majority of the available fuel within the Quivira land base is grass, fires tend to consume the fuel and go out very quickly. Vegetative response varies depending on the time of year, intensity and duration of the fire, but most often is favorable to reestablishment. Serious soil erosion problems can occur if fires burn over large areas between October and January when vegetative response is held in check by weather and soil conditions. Other fuel types are present on the refuge, but seldom are they contiguous enough to be the primary carrier of a fire. Between mid-October and mid-May, fuel in the form of dead grass and marsh vegetation is present in amounts ranging from 2 to 6 tons/acre (4000-12,000 lbs/acre).

1. Fuels Status:

- a. NFFL Fuel Model 1: NFDRS fuel models A; light or short annuals, or L; light or short perennials. Present over roughly 2% of the refuge. In the absence of extreme burning conditions, fire suppression is simple in this fuel type with low resistance to control.
- b. NFFL Fuel Model 2: NFDRS fuel model C, light or short grass with a partial overstory. Present over roughly 5% of the refuge. Fire suppression is normally not difficult in this fuel type, but drought or extreme weather conditions can produce extreme fire behavior, including crowning and spotting. Resistance to control is generally moderate, but can be high during abnormally high winds, low relative humidities and/or drought.
- c. NFFL Fuel Model 3: NFDRS fuel model N, heavy or tall grass (sawgrass). This is the most abundant fuel type on the refuge, covering roughly 90% of the land base. Fuel loadings are generally directly proportional to moisture availability. These fuels can exhibit extreme rates of spread and a very high to extreme resistance to control. Flame lengths can easily reach 20 to 30 feet in a running headfire situation.
- d. NFFL Fuel Model 5/6: NFDRS fuel models F; short to mid-height brush or shrubs growing over a light grass understory, or D; rough, broad-leaved vegetation in wetland areas. Present over roughly 3% of the refuge. Can burn very intensely during dry conditions with a moderate wind. Resistance to control can be high if enough fuel continuity exists.

2. Vegetation:

The vegetative components of the refuge can be found in Section III, part 6. Fire most often has a positive effect on the grasslands and marsh meadows of Quivira inducing more favorable succession and providing a variety of habitat for diversified wildlife use. Without periodic fire, the prairie grassland component would slowly be overtaken by the continued encroachment of undesirable non-native species.

3. Wildlife:

Refuge management objectives are primarily to provide protection, food, water and resting areas for Central Flyway migratory waterfowl on their semiannual migrations. Secondary objectives are to provide nesting habitat for dabbling ducks and to provide an opportunity for public enjoyment of fish and wildlife resources. The area is attractive to 252 species of birds and provides habitat for various species of native mammals.

Fire, and its effect on resident and migratory wildlife, is a natural and essential part of the refuge's ecosystem. Native wildlife evolved with fire and have developed means of tolerating and/or taking advantage of fire and fire effects. Generally speaking, fire results in little wildlife mortality and usually benefits native wildlife. However, a large wildfire during drought conditions or late in the growing season could significantly reduce nesting and escape cover and forage availability for animals.

While uncontrolled fire has potential for negative impacts on wildlife and other resources, prescribed fire within planned prescription parameters can be used as a tool to improve wildlife habitat and reduce mortality. Aggressive wildland fire suppression and the lack of prescribed fire implementation in the prairie ecosystem the past century has resulted in unnaturally altered habitats. Fire exclusion and the onslaught of agriculture are two major factors that are undoubtedly responsible for the declining abundance of some wildlife species.

4. Air Quality:

Air quality of the Quivira area is generally good. With no major industry in the county, the main source of air pollution is agriculture. Soil particles suspended in the air (dust) and organic particles from prescribed fires are common air pollutants in the county. Suspended particulates from wildfires also occur, but not as frequently as prescribed fire.

Prescribed burning is a widely practiced vegetative management tool of the Quivira area. In addition to refuge burning, many area farmers burn their fields and crop stubble during the spring and summer months. The grass fuel models of the prairie consume very quickly, and smoke is dispersed as quickly with the nearly constant wind of the plains region. As a result of this, and the fact that there is so much agricultural burning in the state with so little impact on most areas, Kansas has very liberal prescribed burning and smoke management laws.

5. Soils:

Most soils in the area are highly erodible. Their description can be found in Section III, part 7. Fire's effect on soil is mostly dependent on the time of year in which the fire occurs. If soils are left barren of vegetation at a time when vegetative recovery is not soon forthcoming, such as late fall through winter, they are highly susceptible to wind erosion. Damaging heat penetration is very unlikely due to the short fire residency time in Quivira's grass fuel types.

IV. QUIVIRA NWR FIRE MANAGEMENT GOALS AND OBJECTIVES

A. GENERAL FIRE MANAGEMENT GOALS:

1. Provide for firefighter safety first, protect life, public and private property and cultural and natural resources from wildfire.
2. Use prescribed fire to the fullest practical extent to accomplish resource management objectives and to restore fire as a natural ecological process.
3. Use prescribed fire when it is the most effective and efficient means to achieve management objectives.
4. Perform all fire management work in the safest, most cost effective manner possible, consistent with applicable laws, policies, and regulations.
5. Educate the public regarding the natural role of fire within the prairie ecosystem and the need to prevent unwanted wildfires.

B. SPECIFIC FIRE MANAGEMENT OBJECTIVES:

1. Wildfire Program Objectives:

- a. Fish and Wildlife Service policy mandates that wildland fire be managed using the appropriate management response concept. The Refuge will utilize an appropriate management response to manage all wildland fires and will incorporate minimum impact suppression tactics whenever appropriate.
- b. Maintain well-trained and qualified refuge firefighting resources.
- c. Protect from fire important scientific, cultural, historic, prehistoric and scenic resources as well as refuge occupancy sites, visitor and administrative facilities and adjacent private land.
- d. Minimize the cost of fire suppression and the impacts it has on the environment.
- e. Prevent human-caused wildfires.

2. Prescribed Fire Program Objectives:

- a. Provide for personnel safety first.
- b. Maintain well-trained and qualified refuge prescribed fire resources.
- c. Provide a fire protection buffer around the headquarters and staff housing compound.
- d. Restore the natural fire regime (5-8 year return interval) to Quivira.
- e. Restore and perpetuate native wildlife species.
- f. Maintain a diversity of plant communities.
- g. Provide optimum shore bird habitat for the Wildlife Drive.

- h. Enhance and maintain vigor and palatability of perennial grasses and forbes.
- i. Reduce the encroachment of non-native tree and shrub species into the grasslands.
- j. Reduce the risk of wildfire.

C. HAZARDOUS FUEL PROBLEMS:

The Quivira Refuge is literally a “sea of grass” with the only fuel breaks being interspersed water impoundments, occasional wetlands and roads throughout its 21,936 acre area. Fuel model 3 (tallgrass) is the predominate fuel type, covering roughly 90% of the land base. These conditions represent a “fuels problem” themselves, particularly during the fall, winter and early spring when all the grasses are dead and have the potential to produce uncontrollable wildfire under the right weather conditions. Along with the tallgrass; salt cedars exist throughout the refuge in shelterbelts, pockets and random individual trees. These trees have great passive and active crown-fire potential and can cause long range spot fires to occur.

V. FIRE MANAGEMENT STRATEGIES

A. OVERALL APPROACH:

The refuge’s wildland fire suppression policy is based on the Department Manual, (620DM 1). Many suppression policy guidelines can be found in the Wildfire Suppression Operations Handbook (621 FW). Previously listed goals and objectives will be accomplished in a manner consistent with these policy and guidelines as well as other laws, policies and regulations.

B. SPECIFIC STRATEGIES:

1. **Maintain “personnel safety” as the paramount concern** during all fire management activities. With the possible exception of instances where human life is threatened, no refuge employee, contractor or cooperator will be purposely exposed to life-threatening conditions or situations.
2. Suppress all wildfires 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.
3. Utilize only trained, qualified and properly outfitted individuals to perform all operations.
4. Maintain an initial attack organization capable of conducting initial attack (IA) on Class A, B and C wildfires. IA personnel will maintain a minimum response time of one hour to all refuge fires during the April - September fire season.
5. Utilize water impoundments, wetlands, existing roads, crop fields or other natural barriers as primary control lines, anchor points, escape routes and safety zones.
6. When possible, use backfires from existing barriers to halt the spread of the fires.
7. Use burnouts to stabilize and strengthen primary control lines.

8. Avoid driving fire trucks over wetland and deep sandy soil areas where experience has shown that vehicles can easily become stuck.
9. Maintain cooperative agreements with local fire agencies to promote cooperative prevention, suppression and prescribed fire activities. Provide assistance to local or federal cooperators under the “total mobility” and “closest resource” principles in accordance with Policy.
10. Emphasize fire prevention to the local public, adjacent landowners, refuge users and school children through personal contacts, informational brochures and signs and participating in school and refuge sponsored programs.
11. Prepare and implement a long-term, rotation-based prescribed fire plan for the entire refuge which will compliment other resource objectives. Prepare treatment alternatives, prescriptions and rotations based on existing and future research or monitoring.
12. Utilize prescribed fire as a management tool for achieving hazard fuel and resource management objectives. It should be used in accordance with the above named prescribed fire plan or, in the absence of this plan, the current system of proposing, planning and implementing prescribed fires. In either case, a burn plan will be written and must then be approved through the existing Regional process for any burn proposal. In addition, prescribed fire will be used in a manner that approximates presettlement fire history to the extent practical.
13. Initiate fire effects research and/or monitoring which will provide a better understanding of local fire effects as well as the basis for improving future fire prescriptions and integrating the use of prescribed fire with other land management treatments to achieve habitat objectives.
14. Integrate fire management themes such as ecology and prevention into existing interpretive and education programs, and implement a fire prevention program with the local schools.

C. STRATEGY SELECTION:

Justification for protection strategies should be based on cost effectiveness of protecting the values at risk. The cost of strategy implementation must be less than the value of the resource being protected as well as the least costly plus loss alternative.

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. |

| | | |
|---|---|--|
| <ol style="list-style-type: none"> 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. | <p>Aggressively suppress the fire using direct or indirect attack methods, holding the fire to the fewest acres burned as possible.</p> | <ol style="list-style-type: none"> 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. |
|---|---|--|

Justification for resource enhancement strategies (prescribed fire) should be based on cost effectiveness of achieving the resource management objectives identified in refuge planning documents (EA and/or Burn Plan).

D. LIMITS TO STRATEGIES

Unavoidable impacts of fire include the danger to small animals and the loss of food and cover until revegetation occurs. Species affected would include rabbits, small rodents and reptiles. Ground nesting birds would include ring-necked pheasants, bobwhite quail, northern harriers, meadowlarks and dickcissels. These species begin to reach their peak nesting season in early May (Kansas Wildlife & Parks). Losses can be minimized by prescribed burning before or after the peak nesting period, by restricting the size of the burn in one day, by ignition technique and by not burning contiguous areas in the same season

Burning operations in April and early May offer the shortest period of time before new spring growth and seasonal rains.

Further limits include:

1. Heavy equipment will not be used within the Comanche Archeological site and will be restricted as directed in the Santana Research Natural Area management document.
2. 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.
3. Prescribed burning in areas where threatened, endangered, and candidate species exist will not be conducted if the prescribed fire is detrimental to the species or if any adverse impacts cannot be mitigated. Section 7 clearance will be secured, as appropriate.
4. Prescribed burns will not be conducted during periods of high fire danger when county or State-wide burning bans are in effect.
5. Generally, no more than one prescribed burn will be active at one time although multiple burns may be conducted consecutively in one day. Only in circumstances where additional burns are closely situated and can be safely managed by the Refuge staff and local back-up forces are available, will multiple fires be conducted simultaneously.

VI. FIRE MANAGEMENT UNITS (FMUs)

(see Appendix VI-A, Fire Damage Potential map)

It has been determined that the Quivira Refuge is a single FMU as outlined below:

By definition, FMUs are areas (within a managed area) that have common fire management strategies, fuels, values at risk, etc., and may even contain two or more separated geographical portions if the fire management strategies are similar. “Conditional” FMUs are areas where different suppression strategies are used depending on certain conditions. FMUs are delineated for suppression response purposes, not for objective-accomplishing treatment units as in the case of a prescribed fire management unit.

The Quivira Refuge has been accurately described as a virtual “sea of grass”. Indeed, a nearly continuous blanket of mixed-grass prairie exists over the vast majority of the land base, broken only by water impoundments and, to a lesser extent, marshes, roads and an occasional crop field. Although a diversity of fuel conditions, potential fire behavior and effects, management restrictions/constraints, accessibility and values at risk exist on the refuge; there are not enough significant differences in any of these elements, geographically or otherwise, to warrant separate FMUs for fire suppression purposes.

As close as the refuge could come to having multiple FMUs would be “conditional” FMUs based upon seasonal differences in the weather. Under normal conditions, there are significant seasonal differences in weather conditions, fuel moisture and expected rates of spread and resistance to control that could either hinder or assist fire suppression. As an example, the spread rate and resistance to control of a wildfire that occurs on a windy day between October and May, when fuel moistures are at their lowest, is significantly different from a fire that occurs during a normal greenup period or during the summer rainy season. These seasonal differences will always need to be taken into account for any suppression response, but each seasonal condition applies equally and concurrently to all areas of the refuge. Therefore, separate “conditional” FMUs are not warranted.

Due to the widespread similarity of fuel conditions, fire spread potential, accessibility and values at risk, both on and adjacent to the refuge, **all refuge wildfires will be attacked aggressively no matter when or where they occur, how they are caused or what fire behavior characteristics they exhibit.** Other than water impoundments and a few small islands of land that exist on the Little Salt Marsh at the south end of the refuge, there are not large enough areas of fuel or topographic condition variances to warrant dividing the refuge into more than one FMU. The variances that do exist are spread relatively equally throughout the land base, furthering the single FMU concept. The other fire behavior-influencing element, weather, is addressed in the “conditional” FMU paragraph above.

For resource management purposes, a number of individual prescribed fire (RX) FMUs are necessary. They are addressed in the Prescribed Fire Management Plan for the refuge (Technical Fire Mgt. Project).

A. FIRE USE

All wildland fires will be suppressed using the appropriate management response concept. The benefits derived from wildland fire will not be a factor considered when determining the appropriate management response.

B. OBJECTIVES AND STRATEGIES AS THEY RELATE TO THE FMU:

Refuge/FMU fire management goals, objectives and strategies are described in Sections IV, V and VI. Specific suppression strategies are described in Section V, part B.

C. FUEL TYPES:

Section III, part D, 1. See Appendix VI-A.

D. FIRE BEHAVIOR:

The primary fuel at Quivira is grass, and the majority of this is FBPS fuel model 3, sawgrass. This fuel model can exhibit extreme rates of spread and resistance to control during the normal dormant season of mid-September to mid-May. In the FBPS fuel model 3, the Range Fire Index moves into the “very high” category when the burning index exceeds 146 points. High rates of spread and resistance to control can be experienced during the “green” stage of growth, as well, if wind, relative humidity and fuel moisture conditions are favorable for fire spread. Flame lengths and rates of spread can exceed 22 feet and 300 chains per hour respectively if the one hour fuel moisture is $\leq 5\%$ and winds are ≥ 10 mph. These conditions are not unusual during the dormancy period in central Kansas. Conversely, diurnal temperature and humidity changes, particularly during the fall, winter and spring, produce low fire activity at night and may completely extinguish a fire.

Normal burning conditions during the mid-May to mid-September period are not as conducive to extreme fire behavior and usually offer firefighters much less resistance to control. Fine fuel moistures are normally $>15\%$ during this period, with burning indexes low to moderate.

Fires that occur in any of Quivira’s tree-covered areas generally exhibit low to moderate fire intensity from mid-May to mid-September. However, drought conditions during this period make all fuels available and can produce crowning and extreme fire behavior. Fires that occur in these areas during the dormancy period, under the extreme conditions described above, are extremely difficult to control and have long range spotting potential due to high wind speeds, low fuel moistures, heavier fire brands, and volatile receptors. Increases in live and dead fuel loadings due to fire suppression, limited prescribed fire use and no mechanical or hand fuel treatment has served to increase fire intensity in these areas over the years.

The Great Plains have a history of large, extreme grass fires. Large fires are becoming less common due to human interventions such as agricultural applications, housing developments, fuel breaks such as roads and waterways and more effective fire suppression methods. Although large fires can occur at any time, they generally occur when one or more excellent growing seasons is followed by a dry winter and/or drought. These fires create circumstances with great potential for injury to those who try to suppress them and anyone who may be in their way. Most recently, the winter and spring of 1996 demonstrated the potential danger of these type of fires. The entire state of Kansas was under a complete burn-ban order due to extreme drought conditions brought on by a lack of significant precipitation from October of 1995 through June of 1996.

See Appendix VI-A map.

VII. FIRE MANAGEMENT ORGANIZATION AND RESPONSIBILITIES

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.

The fire job responsibilities as outlined in the Fireline Handbook (PMS-410-1) and the responsibilities for the positions below are to be fulfilled by those holding those positions.

A. WILDFIRE/RXFIRE RESPONSIBILITIES BY STAFF AND FIRE POSITIONS:

1. Refuge Manager:

- a. Responsible for the overall management of the refuge including fire management.
- b. Ultimately responsible for all wildfire and rxfire management decisions on the refuge.
- c. Insures effective cooperative relations within the refuge, cooperating fire organizations and adjoining land owners.
- d. Approves low to moderate complexity prescribed burn plans after reviewed by the zone FMO.
- e. Supervises and administers the Pack Test for the refuge Fire Management Officer.
- f. Approves Prescribed burn plans.

2. Refuge Fire Management Officer:

- a. Responsible for all planning and coordination of presuppression activities including:
 1. Insuring fire training needs are met by conducting courses locally and scheduling employee participation in regional/interagency training.
 2. Physical fitness testing, recording and red carding of all fire qualified employees.
3. Insuring firefighter physicals are completed as specified by Service policy.
4. Preparing, revising and following local cooperative fire agreements.
5. Insuring readiness by following the refuge “step up” presuppression plan.
6. Insuring radio communications exist between refuge personnel and cooperators.
7. Preparing annual FIREPRO budget requests within the Fire Management Information System (FMIS).
8. Approving the use of and maintaining accountability of the fire budget account.
9. Ordering and inventory of fire equipment and supplies.

b. Responsible for coordinating and directing all refuge suppression activities including:

1. Fire dispatching.
2. Fire Command.
3. Insuring fire management policies, particularly safety regulations, are observed.
4. Insuring all personnel are fully qualified to perform in their respective assignments.
5. Advising the refuge manager of the status of fire suppression operations.

c. Responsible for postsuppression activities including:

1. Insuring the refuge is back to a state of fire readiness through replenishment of equipment and supplies, firefighter gear rehab and staffing.
2. Coordinating any rehabilitation needs through the refuge manager.

d. Regional and interagency responsibilities include:

1. Maintaining liaison with the KS/NE Zone Fire Management Officer, Regional Fire Management Coordinator and the Pueblo Interagency Dispatch Center (PIDC).
2. Coordinating refuge personnel dispatching with PIDC and other USFWS dispatch centers.
3. Keeping abreast of current fire management information through R6 CCMail.

e. Responsible for managing prescribed fire activities including:

1. Planning and implementing the annual rxfire program to meet management objectives.
2. Insuring the completion, routing and sign-off of all rx fire plans according to R6 policy.
3. Insuring prescription parameters are met during rxfire operations.
4. Insuring that all participants are fully qualified to perform in their respective assignments.
5. Providing opportunities for personnel to receive on-the-job training.
6. Insure all rxfires are out, and declared so in writing within each rx fire plan and fire report.

f. Responsible for the completion of data entries into FMIS including:

1. Insuring employee identification, training, qualifications, task book issuance and experience data entries for wildfire and rxfire activities are kept current within the system.
2. Completing DI-1202 fire reports within two weeks of fires being declared out.
3. Completing annual fire budget requests as shown in "a..6" above.
4. Submits annual updates for the Refuge Fire Management Plan to the Zone FMO.

3. Engine Foreman/Lead Fire Crewmember:

a. Passes the Fitness Test at the arduous level, once annually, within two weeks of the annual reemployment date, as specified by Service policy.

- b. Satisfactorily completes required personal physicals as specified by Service policy.
- c. Maintains all fire equipment, including engines, in a state of readiness.
- d. Supervises and trains assigned engine crewmembers.
- e. Serves as qualified/needed on local and interagency fires with minimum qualifications of Engine Boss, ICT4/5 and FFT1.
- f. Establishes, maintains and actively participates in a refuge physical fitness program.
- g. Administers the Pack Test to other refuge personnel as directed by the refuge FMO.
- h. Insures self and other fire crewmembers complete all fire and project work assignments satisfactorily and safely, using required personal protective equipment to perform each job.
- i. Attends and assists in the instruction of local and regionally-sponsored fire training as directed by the refuge FMO.
- j. Maintains fire records of subordinate fire crewmembers.
- k. Maintains an accurate fire equipment inventory.
- l. Assists the refuge FMO in maintaining accurate fire records.
- m. Assists the refuge maintenance and biology departments on an as needed/as available basis.

4. Assistant Engine Foreman:

- a. Passes the Fitness Test at the arduous level, once annually, within two weeks of the effective employment date, as specified by Service policy.
- b. Satisfactorily completes required personal physicals as specified by Service policy.
- c. Assists the Engine Foreman with the maintenance and upkeep of all fire equipment, maintaining a state of readiness.
- d. Serves as qualified and needed on local and interagency fires, usually as a Type 2 firefighter.
- e. Performs fire and other resource/maintenance oriented jobs as directed by the Engine Foreman.
- f. Uses all required personal protective equipment for all jobs performed.
- g. Actively participates in the refuge physical fitness program.
- h. Attends local and regionally-sponsored fire training as directed by the Engine Foreman/FMO.

5. Wildfire Incident Commander (IC), (as assigned):

- a. Responsible for the safe and efficient suppression of the assigned wildfire.
- b. Fulfills the duties described for the IC in the Fireline Handbook and Field Operations Guide.
- c. Notifies the refuge FMO of all resource needs, including the need for extended attack, and issues situation updates when time and conditions allow.
- d. Ensures that fire behavior and weather are monitored; data collected and recorded; firefighters are briefed on expected weather, fire behavior, communications, escape routes, and safety zones; and fire lookouts posted.
- e. Insures the safety of all personnel and that everyone is qualified for their job.

- f. Identifies and protects endangered or threatened species and any sensitive areas as outlined in the FMP.
- g. Utilizes minimum impact tactics.
- h. Insures the fire is staffed until declared out.
- i. Insures fire site rehabilitation is completed if deemed necessary by the refuge manager.
- j. Submits completed DI-1202 fire reports, crew time sheets and a list of any other fire related expenditures or losses to the refuge FMO within three days of the fire being declared out.

6. Prescribed Fire Burn Boss (normally RXB2), (as assigned):

- a. Normally the person that writes the rxburn plans for assigned burn units.
- b. Coordinates and conducts rxburns according to the approved rxburn plan requirements including monitoring and evaluation.

7. Cooperators:

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

Cooperators will:

- a. Provide assistance in detection and suppression of wildfires.
- b. Assist, as needed, in the investigation of human-caused fires.
- c. Assist with local fire training and prescribed burning when possible.

B. FIRE RESOURCE AND POSITION QUALIFICATIONS DIRECTORY:

See Appendices VII-A/B.

C. PRESCRIBED FIRE DECISION CRITERIA/VALIDATION RESPONSIBILITY:

This responsibility lies with the refuge FMO or the qualified Burn Boss of any planned and approved prescribed burn. The Refuge Manager has the authority to override a decision to burn if he/she feels that the ignition, under the weather conditions present or predicted, is unsafe. The decision by the FMO or Burn Boss not to burn may not be overridden.

D. INTERAGENCY COORDINATION:

1. See Appendices VII-A/B, Fire Resource and Position Qualifications Directory and Interagency Dispatch Manifest.
2. MOUs are in place with Stafford, Reno and Rice County Volunteer Fire Departments. See Appendices VII-C, D and E. An MOU between the Hutchinson Community College Fire Science Department and National Wildlife Refuges in Kansas for wildfire suppression and prescribed fire assistance has been drafted and is currently in the approval stage. The Draft MOU is in Appendix VII-F of this Plan.

VIII. WILDFIRE PROGRAM

A. FIRE PREVENTION:

Since 1960, 53% of the wildfires on or immediately adjacent to Quivira Refuge have been human-caused and account for 93% of the total acres burned. Escaped fire from private field burning accounts for 38% of this total acreage. 34% of the wildfires were lightning-caused, but only account for 1% of the total burned acres. The remaining 13% of the wildfires since 1960 have an unknown cause and account for 6% of the total acreage burned.

The human-caused fires are the most potentially damaging since they usually occur during the time of year when both weather and vegetative conditions favor high rates of spread and resistance to control, there are fewer initial attack resources available at the refuge and the environment is not adapted to fire.

Generally, the local public and many visitors are very aware of the need to prevent wildfires and have an educated fear of rangeland fires. However, as a reminder of the fire prevention message, the refuge will purchase and distribute fire prevention materials to local schools, adjacent landowners and information kiosks. The refuge will also post special warnings/notices, area closings and increase patrols during periods of very high fire danger as part of its step-up plan preparations. Equipment and/or public use restrictions may also be implemented when needed.

Another prevention method employed by the refuge is the annual mowing of unpaved refuge roads, roadsides and parking areas to prevent vehicles from starting fires.

Some fuel management strategies have been effective in the prevention of extreme fire behavior, but extensive fuel reduction is not compatible with many of the other refuge management objectives because of its affect on habitat and wildlife populations. In light of this, the refuge policy will be to: 1. Use mechanical means and/or prescribed fire to maintain recommended safe fuel levels in areas adjacent to property, facilities and/or sensitive resources. 2. Maintain strategic fuel breaks throughout the refuge to assist in suppression operations and prevent the spread of fires into sensitive areas or across administrative boundaries. Fuel breaks will not be expected to stop all fires, but to provide areas of less fuel loading and fire intensities for concentrated suppression and/or firing operations. Priority will be given to areas where fires are both likely to occur and escape initial attack.

B. FIRE SEASON:

The defined “fire season” of the Quivira Refuge is the time of year when lightning is most associated with wildfire starts, mid-April to mid-September annually. However, according to records kept since 1960, fires have occurred every month of the year that have resulted in suppression action taken by refuge personnel. Wildfires that occur outside the normal fire season have most often been human-caused fires. More information can be found in Section III, part B.

C. FIRE BEHAVIOR: See Section VI, part D.

D. PREPAREDNESS:

The Refuge Fire Management Officer is responsible for coordinating refuge preparedness actions. Specific duties are assigned in the step-up plan. Quivira’s fire season can run year- round depending on weather conditions.

Only personnel meeting current Service fitness, training and experience requirements will be dispatched to fires. Non red-carded personnel may assist in support capacities, but will not be permitted on the fire line.

1. Necessary training activities: Service policy sets training, qualification and fitness requirements for all firefighter positions. All firefighters will be provided with the training required to meet Service fire job qualification standards for the jobs they will be expected to perform, subject to the availability of those courses. Interagency training opportunities will be utilized whenever possible. When required training courses are not available through interagency training, the Zone FMO or the Quivira FMO may conduct that training within the state if they meet the instructor requirements.

All firefighters will be required to participate in an annual firefighter refresher, including shelter deployment, to remain qualified. Refreshers will focus on local needs as well as either Standards for Survival or the Look Up, Look Down, Look Around courses.

In addition to formal training, there will be occasional safety (tailgate) sessions throughout the fire season for all employees. Training day activities will focus on drills designed to increase the efficiency and safety awareness of fire crews. Short training sessions on various topics may also be given. This training will also serve to meet Service requirements for annual firefighter refresher training.

All formal training will be entered into the Fire Management Information System by the Refuge FMO at least once annually and will serve as a formal record of employee training.

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 ??? 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 (Appendix ???). 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.

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.

2. Fire readiness of equipment and supplies; Fire cache; Assignments: Primary fire equipment, or that equipment that is essential to firefighting operations and maintained and used for that purpose exclusively, is inventoried annually and to be kept at recommended stocking levels throughout the year. The Refuge FMO, with assistance from the Engine Foreman, is responsible for ordering, inventorying, maintaining and restocking this equipment. All maintenance of primary equipment will be paid out of fire funds.

Secondary equipment, or that equipment that is primarily used to support non-fire operations, is often used to support firefighting operations. 10% of the total annual maintenance cost of any secondary equipment that is used in firefighting operations should be paid out of fire funds. This equipment is identified in Appendix VII-A, Quivira Fire Resource Directory.

Engines and ATVs are the primary initial attack resource on the refuge due to the predominance of areas with fine fuels and good vehicle access. Mobile water tanks (Buffaloes) are heavily used to support engine/ATV operations. Earth moving, road grading and fuel break-creating equipment are readily available and are often used in backfiring operations. Hand crews and portable pumps are not as efficient in range fires, but are effective in areas of riparian habitat where vehicle access is limited by vegetation, topography, hydrology or policy. Air attack resources are not readily available, but can be resource ordered when needed.

The refuge fire cache is maintained at a stocking level to support five additional firefighters.

All required PPE is a part of that inventory. All the primary engines will be equipped with tools, firing devices and water handling accessories. In addition, one chainsaw with operating accessories will be

maintained as a fire saw on the International pumper truck. It is the responsibility of the Engine Foreman to insure full stocking levels are maintained.

3. Enhanced detection with increased fire danger/Stepup Plan:

See Appendix VIII-A, Step-Up Plan.

4. Impacts of Drought and Preparedness Levels

Firefighters will be held at Quivira if local conditions warrant, regardless of outside preparedness levels. The decision to release Quivira firefighters for interagency assignments will be made by the Refuge Manager and the FMO using the Step-up Plan as a guide. Off-refuge interagency fire assignments for firepro employees will take precedent over non-fire duties on the refuge.

As indicated previously, periods of drought can greatly impact fire behavior and resistance to suppression. For that reason the Rangeland Fire Index, Palmer Drought Index and the Keech-Byram Drought Index will be monitored at a minimum on a weekly bases throughout the year. All are available on the Internet at <http://ndc.fws.gov>. The Refuge fire staff can also contact the Pueblo Interagency Dispatch Center (719-545-1454) during periods of high fire danger to track indices and anticipate possible fire activity. Preparedness actions have been identified in the Step-Up Plan to respond to unusual conditions associated with drought and other factors.

The major indicator of drought would be departure from normal annual precipitation. Quivira NWR receives an average of 24 inches of precipitation annually. Nearly 75% of this amount occurs between April and September. If below average precipitation occurs during this time frame potential for drought condition exist depending on departure from average. Rainfall will be measured and tracked through out the year on Quivira NWR. Also monitored, and partially a result of precipitation received, is stream flow of the Rattlesnake Creek. This is monitored monthly and if drops below normal levels will directly influence refuge's ability to store water and fill wetlands.

Currently the Rangeland Fire Spread Index (RFI) is used for the Step Up plan. This is an excellent indicator of potential large fires and extreme behavior in the fuel models associated with Quivira NWR. Potential for large fires exist through out the year. The RFI can be checked via internet for Kansas at the following address: <http://www.crh.noaa.gov/ict/firewx.htm>. This site is located on the National Weather Service-Wichita, KS, home page.

Both the Palmer Drought Index and Keetch-Byram Drought Index (KBDI) will be checked via the following Internet address; <http://www.boi.noaa.gov/fwweb/fwoutlook.htm>. These sites will allow Fire Management Staff to gauge possible drought conditions. The KBDI will be the primary index used as it seems to gauge conditions in this area better then the Palmer Drought Index. However, both indexes will be referenced throughout fire season. If the KBDI is 501 or higher area consider the need for additional personnel and equipment. No burning will be completed if KBDI is 601 or higher.

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 Refuge engines 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 Rocky Mountain Area Coordination Group to conduct prescribed burns.

E. PREPAREDNESS:

1. Step-up staffing plan:

The FMO will monitor current and predicted fire weather reports and take appropriate actions as listed in the Step-up Plan (Exhibit VIII-A). The FMO may authorize emergency preparedness overtime for Staffing Class-IV and V step-up actions that can not be met with regularly scheduled employees once an emergency preparedness account is activated. Collateral duty firefighters, including trained and qualified AD/EFFs, may be assigned/hired (see “funding” below) for emergency preparedness duties if needed. It may not be possible for the refuge to meet some staffing classes once refuge resources have been dispatched to a fire. In those cases, it will be the responsibility of the FMO to determine if outside assistance should be ordered.

2. Emergency Presuppression and Severity 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 less or a Keech-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/fwweb/fwoutlook.htm>

At any time during the year, but particularly during the refuge fire season of mid-April to mid-September, severity funds may be requested if a severe drought is indicated by drought indices or if the fuel model N burning index is above 146 and the long range forecasts call for below

normal precipitation and/or above average temperatures.

Severity funds may be used to hire additional firefighters, extend firefighter employment periods or to provide additional resources such as tenders, engines, etc.

F. FIRE DETECTION:

Quivira Refuge relies on neighbors, visitors, staff and cooperators to detect and report fires. In addition, the step-up plan provides increased patrols if deemed necessary by the FMO and/or Refuge Manager.

There may be occasions when unqualified personnel discover a wildland fire. When this occurs the employee should report the fire and request assistance before taking action to suppress or slow the spread of the fire. If the fire poses an imminent threat to human life, the employee may take appropriate action to protect that life before requesting assistance. The unqualified personnel will be relieved from direct on-line suppression duty or reassigned to non-fireline duty when qualified initial attack forces arrive.

G. PREATTACK PLAN:

All the key components to a fully operational preattack plan for the refuge are within the FMP in both map and text form, including: a response map with roads, designated locations, fire stations, caches, water sources, helispots and cooperator districts; a hazard/risk map with fire occurrence, values at risk and hazard potential zones; a natural and cultural resource map with sensitive/non-sensitive zones and restricted vehicle access areas; structure assessments; names and phone numbers of contacts to be made in the event of extreme conditions and/or wildfire.

H. FIRE SUPPRESSION:

1. General: Service policy requires the refuge to utilize the Incident Command System (ICS) and to utilize firefighters that meet the National Wildfire Coordinating Group's (NWCG) qualification requirements for fires occurring on Service managed land. Mutual aid resources responding from fire departments to Service fires must meet the standards of their department. All responders, including mutual aid resources, will report to the Incident Commander (IC), either in person or by radio, to receive their duty assignment. Mutual aid resources will be the first priority for release on refuge fires.

2. Initial reporting and dispatch: Any refuge employee who spots a fire within or adjacent to the refuge will report the fire immediately to Headquarters. Fires in and around the refuge that are spotted by citizens are often reported to the Stafford County Sheriff's office, who in turn alert the Stafford County Rural Volunteer Fire Department (RVFD). Once alerted, the RVFD will call the refuge to report the fire, request

reconnaissance and/or ask for immediate suppression assistance. The person receiving the report at the refuge is responsible for initiating the Fire Dispatch Plan (Appendix VIII-F) and assuming the duties of fire dispatcher. A relief dispatcher may be ordered if needed.

Requests for assistance from cooperators on fires not threatening the refuge must be made to and approved by the FMO or the Refuge Manager. A list of available fire qualified employees for local, zone, regional and national dispatch will be compiled weekly during the fire season by the FMO. This list will be forwarded to the KS/NE Zone FMO in Valentine, Nebraska who will then forward it to the Pueblo Interagency Dispatch Center and the Regional Office. Only qualified and properly equipped resources will be dispatched off of the refuge.

For refuge fires, the fire dispatcher will stay on duty until all refuge resources return, and will monitor and record the radio traffic of refuge firefighters. The dispatcher will not be required to stay on duty when fires occur in areas that are outside refuge radio coverage, but must notify the IC and the County dispatcher when they leave their post, and leave a forwarding phone number in case any informational needs arise.

The dispatcher will be responsible for coordinating and assuring the delivery of any resource orders made by the IC including engines, tools, supplies and meals. The IC will place all resource orders through the dispatcher, specifying what is needed, when and where it should be sent and who is to receive it. The dispatcher will promptly determine if the resource order can be filled or procured locally and notify the IC. If the order can not be filled locally, the dispatcher will place the order through either the Kirwin or Flint Hills Refuges and/or outside area vendors. This situation would be extremely rare for fire suppression operations at Quivira.

3. Initial attack: Only trained and qualified personnel will serve as IC for any fire. IC qualification standards for the size and complexity of each fire will be maintained. The IC is responsible for all aspects of management of the fire. If a qualified IC is not immediately available, the most experienced available firefighter will serve as IC until a qualified IC can take over the fire. All refuge and cooperator resources will report to the IC, in person or by radio, prior to attacking the fire. The IC will provide a size-up of the fire to the dispatcher as soon as possible, and determine the resource needs for the fire. The IC is responsible for placing or cancelling resource orders for the fire.

The appropriate management response will be selected by the IC to effectively suppress the fire. Minimum impact tactics will be utilized whenever possible. Dozers, graders, plows or discs will not be used inside refuge boundaries without prior approval of the Refuge Manager or his or her designee. Backfiring from fuel breaks will be a principle tactic when possible.

4. Escaped fires/extended attack: The IC will notify the FMO and/or the Refuge Manager whenever it appears that a fire will escape initial attack efforts, refuge lands or when fire complexity will exceed the capabilities of command or operations personnel. The IC, in conjunction with the Stafford, Reno or Rice County Fire Chief, will be responsible for coordinating all extended attack actions including: completion of the Wildland Fire Situation Analysis (WFSA), ordering of appropriate suppression resources and the completion of the Delegation of Authority (Appendix VIII-K) if needed.

I. 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 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 used 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.

J. RECORDS AND REPORTS:

The FMO or the Refuge Manager will complete all situation reports as soon as practical. The IC will complete the DI-1202 fire report, with assistance from the FMO, and the crew time reports for all personnel assigned to the fire. These documents will then be turned in to the FMO. The IC should include a list of expenses and/or items lost on the fire on the fire report. The FMO will enter the fire report and applicable experience entries into the FMIS and assure that the timekeeper is informed of all time and premium pay to be charged to the fire, and that expended supplies are replaced. Any AD/EFF fire time will be processed through the NIFC BLM Payroll Unit as outlined in their "Emergency Firefighter Timekeeping Procedure Guide for the USFWS"

Additional Section VIII "Wildfire Program" Appendices that can be found in the Appendices Section:

VIII-B, Quivira Locality Map

VIII-C, Quivira Water Control Structure Map

VIII-D, Reno County Emergency Preparedness Map

VIII-E, Normal Unit Strength (NUS)

VIII-F, Fire Dispatch Plan

VIII-G, IC Procedures

VIII-H, Quivira Radio Frequency List

VIII-I, Fire Detection Report

VIII-J, Resource Order Filing Procedures

VIII-K, Delegation of Authority

VIII-L, Fire-time Account Numbers

IX. PRESCRIBED FIRE PROGRAM

Prescribed fire will be used as a management tool on the Quivira Refuge as explained in the

Environmental Assessment and Compatibility Determination (Appendix I-A) that covers Quivira Refuge management activities, and as outlined in Sections II, IV and V. In addition to this document, a Refuge Prescribed Fire Management Plan has been completed. This Plan, titled “Quivira National Wildlife Refuge, An Assessment of Area Fire History, Resource Management Practices and Prescribed Burning Costs with Resulting Prescribed Fire Strategy Determinations” was written to satisfy the project completion requirements of the Technical Fire Management Course. It addresses the prescribed and wildland fire history and future prescribed fire needs of the Refuge and outlines goals, objectives, management units, strategies and other applicable elements of the Refuge prescribed fire program. A copy of this Plan accompanies the Fire Management Plan and serves as the prescribed fire management reference for the Refuge.

In addition to the Prescribed Fire Plan, the following topics will assist in further clarifying the overall Refuge prescribed fire program:

A. TYPES OF PRESCRIBED FIRE

1. Resource Management Ignitions: Will be the primary type of prescribed fire used on the Refuge, for the purpose of restoring, creating and/or maintaining plant community diversity to enhance native plant and wildlife populations.

2. Hazard Fuel Reduction Ignitions: Occasionally used to reduce the risk of wildfire damage, particularly where fire return intervals have not been maintained.

B. PLANNING

Although the normal prescribed fire season at Quivira Refuge is from mid-February to mid-May, burns may be conducted at anytime of the year depending on site-specific unit objectives and prescription parameters.

Burn Plans will be written for each planned ignition. Burn plan format and approval procedures will follow established Region 6 policy and guidelines. Ignitions should be planned and approved well ahead of time to provide adequate timeframes for burn preparatory work such as mowing, discing and blacklining.

As part of the planning process, Refuge planners will review the affects of fire management activities and incorporate contingency planning elements into each fire management operation.

During a prescribed fire, in the event of a slop-over, the Burn Boss will be notified immediately and all ignition may cease. The slop-over will be declared an escaped fire if it can not be contained within 1/4 hour with on-site resources or if structures are threatened regardless of the containment time, or if it is immediately obvious that slop-over can not be contained with on site resources. The IC will determine the most appropriate suppression strategy to suppress the fire. Direct attack is the preferred method and will be used unless otherwise directed by the IC. It is important to note that an escape under weather conditions considered “ in prescription” will

quickly grow beyond the suppression capabilities of on-site resources. Use of indirect attack along the numerous man-made or natural barriers found on and off the refuge will need to be quickly implemented. Generally there are no large unbroken tracts of continuous fuels surrounding the refuge. Surrounding area is fragmented by crop fields, roads and waterways which make good barriers to hold off of. Protection of private structure and improvements will be high priority.

If a prescribed fire/controlled burn on private land escape predetermined boundaries and crosses onto Quivira NWR it will be treated as a wildfire and suppressed using the appropriate response concept. An investigation on cause will be initiated as outlined in the FWS Fire Management Handbook. Refuge Manager, Fire Management Officer and appropriate Law Enforcement Officer will need to be involved in investigation.

C. CONSTRAINTS

The Quivira Refuge is within the Rocky Mountain Coordination Center's area of jurisdiction. Prescribed fires are not permitted when the area is in a fire danger preparedness level of V, or if the national preparedness level is V.

In addition, Quivira will not ignite prescribed fires when adjacent county and/or State burning bans are in effect, when the Palmer Drought Index is in the extreme drought (greater than -4) category or if the Ketch-Byram Drought Index is greater than 600.

Regulations and procedures on open burning and obtaining burn permits in the State of Kansas can be found in the Quivira Prescribed Fire Plan.

D. TRAINING

The Refuge FMO will ensure that NWCG/NIIMS prescribed fire qualification requirements are met by all personnel involved in the implementation of the Refuge prescribed fire program. Additionally, interest and career development evaluations will be completed for each Quivira employee for the purpose of completing individual fire training plans. All areas of interest will be considered in these training plans, not just operations/implementation.

E. COMPLEXITY

A full range of complexity, as outlined in the Region 6 Complexity Analysis Guide, exists at Quivira Refuge. Most ignitions are low to moderate complexity, requiring a Burn Boss Type 3 or Type 2, respectively.

F. MONITORING AND EVALUATION

Covered in the Quivira Prescribed Fire Plan

G. IMPACTS

Covered in the Quivira Prescribed Fire Plan

H. REPORTING AND DOCUMENTATION

All prescribed burns will be reported on Individual Fire Reports (DI-1202) and submitted to the Regional Office within 10 days of the fire being called “out” by the burn boss. Quivira has access to the SACS computer system and the Fire Management Information System, permitting electronic fire report completion. A hard copy of each report, along with project completion maps and other pertinent information will be kept on file in the Fire Office. All documentation associated with each burn including spot weather forecasts, burn plan amendments, cost records, implementation checklists, objective accomplishment and monitoring forms and postburn reports will be kept on file in each unit-specific burn plan folder.

X. FIRE USE

There are no current plans to use wildland fire to achieve resource management objectives at Quivira. The comparatively small size of the refuge and its geographic association with adjacent private lands, the tremendous values associated with adjacent private land as described in Section III, part 8 and the oil and gas production and permittee-grazing activities that occur over many areas of the refuge during the fire season rule out this option. The Management-Ignited Prescribed Fire Plan mentioned in Section IX above will address this issue and be written to include warm-season ignitions, within designated areas, to protect the integrity of the Quivira ecosystem by obtaining the most natural fire effects possible.

XI. AIR QUALITY/SMOKE MANAGEMENT GUIDELINES

Visibility and clean air are primary natural resource values. The protection of these resources must be given full consideration in fire management planning and operations. In addition management can have serious health and safety effects which must be considered during the planning and approval process.

Smoke management will be incorporated into prescribed fire planning and, to the extent possible, wildfire suppression. Sensitive areas and time periods will be identified and precautions taken to safeguard visitors, local neighbors and employees.

Federal smoke management regulations and guidelines will be followed when planning and conducting prescribed fire on the refuge. There is no State Implementation Plan (SIP) for smoke management in Kansas.

The state of Kansas has minimal smoke management guidelines and regulations that pertain mainly to agricultural burning and the prevention of smoke lingering on roadways and other sensitive areas. Night time ignitions, burning on days when the cloud cover is $>.7$ and/or when wind speeds are <5 or >15 mph are all prohibited. No prescribed burning permits are required, however, a brief prescribed fire plan outline of “who, what, where, when and how” has been provided to the public by the Kansas Department of Health and Environment to be completed and turned in to the local Sheriff’s office prior to burning so the Sheriff dispatcher can track prescribed burning activities for the RVFDs.

XII. FIRE RESEARCH AND MONITORING

The effects of fire on refuge plant and animal populations need to be better understood. Fire behavior data will be collected on all refuge prescribed fires, and on wildfires when practical. Through applied research and careful application of fire, this data 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 monitoring will comply with accepted scientific methods. The results, along with information gathered through research studies, will be used to improve the effectiveness of the fire management program.

XIII. PUBLIC SAFETY

Firefighter and public safety will always take precedence over property and resource protection during any fire management activity. Firefighter safety is covered in Sections IV, V, VII and VIII. This section will deal with public safety.

The greatest threat to public safety from refuge wildfires is entrapment by extremely fast moving fire fronts or fingers. Of particular concern are public users and adjacent land owners which may be present in the area of the fire, and neighbors who initiate their own suppression actions without proper training, equipment and/or communication. Refuge staff will attempt to keep the fire scene clear of anyone and everything except refuge and cooperator firefighters and associated support personnel and equipment.

The refuge has numerous wetland areas that are oftentimes overlooked by cooperators during suppression actions. These areas have proven to be hazardous in the past, causing numerous vehicles to become stuck and abandoned until a dozer or other piece of heavy equipment could pull them out. Refuge staff will continue to educate cooperators of this and other hazards.

Smoke from wildfires, particularly smoke that drifts into roadways causing dangerously reduced visibility, is a concern. The fire dispatcher will notify the applicable county Sheriff’s office whenever the IC determines that smoke may be causing a driver’s safety hazard. The Sheriff or Highway Patrol office can assess the situation and take action as needed.

To follow-up on the above concerns, the following steps will be taken to minimize this threat:

- Develop a professional and skilled fire management organization capable of safely suppressing wildfires and conducting prescribed burns.
- Emphasize fire prevention as noted in Section VIII, part A.
- Develop a Management-Ignited Prescribed Fire Plan that will provide for the best possible management of hazard fuels and wildlife habitats.
- Improve interagency and mutual aid coordination, cooperation, participation, information sharing and training opportunities.

The Quivira Refuge Fire Management Program is currently in the infancy stage of at least three of the above four goals. The goals will be obtained as the program matures, is accepted and becomes grounded in its mission and purpose.

XIV. PUBLIC INFORMATION AND EDUCATION

Informing and educating the public is an important part of the US Fish and Wildlife Service mission. Information and education is critical to gaining public support of all aspects of fire management. Several different aspects of this task are:

Wildfire suppression: The IC is responsible for the dispersal of fire information to the press or the public on wildfires. The IC may request assistance with these tasks if needed.

Prescribed fire: Prescribed fire is nothing new to central Kansas residents. Many local farmers and ranchers conduct burning operations for vegetative management and economic purposes. Since prescribed burning on refuge lands is conducted primarily for wildlife habitat management and fuel reduction purposes, it is advantageous for managers to seek ways of educating the public about our program. First order fire effects are obvious to fire managers following wildfires or prescribed fire operations. Public tours of such areas soon after they have burned offer excellent educational opportunities, as do actual on-site observations of ignitions. It is certainly possible to coordinate a well-controlled group observation of prescribed burning operations if enough interest can be generated. These type of programs can be used to discuss fire effects, generate public tolerance of temporary changes in aesthetics, explain, first hand, the purpose of using fire as a management tool or, in the case of a wildfire, the purpose and need of suppression resources.

Fire prevention: Section VIII, part A outlines the refuge fire prevention program.

XV. ARCHEOLOGICAL/CULTURAL/HISTORIC RESOURCES

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

National Historic Preservation Act of 1966, as amended, Section 106 clearance will be followed for any fire management activity that may affect historic structures or archeological resources.

Currently wildfires are suppressed. However, historical evidence demonstrates that natural and artificial fires were regular events in the mixed grass prairie. In recent years, fire suppression has resulted in a steady buildup of grassland and riparian fuel loads, colonization of disturbed soils by invading plant species, and natural vegetative growth, increasing the chances of an uncontrolled wildfire that could potentially endanger the Refuge's cultural resources as well as surrounding lands. Although over 20 years of fire ecology research allows ecologists to predict impacts on biotic communities, the possible impacts of prescribed burning (and wildfires) on archeological resources are not well known. Research conducted in North Dakota indicated that fire-related impacts to buried artifacts are negligible, but effects on surface-exposed artifacts will be significant, depending on artifact type and size (Seabloom et al 1991).

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

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

- ! Files and records of cultural resources should be consulted by the staff when planning prescribed burns, developing pre-attack plans, and performing other preparedness actions. The potential for adverse impacts to cultural resources will be evaluated prior to prescribed burning and in the selection of fire suppression strategies during wildfires.
- ! The Regional Archeologist will be contacted during the development phase of the burn plan writing process when cultural resources are suspected or known to exist in the project area.
- ! The Kansas State Historic Preservation Officer (SHPO) will be contacted by the Regional Archeologist when it is known a planned management action may impact archeological or cultural resources. The SHPO has 30-days to respond. The Refuge will follow any programmatic archeological/cultural resources management plan that may be implemented in the future.
- ! Low impact wildfire suppression tactics (cold-trailing, use of foam/wet-water/water, use of natural and manmade barriers, change in vegetation, mowing, etc.) will be used to the fullest extent possible. Line construction for prescribed fire activities will follow the same principle. Maps indicating the known location of significant cultural resources will be consulted prior to laying out burn units, and whenever possible, before constructing fireline to halt the spread of a wildfire.
- ! Prescriptions for management ignited prescribed fires will take into account the presence

of known cultural sites. Cooler fires with short residence time will be used in areas containing known cultural sites, whenever possible.

- ! Known surface sites will be marked, protected, and excluded from the burn, if possible. Foam will not be used in areas known to harbor surface artifacts.

- ! The use of mechanize equipment within the refuge must be approved by the Refuge Manager on a fire by fire basis, and the use these resources will be considered in the approval process for any planned management actions. When the use of heavy equipment is authorized, its use will be monitored.

- ! The location of sites discovered as the result of fire management activities will be reported by the ROS to the Regional Archeologist.

- ! Rehabilitation plans will address cultural resources and will be reviewed by the Regional Archeologist.

XVI. FIRE CRITIQUES AND ANNUAL PLAN REVIEW

Refuge staff recognize that Fire Management is an evolving mission within the Service and refuge system. Fire managers should make every effort to advance in fire management so that staff and resources are afforded the best available protection from wildfire and application of prescribed fire. Accomplishment of this goal will require periodic review of the fire management program as described below:

A. Fire critiques: ICs/Burn Bosses will critique all fires. Most critiques will be short and informal. The results of wildfire critiques will be recorded in the remarks section of the DI-1202 fire reports. Prescribed burn critiques will be recorded within the burn plans. Critiques should be passed on to the FMO and the refuge Manager, and may be passed on to the Regional Fire Management Coordinator when appropriate.

The FMO will conduct formal fire critiques if:

- Significant fire related injury/accident occurs.
- Significant property or resource damage occurs.
- Fire shelter deployment occurs (entrapment investigation also initiated).
- Significant safety concerns are voiced.
- Extended attack occurs or fire exceeds 100 acres.
- Prescribed fires are declared wildfires for any reason.

A formal report documenting each critique will be prepared.

B. Fire season and annual plan review: The Refuge Manager and the FMO will meet in November to review and discuss all aspects of the fire management program during the prior fire season, and develop strategies for improving these operations in the future. A list of recommended actions, assigned responsibilities and time frames for implementation will be developed.

XVII. CONSULTATION AND COORDINATION

The final revision of the FMP was prepared after consultation with:

Phil Street, Region 6 Fire Management Coordinator

Carl Douhan, Region 6 Prescribed Fire Specialist

Jim Kelton, Kansas/Nebraska Zone FMO

Rich Sterry, Flint Hills NWR FMO

E.A. for The Management Of Upland Habitats Of The Quivira NWR (9/9/94)

E.A. for Prescribed Burning on the Quivira NWR (3/84)

Quivira NWR Fire Management Plan (revised 1/27/86)

Kirwin NWR Fire Management Plan (2/97 Draft)

Charles M. Russell NWR Fire Management Plan (revised 7/95)

USFWS Fire Management Plan Checklist (2/23/96)

Copies of this Fire Management Plan will be provided to:

Region 6 Fire Management Coordinator

KS/NE Zone FMO

Kansas State Department of Health and Environment

Stafford, Reno and Rice County RVFD Chiefs

Other interested cooperators

XVIII. ADDITIONAL PLANS NEEDED TO FULLY EXECUTE THIS FMP:

The Quivira National Wildlife Refuge Fire Management Plan is a fully operational Plan. The Technical Fire Management project document “Quivira National Wildlife Refuge, An Assessment of Area Fire History, Resource Management Practices and Prescribed Burning Costs with Resulting Prescribed Fire Strategy Determinations” is considered a part of this plan. This document addresses management issues and concerns and establishes a range of alternatives for the accomplishment of preestablished management goals and objectives through prescribed fire applications on the Refuge.

No other plans are needed to fully execute the FMP.

XIX. APPENDICES

Appendices are on the following pages.....

Appendix III-C

COOPERATORS, PERMITTEES, OIL & GAS PRODUCERS

Cooperators (Farming): See Map, Appendix III-D

| | | |
|-------------------|----------------------------|-------------------|
| Lawrence Boy | Harold R. or Steve Nielson | Ron Starr |
| Route 1, Box 46 | 303 North Pioneer, Box 235 | Route 1 |
| Raymond, Ks 67573 | Alden, Ks 67512 | Raymond, Ks 67573 |
| No phone | 316-534-2831 or 562-7352 | 316-534-3812 |
| (60.3 acres) | (959.6 acres) | (58.9 acres) |

Permittees (Grazing): See map, Appendix III-E

| | | |
|-------------------------|------------------------|-----------------------|
| Ed and/or Jack Hamilton | Mark Hornbaker | Bud Miller |
| 316 East Ave. F | Rt. 3, Box 25 | 218 N. Brownlee Rd. |
| Sylvia, Ks 67581-9208 | Stafford, Ks 67578 | Sylvia, Ks 67581-9281 |
| 316-486-2435 or 3211 | 316-234-6095 or 5072 | 316-486-2372 |
| (2,597 acres) | (1,015 acres) | (1,760 acres) |
| Todd Miller (Bud's son) | Tom Schweizer | Tom Turner |
| 5 North Olcott Rd. | 316-278-2194 | Rt. 3, Box 129 |
| Sylvia, Ks 67581-8938 | (2,026 acres - Cell B) | Stafford, Ks 67578 |
| 316-486-2306 | (2,075 acres - Cell G) | 316-234-5703 |
| (shares father's acres) | | (2,765 acres) |

Oil & Gas Producers: See map, Appendix III-F

| | |
|----------------------------|-----------------------------------|
| Sleeper #1 Lease, Well #83 | Sleeper A1 Lease, Wells #58/59 |
| Sleeper #2 Lease, Well #85 | Sleeper A2 Lease, Well #60 |
| Davis Petroleum, Inc. | Sleeper Wells #64,87&88 |
| Rt. 1, Box 183B | White Eagle Resources Corporation |
| Great Bend, Ks 67530 | 112 Southwest 9th Street |
| 316-682-1537 or | Plainville, Ks 67663 |
| 316-793-3051/5831 | Contact: George Hutton |
| Pumper...Darrel Willinger | 913-434-4900 (office) |

R.R., Hudson, Ks
316-458-5341

913-635-4900 (mobile)
913-434-2928 (home)
Pumper: Gaylen Lloyd, Great Bend, Ks
316-797-7806 (mobile) 316-792-7806 (home)

Fair B5 Lease, Well # 82
Larson Operating Co.
316-653-7368
Tom Larson
316-793-2168 (mobile)

Wolf "A" Lease, Wells # 28,29,30,33,34
Vamco Operations
Rt. 1, Box 33 Chase, Ks 67524
John Thomas, Owner/Operator
316-938-2411

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Oil & Gas Producers, continued...

Sleeper B. Lease, Well #81
Sleeper C. Lease, Well #84
Ainsworth Operating Co.
1255 Lake Avenue
P.O. Box 1269
Colorado Springs, Co. 80901
719-576-5300 or
Kent Roberts
Suite 301, 212 N. Market
Wichita, Ks 67202
316-262-5300
Company Rep...Terry Hidy
719-576-5330
Pumper...Darrel Willinger
R.R. Hudson, Ks
316-458-5341

Smith B-2 Lease, Wells #63,65,75
Fair Estate Lease, Well #38
F.G. Holl Oil Co.
6427 E. Kellogg
Wichita, Ks 67207
316-684-8481 or
316-995-3171 (Belpre, Ks #)
Company Rep...Delmar Manning
316-564-3221
Pumper...Calvin Kesselman, Chase, Ks.
316-938-2411

* Bureau of Land Management
Oklahoma Resource Area Headquarters
221 N. Service Road
Moore, Ok 73160
Brian D. Mills, Agent
405-794-9624 (office)

Flora B Lease, Well # 10
Rama Operating Co.
P.O. Box 157, 107 W.Broadway
Stafford, Ks 67578

*Kansas Corporation Commission
Richard Lacey

| | |
|----------------------------|--------------------------------|
| Company Rep...Robin Austin | 316-338-1610 (mobile) |
| 316-234-5191 (work) | 316-653-4929 (home) |
| 316-234-5697 (home) | |
| Pumper...Darrell Shultz | *Kansas Corporation Commission |
| 316-793-1128 (mobile) | Steve Durant |
| 316-534-2933 (home) | 304 West McArtor |
| | Dodge City, Ks 67801 |

*Federal or State compliance/operations/royalty inquiry representatives.

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APPENDIX III-J “QUIVIRA NWR WILDFIRE RECORD”

1960-1996 (37 years)

| <u>Date</u> | <u>Name</u> | <u>Acres</u> | | <u>Class</u> | <u>Fuel</u> | <u>Cause</u> |
|-------------|-------------|---------------|----------------|--------------|-------------|----------------------|
| | | <u>Refuge</u> | <u>Private</u> | | | |
| 04/01/60 | | .25 | | A | Grass | Motor grader exhaust |
| 11/04/60 | | 160 | | D | Grass | Unknown |
| 02/17/62 | | 35 | | C | Grass | Lightning |
| 05/03/62 | | 2 | | B | Grass | Lightning |

| | | | | | | |
|----------|----------------|-------|-------|---|-------------|-----------------------|
| 05/03/62 | | .25 | | A | Grass | Lightning |
| 05/18/62 | | 45 | | C | Grass | Lightning |
| 06/21/62 | | 4 | | B | Grass | Lightning |
| 06/22/62 | | 4 | | B | Grass | Reburn from 6/21 fire |
| 04/18/63 | | 246 | | D | Grass | Unknown |
| 03/18/68 | | 380 | 220 | E | Grass | Aircraft crash |
| 06/13/68 | | 160 | | D | Grass | Lightning |
| 07/12/68 | | 5 | | B | Grass | Lightning |
| 02/27/70 | | 300 | | E | Grass | Vehicle exhaust |
| 08/08/70 | | | 1 | B | House | Lightning |
| 09/14/71 | | 3 | 3 | B | Grass | Field burning |
| 07/15/71 | | 1 | | B | Grass | Unknown |
| 08/18/75 | Veikley | .25 | | A | Grass | Lightning |
| 01/12/76 | North Lake | | 42 | C | Grass | Field burning |
| 03/08/77 | Unit 29 | 197 | | D | Grass | Escaped Rx fire |
| 07/14/78 | Big Salt Marsh | 90 | 30 | D | Grass | Lightning |
| 07/18/78 | Backhoe | 20 | | C | Grass | Equipment exhaust |
| 07/30/79 | Unit 25 | 130 | | D | Cattails | Lightning |
| 07/18/80 | Breakfast | | 3 | B | Grass | Lightning |
| 08/08/80 | Sleeper | | 140 | D | Grass | Oil well pump exhaust |
| 10/14/80 | Early A.M. | 15 | | C | Grass | Lightning |
| 03/16/81 | Rattlesnake | 1,200 | | F | Grass | Escaped Rx fire |
| 07/02/81 | Quivira | .25 | | A | Grass | Lightning |
| 04/15/82 | Marks | 300 | 300 | E | Grass | Vehicle exhaust |
| 07/11/83 | Cemetary | | 3 | B | Grass | Field burning |
| 07/02/84 | Miller | | 290 | D | Wheat/Grass | Field burning |
| 08/02/84 | Bridge-62 | .50 | | B | Hay bales | Unknown |
| 11/05/84 | Unit 25 | 198 | | D | Grass | Escaped Rx fire |
| 11/26/84 | Marsh Road | 1 | | B | Grass | Unknown |
| 05/05/85 | Miller | | 1 | B | Grass | Lightning |
| 02/18/86 | Sleeper | | 352 | E | Grass | Smoking |
| 05/12/86 | Parking Lot | .1 | | A | Grass | Escaped Rx fire |
| 06/07/87 | Idlo | | .1 | A | Grass | Field burning |
| 03/22/88 | North Lake | 1 | 8,000 | G | Grass | Field burning |

“QUIVIRA NWR WILDFIRE RECORD, CONTINUED”

| <u>Date</u> | <u>Name</u> | <u>Acres</u> | | <u>Class</u> | <u>Fuel</u> | <u>Cause</u> |
|-------------|------------------|---------------|----------------|--------------|-------------|-----------------------|
| | | <u>Refuge</u> | <u>Private</u> | | | |
| 07/09/88 | Unit 49 | 15 | | C | Grass | Lightning |
| 08/13/88 | Schultz | | 5 | B | Grass | Field burning |
| 12/28/88 | Quivira | 700 | 100 | E | Grass | Unknown |
| 03/07/89 | G-2 | 600 | | E | Grass | Unknown |
| 03/14/89 | Hudson Road | | 1,200 | F | Grass | Powerline |
| 04/06/89 | Sleeper | 3,800 | 1,000 | F | Grass | Field burning |
| 11/20/89 | Fiscus | | 2 | B | Grass | Trash burning |
| 04/10/90 | Darrynane | 160 | | D | Grass | Smoking |
| 07/20/90 | Hamilton | 3 | | B | Grass | Lightning |
| 03/09/91 | Road 484 | 3,700 | | F | Grass | Vehicle exhaust |
| 04/10/91 | Creek | 400 | | E | Grass | Smoking |
| 08/11/91 | Sylvia | | 300 | E | Grass | Unknown |
| 08/11/91 | L.D. Davis | .5 | | B | Grass | Equipment Use |
| 09/07/91 | Coop Truck | .5 | | B | Grass | Burning vehicle |
| 09/14/91 | Unit 29 | 3 | | B | Grass | Burning vehicle |
| 03/17/92 | East Little Salt | 3 | | B | Grass | Lightning |
| 06/27/92 | Rattlesnake | 2 | | B | Grass | Lightning |
| 07/07/93 | Hornbaker | | 2 | B | Grass | Unknown |
| 03/04/94 | Smith | | 75 | C | Grass | Equipment Use |
| 03/16/94 | Sylvia | | 4,960 | F | Grass | Railroad brakeshoe |
| 03/30/94 | Bunkhouse | 15 | | C | Grass | Escaped Rx fire |
| 06/21/94 | Cottonwood | | .1 | A | Grass | Lightning |
| 06/21/94 | City Service | .2 | | A | Grass | Lightning |
| 07/01/94 | Hornbaker | | 800 | E | Grass | Field burning |
| 03/04/96 | Blacktop | 32 | | C | Grass | Smoking |
| 04/18/96 | Deer Stand | | 340 | E | Grass | Smoking |
| 04/25/96 | Gatton | | 6,000 | G | Grass | Incendiary, pyromania |
| 08/26/96 | Rice | 1 | | B | Grass | Lightning |
| 08/26/96 | Santana | .1 | | A | Grass | Lightning |

| | | | | | |
|-------------|----------|-------------|--------------|----------------|-------------------|
| 1985 | 1 | 0 | 1 | 1 | 1 |
| 1986 | 2 | .1 | 352 | 352.1 | .1 - 352 |
| 1987 | 1 | 0 | .1 | .1 | .1 |
| 1988 | 4 | 716 | 8,105 | 8,821 | 5 - 8,001 |
| 1989 | 4 | 4,400 | 2,202 | 6,602 | 2 - 4,800 |
| 1990 | 2 | 163 | 0 | 163 | 3 - 160 |
| 1991 | 6 | 4,104 | 300 | 4,404 | .5 - 3,700 |
| 1992 | 2 | 5 | 0 | 5 | 2 - 3 |
| 1993 | 1 | 0 | 2 | 2 | 2 |
| 1994 | 6 | 15.2 | 5,835.1 | 5,850.3 | .1 - 4,960 |
| 1995 | 0 | 0 | 0 | 0 | 0 |
| <u>1996</u> | <u>5</u> | <u>33.1</u> | <u>6,340</u> | <u>6,373.1</u> | <u>.1 - 6,000</u> |
| Totals | 67 | 12,933.9 | 24,169.2 | 37,103.1 | .1 - 8,001 |

APPENDIX III-L

37 YEAR WILDFIRE AVERAGES, TOTALS AND PERCENTAGES (1960-1996):

AVERAGES (fires and acres):

Fires/year.....1.8
 On-refuge acres burned/year.....349.6
 Off-refuge acres burned/year....653.2
 Total acres burned/year.....1,002.8

TOTALS AND PERCENTAGES:

Fires:

Sole refuge land fires suppressed.....40 (60%)
 Sole private land fires suppressed.....20 (30%)
 Dual ownership fires suppressed.....07 (10%)
 Fires suppressed on all lands.....67 (100%)

Acres:

Refuge acres burned.....12,933.9 (35%)
 Private acres burned.....24,169.2 (65%)
 Total acres burned.....37,103.1 (100%)

Fires by size class:

Class A fires (.1 - .25 acres).....09 (13%)
 Class B fires (.25 - 9 acres).....22 (33%)
 Class C fires (10 - 99 acres).....09 (13%)
 Class D fires (100 - 299 acres).....10 (15%)
 Class E fires (300 - 999 acres).....10 (15%)
 Class F fires (1000 - 4999 acres)....05 (08%)
 Class G fires (5000 + acres).....02 (03%)
 Total fires.....67 (100%)

III-L1

APPENDIX III-M

Fires, acres, percentages and largest wildfires by cause, 1960 - 1996 (37 years):

| <u>Cause</u> | <u># of fires</u> | <u>% of total fires</u> | <u># of acres</u> | <u>% of total acres</u> | <u>Largest fire</u> |
|-----------------------|-------------------|-------------------------|-------------------|-------------------------|---------------------|
| Lightning | 23 | 34% | 546.15 | 01% | 160 ac. |
| Private field burning | 09 | 13% | 13,947.1 | 38% | 8,000 ac. |
| Unknown | 09 | 13% | 2,110.5 | 06% | 800 ac. |
| Smoking | 05 | 07% | 1,284 | 03% | 400 ac. |
| Escaped rx fire | 05 | 07% | 1,610.1 | 04% | 1,200 ac. |
| Equipment exhaust | 03 | 04% | 160.25 | <01% | 140 ac. |
| Vehicle exhaust | 03 | 04% | 4,600 | 12% | 600 ac. |
| Equipment use | 02 | 03% | 75.5 | <01% | 75 ac. |

| | | | | | |
|-----------------------|----|-----|-------|------|-----------|
| Burning vehicle | 02 | 03% | 3.5 | <01% | 3 ac. |
| Trash burning | 01 | 02% | 2 | <01% | 2 ac. |
| Powerline | 01 | 02% | 1,200 | 03% | 1,200 ac. |
| Railroad brakeshoe | 01 | 02% | 4,960 | 13% | 4,960 ac. |
| Incendiary, pyromania | 01 | 02% | 6,000 | 16% | 6,000 ac. |
| Aircraft crash | 01 | 02% | 600 | 02% | 600 ac. |
| Reburn lightning fire | 01 | 02% | 4 | <01% | 4 ac. |

53% of the wildfires over the last 37 years have been human-caused, and account for 93% of the acres burned. Private field burning accounts for the bulk (38%) of this acreage.

34% of the wildfires over the last 37 years have been lightning-caused, and account for only 1% of the acres burned.

13% of the wildfires over the last 37 years have an unknown cause, and account for 6% of the acres burned.

**APPENDIX III-N “QUIVIRA NWR PRESCRIBED FIRE RECORD”
1977-1996 (20 years)**

| <u>Date</u> | <u>Name</u> | <u>Acres</u> | <u>Personnel</u> | <u>Comments</u> |
|-------------|-------------|--------------|------------------|------------------------------|
| 03/08/77 | Unit 29 | 135 | 2 | |
| 1979 | ? | 1,320 | | 5 separate areas were burned |
| 1980 | ? | 360 | | 4 separate areas were burned |

| | | | | |
|----------|----------------|-------|---|------------------------------|
| 03/18/81 | Rattlesnake | 1 | 3 | |
| 1981 | ? | 380 | | 4 other areas were burned |
| 1982 | ? | 90 | | 1 area was burned |
| 1983 | ? | 680 | | 9 separate areas were burned |
| 11/05/84 | Unit 25 | 3 | 5 | |
| 1984 | ? | 729 | | 5 separate areas were burned |
| 04/02/85 | Unit 14 | 95 | | |
| 04/08/85 | Darrynane | 42.5 | | |
| 04/08/85 | Rice County | 325 | | |
| 04/11/85 | Prairie Dog | 365 | | |
| 04/11/85 | Unit R20 South | 260 | | |
| 04/12/85 | Artesia | 295 | | |
| 04/23/85 | Unit R20 North | 397 | | |
| 04/24/85 | Unit R-15 | 217.5 | | |
| 04/25/85 | Schwiethale | 80 | | |
| 04/25/85 | R-2 Hornbaker | 330 | | |
| 04/25/85 | Wheeler | 152.5 | | |
| 03/03/86 | Islands | 37.5 | | |
| 03/07/86 | Cheatgrass | 84.5 | | |
| 04/09/86 | Big Salt Marsh | 120 | | |
| 04/11/86 | Schwiethale | 160 | | |
| 04/20/86 | Miller | 450 | | |
| 04/21/86 | Unit 25 | 575 | | |
| 04/22/86 | Hildebrand | 160 | | |
| 04/28/86 | Santana | 470 | | |
| 05/01/86 | Unit 14C | 55 | | |
| 05/02/86 | Section 5 | 525 | | |
| 07/25/86 | Unit 30 | 65 | 6 | |
| 03/12/87 | LSM Islands | 2 | | |
| 04/07/87 | Schwiethale | 210 | | |
| 04/07/87 | Headquarters | 9 | | |
| 04/08/87 | LSM North | 85 | | |
| 04/08/87 | Bunkhouse | 105 | | |
| 04/17/87 | Sterling Road | 540 | | |
| 04/24/87 | Artesia | 340 | | |
| 04/24/87 | Marsh Road | 145 | | |
| 04/29/87 | LSM East | 60 | | |

“QUIVIRA NWR PRESCRIBED FIRE RECORD, CONTINUED”

| <u>Date</u> | <u>Name</u> | <u>Acres</u> | <u>Personnel</u> | <u>Comments</u> |
|-------------|-------------------|--------------|------------------|--------------------------------------|
| 05/12/87 | Deadhorse | 78 | | |
| 03/14/88 | Unit 22 | 60 | | |
| 04/04/88 | North Lake | 415 | | |
| 04/06/88 | Miller Coop | 152 | | Included approx 900 ac. of pvt. land |
| 04/11/88 | Maintenance 26 | 3 | 4 | |
| 04/12/88 | West Big Salt | 240 | 6 | |
| 04/12/88 | Hunter Access | 18 | 3 | |
| 04/19/88 | Deadhorse | 167 | | |
| 04/20/88 | Prairie Dog | 165 | 6 | |
| 04/22/88 | Unit 28 | 190 | 7 | |
| 04/28/88 | S.E. Little Salt | 352 | 7 | |
| 05/04/88 | Marsh Road | 430 | 5 | |
| 04/03/90 | Unit 7 | 200 | | |
| 04/30/90 | Unit 14C | 30 | | |
| 05/02/90 | Unit 16 | 150 | | |
| 02/12/91 | Unit 14B | 180 | | |
| 03/30/92 | Unit C/28-30 | 1,122 | 7 | |
| 04/02/92 | Unit 14/20 | 801 | 7 | |
| 04/06/92 | Unit 7 | 200 | 7 | |
| 04/02/93 | Unit 30A | 60 | 7 | |
| 04/26/93 | Unit 7 | 250 | 7 | |
| 09/09/93 | Unit 30 | 65 | | |
| 09/27/93 | Unit 40 | 100 | 7 | |
| 12/08/93 | Unit 25 | 92 | 7 | |
| 02/02/94 | Wildlife Drive | 526.5 | 4 | |
| 03/30/94 | Unit 29 | 175 | 6 | |
| 05/05/94 | Little Salt Marsh | 1,024 | 8 | |
| 05/10/94 | Richardson | 400 | 8 | 80 ac. Qvr, 320 ac. pvt. w/4-4 crew |
| 05/11/94 | Williamson | 160 | 6 | All pvt. land w/4 Qvr, 2 pvt crewmen |
| 10/19/94 | Unit 28 | 135 | 5 | |
| 12/20/94 | N.W. Little Salt | 275 | 5 | |
| 01/19/95 | Wildlife Drive | 640 | 3 | |
| 01/25/95 | Unit 20 | 160 | 4 | |
| 02/02/95 | East Lake | 190 | 5 | |

| | | | | |
|----------|-------------|-------|---|---------------------------------------|
| 03/23/95 | 60 Units | 1,020 | 4 | |
| 03/28/95 | Fisher Coop | 1,680 | 6 | 400 ac. Qvr, 1280 ac. pvt. w/2-4 crew |
| 04/24/95 | Unit 40 | 550 | 3 | |
| 04/27/95 | Unit 10/11 | 840 | 3 | |
| 05/11/95 | Fritzmier | 130 | 2 | All pvt. land w/2 Qvr, 4 pvt. crewmen |
| 05/16/96 | Unit 25 | 92 | 5 | |

APPENDIX III-O

“PRESCRIBED FIRE FREQUENCY AND ACRES BURNED”

1977-1996 (20 years)

| <u>Year</u> | <u># of Rxfires</u> | <u>Total Acres Burned</u> |
|-------------|---------------------|---|
| 1977 | 1 | 135 |
| 1978 | 0 | 0 |
| 1979 | 5 | 1,320 |
| 1980 | 4 | 360 |
| 1981 | 4 | 380 |
| 1982 | 1 | 90 |
| 1983 | 9 | 680 |
| 1984 | 6 | 732 |
| 1985 | 11 | 2,559.5 |
| 1986 | 11 | 2,702 |
| 1987 | 10 | 1,574 |
| 1988 | 11 | 2,192 |
| 1989 | 0 | 0 |
| 1990 | 3 | 380 |
| 1991 | 1 | 180 |
| 1992 | 3 | 2,123 |
| 1993 | 5 | 567 |
| 1994 | 7 | 2,695.5 |
| 1995 | 8 | 5,210 |
| <u>1996</u> | <u>1</u> | <u>92.....(State-wide burn ban/drought)</u> |
| Totals | 101 | 23,972 |

20 YEAR AVERAGES:

Ignitions/year.....5
Acres rxburned/year.....1,199

**APPENDIX VII-A
QUIVIRA NATIONAL WILDLIFE REFUGE
FIRE RESOURCE DIRECTORY
July, 1998**

| <u>Name/Position</u> | <u>Position Qualifications</u> | <u>Phone Numbers</u> |
|-------------------------------|--------------------------------|------------------------------|
| Dave Hilley, Refuge Manager | ENGB, FFT1, RXI2 | 316-486-2389(h), 486-2393(w) |
| Kathy Owens, Ass't Manager | RADO, EDRC, FFT2 | 316-486-2570(h), 486-2393(w) |
| Morgan Beveridge, FMO | DIVS, CRWB, AOBS | 316-664-5445(h), 486-2393(w) |
| Tim Keller, Engine Foreman | ENGB, FFT1, ICT4, SEC2 | 316-486-2182(h), 486-2393(w) |
| Greg Owens, Range Tech. | FFT2 | 316-486-2570(h), 486-2393(w) |
| Gary Meggers, Range Tech. | FFT1 (rx) , ENOP | 316-486-3173(h), 486-2393(w) |
| *Carl Marks, Work Leader | EQPM, FFT2 (rx) | 316-486-3455(h), 486-2393(w) |
| *Stanley King, Maint. Worker | FFT2 | No home phone, 486-2393(w) |
| *Henry Hall, Maint. Worker | FFT2 (rx) | 316-486-3133(h), 486-2393(w) |
| *Suzanne Fellows, Bio. Tech. | EDRC, FFT2 | 316-838-8824(h), 683-5499(w) |
| *Cynthia Terry, Admin. Ass't. | PTRC (Tr) | 316-234-6887(h), 486-2393(w) |
| Mark Sayler, AD/EFF Team | FFT1 | 316-663-5397(h), 662-3366(w) |
| Bobby White, AD/EFF Team | FFT1 | 316-422-3662(h), 422-5160(w) |
| Eric Wickman, AD/EFF Team | FFT2 | 316-672-0779(h), 672-5911(w) |

* Not qualified as FFT2 in 1998 due to insufficient physical fitness scores.

Additional Resources/Contacts:

Local

| | |
|--|-----------------------------------|
| Quivira Bunkhouse | 316-234-5470 |
| Stafford County Sheriff (Fire Dispatch) | 316-549-3247 |
| Mary Miller, Stafford County Dist.1 Fire Chief | 316-458-4383 (h) 316-549-3478 (w) |
| Henry Hall, Jr. Reno County Dist. 6 Fire Chief | 316-486-3671 (h) |
| Reno County Sheriff (Fire Dispatch) | 316-694-2735 |
| Rice County Sheriff (Fire Dispatch) | 316-257-2363 |
| Kansas Highway Patrol (Highway Security) | 316-744-0451 |
| Ambulance Service (Stafford) | 316-234-5221 |

Zone/Regional

Jim Kelton, KS/NE Zone FMO 402-376-3789/3189 (w) 402-376-1132 (h) 402-376-0245 (cell)
Phil Street, Regional FMC 303-236-8145 x676 (w) 303-933-6851 (h) 303-888-9720 (cell)
Carl Douhan, Rx Fire Specialist 303-236-8145 x618 (w) 303-978-1349 (h) 303-378-3086 (cell)
Hallie Locklear, Program Ass't. 303-236-8145 x617 (w) 303-

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FIRE RESOURCE DIRECTORY, CONTINUED

See the current Fire Management Directory for additional FWS Regional/National contacts.

| | |
|--|------------------------------|
| Pueblo Interagency Dispatch Center (Dave Toelle) | 719-545-1454 or 800-524-3473 |
| National Weather Service, Dodge City | 800-824-9943 |

DISPATCHER RESOURCE LIST:

LESS THAN ½ HOUR ARRIVAL TIME

Quivira NWR:

1Type 7X Engine (250 gl. slip-on, Chevy Cheyenne dually, 10,000 GVWR, 9640 full equip. wt.)

1 Type 4X Engine (770 gl. tank, International, 21,700 GVWR, 18,240 full equipment weight)
1 800 gl. Buffalo tank trailer with 12 horse pump, hose, hardware and overhead tool rack
1 300 gl. Buffalo tank trailer with 3 horse pump
1,500 gl. porta tank (can be mounted on 800 gl. Buffalo tank rack)
3 350CC Honda ATVs with 25 gl. water-holding tanks and 12 volt spray units

½ - 1 HOUR ARRIVAL TIME

Quivira NWR:

1 D5 Caterpillar and trailer
1 JD 670 Road Grader
1 JD 4055 tractor
2 Massey Ferguson tractors with mowers and tiller
1 JD 630 12' disc
1 JD 16' "bat winged" mower

Stafford County Rural VFD: (Does not include City Fire Dep't. resources)

300 gl. Hudson 4X4 Mini-Pumper (unit #434)
1,500 gl. Hudson 6x6 Tanker/Pumper w/foam (unit #436)
3,000 gl. Hudson Tanker (unit #438)
300 gl. Zenith 4X4 Mini-Pumper (unit #464)
1,500 gl. Zenith 6X6 Tanker (unit #466)
200 gl. Stafford 4X4 Mini-Pumper w/Jaws (unit #444)
1,500 gl. Stafford 6X6 Tanker/Pumper w/foam (unit #446)
300 gl. Seward 4X4 Mini-Pumper (unit #474)
1,500 gl. Seward 6X6 Tanker/Pumper w/foam (unit #476)
1,500 gl. Seward Pumper (unit #477)
Seward Rescue Trailer (unit #478)
300 gl. St.John 4X4 Mini-Pumper w/Jaws (unit #424)
1,500 gl. St.John 6X6 Tanker/Pumper w/foam (unit #426)
300 gl. Macksville 4X4 Minipumper (unit #414)
1,500 gl. Macksville 6X6 Tanker/Pumper w/foam (unit #416)

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Reno County Rural VFD, District 6 (Sylvia): (Does not include City Fire Dep't. resources)

1 Type 3 water tender (1,000 gl., 1971 International Towers)
1 Type 2 water tender (3,500 gl., 1983 GMC Brigadiere)
2 Type 7X Engines (300 gl. Slip-ons, 1975 Ford F250 and 1978 Ford F350 (brush truck)

1 - 2 HOUR ARRIVAL TIME

Reno County Rural VFDs, Districts 1-5, 7 and 8:

15 pumper units (100-300 gl.), 17 brush/grass trucks (100-300 gl.), 14 tankers (1,000-5,000 gl.)

Rice County Rural VFDs:

12 pumper units (100-300 gl.), 9 brush/grass trucks (100-300 gl.), 10 tankers (1,000-3,000 gl.)

LOCAL SERVICES:

Aircraft - Call Pueblo Dispatch Center (719-545-1454) for OAS qualified aircraft/pilots out of Liberal, Ks (the closest contract service airport). Liberal is 170 miles SW of Quivira Refuge, 200 miles SW of our closest full-service airport in Hutchinson, Ks).

Drinks, snacks, groceries - Stafford - Pauls Grocery, 309 S. Main (316-234-5239)
Great Bend - Dillons Grocery, 4107 10th St. (316-792-3591)
Love's Country Store, 1221 10th St. (316-792-6731)
Lyons - Love's Country Store, 711 W. Main (316-257-2073)

Meals (Take-out and Restaurants)

Hudson - Wheatland Cafe & Catering, Main St. (316-458-4761)
Stafford - Curtis Cafe, 104 S. Main St. (316-234-5644)
Elroy's Pizza, 115 S. Main St. (316-234-5408)
Great Bend - Wendys, 3519 10th St. (316-793-5868)
Subway, 2723 10th St. (316-792-2255)
Pizza Hut, 4101 10th St. (316-792-8228)
Sam's Mexican Restaurant, N. Hwy 281 (316-793-5519)

Lodging - Hutchinson - Best Western Sun Dome, Des Moines Ave. (316-663-4444)

Great Bend - Holiday Inn, 3017 W. 10th St. (316-792-2431)
Traveler's Budget Inn, 4200 10th St. (316-793-5448)

Best Western Angus Inn, 2920 10th St. (800-862-6487)
St. John - Country Inn Motel, RR 2 (316-549-6604)

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LOCAL SERVICES, CON'T...

Fuel Delivery - Stafford - Zenith Coop, 611 S. Buckeye (316-234-5274/5527)
St. John - Fox Petroleum Products, Inc., 659 E. 4th Ave. (316-549-3324)
Raymond - Fish Service Station, 310 Main (316-534-3170)

Tire Service / Mechanics - Stafford - Zenith Coop, 611 S. Buckeye (316-234-5274/5527)
St. John - Harter's Auto Repair, 113 N. Main (316-549-3533)
Jim's Amoco, 113 W. 4th (316-549-9990)
Jeff's Automotive, 105 W. 1st (316-549-3264)
Ellinwood - Knop Auto Repair, RR2 (316-564-3431)
Great Bend - Hertel's Auto Service, 912 MacArthur (316-792-5105)
Western Auto, 3502 10th (316-792-1288)

Hardware - Stafford - Stafford Lumber Co., 224 S. Main St. (316-234-5121)
Stafford Pump and Supply, 503 S. Main (316-234-5125/5692)
Great Bend - Waters True Value Hardware, 1649 Hwy 96 (316-792-5050)

APPENDIX VIII-A**QUIVIRA NWR STEP-UP PLAN**

This Step-Up Plan utilizes the National Weather Service **Rangeland Fire Index (RFI)** as a fire danger rating. This system serves as a guide to fire preparedness levels/operations and emergency funding use. It will be revised to the National Fire Danger Rating System- Burning Index (BI) when the Weather Information Management System is able to calculate BIs for Quivira.

STAFFING CLASS MATRIX:

| <u>RFI Staffing Class</u> | <u>Action</u> | <u>Range Fire Index</u> |
|----------------------------------|---|--------------------------------|
| I | -Primary engine staged (unstaffed) at Quivira NWR | LOW |
| II | -Primary engine staged (unstaffed) at Quivira NWR | MEDIUM |
| III | -All Staffing Class II actions + -Step-up to Staffing Class IV if lightning is predicted or during periods of high public use | HIGH |
| IV | -All Staffing Class III actions + -Notify Regional Fire Management Coordinator to open emergency preparedness account -Staff firefighters may be assigned to engine and/or detection patrol | VERY HIGH |

- Tour of duty may be changed at Manager discretion
- Notify Rural Volunteer Fire Departments that Refuge firefighters and equipment are on standby
- Maintain firefighter availability for Refuge and cooperative agreement coverage

V

- All Staffing Class IV actions +
- Non-fire personnel may be placed on standby
- Notify Rural Volunteer Fire Departments that Refuge firefighting resources are on standby and should not be dispatched to off-refuge fires

EXTREME

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STEP-UP PLAN, CONTINUED

Range Fire Index

| | | | | | | |
|----------------------------|---------------|-----------------|-----------------|-----------------|------------------|------------------|
| Lightning | Public | <u>L</u> | <u>M</u> | <u>H</u> | <u>VH</u> | <u>EX</u> |
| <u>Activity Use</u> | | | | | | |
| None | Low | Class I | Class I | Class II | Class III | Class IV |
| ProbableHigh | Class III | Class III | Class IV | Class V | Class V | |

Staffing Class

| PREPAREDNESS ACTIONS | I | II | III | IV | V |
|--|----------|-----------|------------|-----------|----------|
| FIRE STAFF | | | | | |
| Maintain radio contact with Headquarters | X | X | X | X | X |
| Carry PPE while on duty, wear nomex and fire boots | | X | X | X | X |
| Maintain response time of ___ minutes | 60 | 30 | 20 | 5 | 5 |
| Remain with assigned engine | | | | X | X |
| Monitor RVFD radio frequencies | | | | X | X |
| Tours of duty changed at Manger's discretion | | | | X | X |
| REFUGE STAFF FIREFIGHTERS | | | | | |

| PREPAREDNESS ACTIONS | I | II | III | IV | V |
|--|----------|-----------|------------|-----------|----------|
| Carry PPE while on duty | | | X | X | X |
| May be assigned to an engine or detection patrol | | | | X | X |
| Tours of duty changed at Manager's discretion | | | | X | X |
| FIRE EQUIPMENT | | | | | |
| * Type 4 and 6 Engines and 2 ATVs in ready status | X | X | X | X | X |
| * Water buffalo in ready status | | | X | X | X |
| MISCELLANEOUS EMERGENCY PREPAREDNESS ACTIONS | | | | | |
| Detection patrol following lightning activity and around high public use areas | | | X | X | X |
| Increase one staffing class if lightning is probable | | | X | X | X |
| RFMC notified, emergency preparedness account opened | | | | X | X |
| Notify Pueblo Dispatch/Zone FMO of staff class and status | | | | X | X |
| Notify RVFD Dispatch that Refuge crew is on standby | | | | X | X |
| Refuge firefighters restricted to fires on Refuge | | | | | X |

*Ready status = unmanned, but filled with water (except in winter) and ready to respond.

Resources assigned to fires may prevent some staffing actions - Refuge Staff should use common sense when determining how to fill behind dispatched resources.

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APPENDIX VIII-E NORMAL UNIT STRENGTH (NUS)

1997 Stocking Level - Quivira NWR Fire Cache - Listed as alphabetized in 1997 GSA Catalog

| ITEM | NFES# | NIFC/GSA ORDER # | PRICE | NUS | CURRENT INVENTORY |
|-----------------------------|--------------|-------------------------|--------------|------------|--------------------------|
| Adaptor, 1"nhf X 1"npsh | | Wildf. Pac.,8A-FM1ONS | 9.35 | 4 | 2 |
| Anemometer | 1155 | 6680-00-833-7010 | 17.37 | 3 | 3 |
| Battery, Alkaline, AA, 1.5V | 0030 | 6135-00-985-7845 | .035 | 120 | 100 |
| Battery, MT-1000 | | Motorola, N5447B | 60.00 | 16 | 10 |
| Blanket, All Weather | | Forestry Sply, 93325 | 12.00 | 8 | 3 |
| Briefcase, Nylon | 1526 | 8460-01-193-9769 | 26.35 | 2 | 2 |

| | | | | | |
|----------------------------|------|------------------------|--------|----|-----|
| Burn Kit, Emergency | | Forestry Sply, 25101 | 64.50 | 3 | 3 |
| Canteen, Polyeth., 1 Quart | 0037 | 8465-00-102-6381 | .36 | 48 | 100 |
| Chaps, Chain Saw, 32" | 0045 | 8415-00-286-7507 | 53.25 | 2 | 1 |
| Chaps, Chain Saw, 36" | 0078 | 8415-01-028-5575 | 57.85 | 1 | 0 |
| Chestpack, Radio | | Wildf.Pac.,13RCP200 | 29.00 | 6 | 3 |
| Clamp, Hose Shut-off | 0046 | 4210-00-767-7123 | 18.29 | 3 | 3 |
| Coat, Brush, Medium | | Wildf.Pac., 12-BC101 | 92.15 | 2 | 2 |
| Coat, Brush, Large | | “ ” 12-BC102 | 92.15 | 3 | 2 |
| Coat, Brush, XL | | “ ” 12-BC103 | 92.15 | 3 | 2 |
| Combination Tool | 1180 | 5120-01-240-2120 | 44.39 | 5 | 5 |
| Compass, Smoke Chaser | 1814 | 6605-00-553-8795 | 12.07 | 5 | 2 |
| Cord, Parachute (700 yds) | 0533 | 4020-00-240-2146 | 79.78 | 1 | 1 |
| Coupling, 1"npsh Dble-F | 0710 | 4210-01-080-1457 | 7.33 | 4 | 1 |
| Coupling, 1.5"nh Dble-F | 0857 | 4210-01-081-8749 | 9.03 | 4 | 1 |
| Coupling, 1"npsh Dble-M | 0916 | 4210-01-080-1458 | 4.31 | 4 | 1 |
| Coupling, 1.5x1.5nh Dble-M | | Wildf.Pac.,8A-DM15N | 15.80 | 3 | 3 |
| Coverall, Yellow Nomex, XL | | “ ” 13-JN-YXLR | 142.50 | 6 | 2 |
| Coverall, Yellow Nomex, L | | “ ” 13-JN-YLR | 142.50 | 2 | 1 |
| Cover, Canteen, Cotton | 0054 | 8465-00-118-4956 | 1.87 | 12 | 12 |
| Crew Time Report, Book | 0891 | 7540-01-058-0222 | 1.06 | 2 | 2 |
| Ear Plugs, (Box) | 1027 | 6515-00-137-6345 | 17.84 | 1 | 1 |
| File Guide, Chainsaw | 0343 | 5110-01-046-5031 | 21.60 | 1 | 1 |
| File, Mill, 12" | 1059 | 5110-00-242-5386 | 2.59 | 6 | 1 |
| File, Round 3/16" | 2105 | 5110-00-782-7491 | .47 | 12 | 2 |
| Flagging, Decomposable | 0456 | 9905-01-351-2136 | 2.68 | 10 | 5 |
| Flagging, Vinyl (Carton) | | Frstry Sply 57926 | 13.00 | 1 | 0 |
| Foam Aspirator, 1"npsh | | Wildf.Pac., 9-51100011 | 133.45 | 2 | 2 |
| Foam Aspirator, 1.5" nh | | “ ” 9-51100012 | 133.45 | 1 | 1 |
| Foam Concentrate, 5 Gl. | | Wildf.Pac., 9-3500 | 61.75 | 10 | 3 |

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| ITEM | NFES# | NIFC/GSA ORDER # | PRICE | NUS | CURRENT INVENTORY |
|----------------------------|-------|-------------------|-------|-----|-------------------|
| Forms, OF-245 Manifest | 1289 | 7540-01-033-8919 | 5.29 | 20 | 20 |
| Forms, OF-288 FTR | 0866 | 7540-01-124-7633 | 7.51 | 50 | 50 |
| Fuel Bottle, Aluminum | 1535 | 7240-01-351-2133 | 8.58 | 8 | 8 |
| Fuel Can, 1.5 Gl. (2 in 1) | | Frstry Sply 93260 | 11.75 | 2 | 2 |

| | | | | | |
|-----------------------------|------|-------------------|-------|----|----|
| Fuel Can, 2.5 Gl. (2 in 1) | | “ ” 93261 | 12.75 | 2 | 2 |
| Fuel Can, 1 Gl. Safety | | “ ” 93135 | 28.95 | 2 | 1 |
| Fuel Can, 2 Gl. Safety | | “ ” 93136 | 32.75 | 2 | 1 |
| Fuel Can, 5 Gl. Safety | | “ ” 93137 | 36.50 | 4 | 4 |
| Fuel Can, 2.5 Gl. Plastic | | “ ” 93141 | 7.50 | 2 | 1 |
| Fusee, Backfiring, (Box) | 0105 | 1370-00-294-1279 | 52.59 | 1 | .5 |
| Gasket, 1" Hose | 0743 | 5330-00-720-2621 | .15 | 25 | 10 |
| Gasket, 1.5" Hose | 0254 | 5330-00-239-1873 | .15 | 25 | 5 |
| Glasses, Safety, Clear | 0475 | 4240-01-292-2816 | 3.70 | 6 | 3 |
| Glasses, Safety, Amber | 0476 | 4240-01-292-5055 | 4.00 | 6 | 0 |
| Gloves, Forest Worker S | 1294 | 8415-01-394-0209 | 11.79 | 8 | 7 |
| Gloves, Forest Worker M | 1295 | 8415-01-394-0210 | 11.79 | 8 | 8 |
| Gloves, Forest Worker L | 1296 | 8415-01-394-0215 | 11.79 | 18 | 10 |
| Gloves, Forest Worker XL | 1297 | 8415-01-397-3937 | 11.79 | 12 | 8 |
| Goggles, Safety | 0300 | 4240-01-292-2818 | 4.84 | 10 | 10 |
| Goggles, Rubber, Clear | | Wildf.Pac., 40078 | 12.20 | 12 | 12 |
| Goggle Retainer | | ” “ 13-449895 | 7.75 | 12 | 12 |
| Handle, File, Wood | 0063 | 5110-00-263-0341 | .71 | 12 | 12 |
| Helmet, Wildfire w/ratchet | | “ ” 13FH911R-CR | 17.60 | 6 | 3 |
| Helmet, Safety, Wildfire | 0109 | 8415-01-055-2265 | 13.98 | 14 | 14 |
| Hose, 1"npsh Synth. x 100 | 1238 | 4210-01-166-8122 | 49.36 | 20 | 10 |
| Hose, 1.5"nh Synth. x 100 | 1239 | 4210-01-165-6597 | 66.13 | 40 | 16 |
| Hose, 1.5"nh csjrl x 50 | 0964 | 4210-01-037-7031 | 53.50 | 10 | 4 |
| Hose, 3/4"nh Synth. X 50 | 1016 | 4210-01-167-1061 | 15.88 | 30 | 0 |
| Hose, 1.5"nh Suction x 8' | 1808 | 4210-00-889-1774 | 51.43 | 2 | 2 |
| Increaser, 1"npsh to 1.5"nh | 0416 | 4210-01-080-6532 | 5.58 | 6 | 2 |
| Increaser, 3/4"nh to 1"npsh | 2235 | 4210-01-080-6531 | 7.44 | 6 | 0 |
| Insect Repellent | 0705 | 6840-01-003-9589 | 1.13 | 12 | 3 |
| Jeans, Nomex 28 x 30 | 2011 | 8415-01-211-3274 | 57.73 | 2 | 2 |
| Jeans, Nomex 30 x 30 | 2012 | 8415-01-211-3275 | 57.73 | 2 | 2 |
| Jeans, Nomex 32 x 30 | 2013 | 8415-01-211-3276 | 57.73 | 2 | 1 |
| Jeans, Nomex 34 x 30 | 2014 | 8415-01-211-7583 | 57.83 | 2 | 2 |
| Jeans, Nomex 32 x 34 | 2020 | 8415-01-211-7588 | 57.83 | 2 | 1 |
| Jeans, Nomex 34 x 34 | 2021 | 8415-01-211-7589 | 57.73 | 2 | 0 |
| Jeans, Nomex 36 x 34 | 2022 | 8415-01-211-7590 | 57.73 | 8 | 4 |
| Jeans, Nomex 38 x 34 | 2023 | 8415-01-211-9626 | 57.73 | 2 | 2 |

| | | | | | CURRENT | |
|------------------------------|--------------|-------------------------|--------------|------------|------------------|--|
| ITEM | NFES# | NIFC/GSA ORDER # | PRICE | NUS | INVENTORY | |
| Kit, First Aid Type IV Belt | 1143 | 6545-01-010-7754 | 116.62 | 2 | 1 | |
| Kit, First Aid Type I Pocket | 0067 | 6545-00-656-1092 | 8.75 | 10 | 8 | |
| Kit, Belt Weather | 1050 | 6660-01-024-2638 | 70.78 | 2 | 2 | |
| Kit, Mop-Up, 3 Person | 0772 | 4210-01-321-4206 | 398.45 | 1 | 1 | |
| Lantern, Headlamp FFTR | 0713 | 6230-01-387-1399 | 17.45 | 15 | 8 | |
| Liner, Backpack Pump Bag | 0597 | 8465-01-321-1679 | 8.39 | 8 | 0 | |
| Liner, Fire Shelter Case | 0199 | 8465-01-300-1699 | 2.24 | 15 | 8 | |
| Liner, Waterbag, 1 Gl. | 1552 | 8465-01-186-9764 | 1.41 | 8 | 0 | |
| Mattress, Air | | Local | 17.00 | 8 | 0 | |
| McLeod Rake | 0296 | 4210-00-203-3512 | 46.74 | 6 | 4 | |
| MREs, (12/Box) | 1842 | 8970-00-149-1094 | 67.35 | 1 | 0 | |
| Nozzle, Twin Tip Forester | 0024 | 4210-00-640-1892 | 85.00 | 6 | 2 | |
| Nozzle, 3/4"ght, 18 gpm | | Wildf.Pac.,9-53318750 | 35.75 | 1 | 1 | |
| Nozzle, 3/4"ght Mop-up | 0136 | 4730-00-595-1103 | 13.98 | 6 | 0 | |
| Nozzle, 1"npsh Polycarb. | 0138 | 4210-00-085-2291 | 6.18 | 6 | 3 | |
| Nozzle, 1"npsh Combibarrel | 1081 | 4210-01-165-6603 | 21.88 | 8 | 8 | |
| Nozzle, 1"npsh, 18 gpm | | Wildf.Pac.,9-53318102 | 35.75 | 2 | 2 | |
| Nozzle, 1"npsh,10-30 gpm | | " " 9S-11030102 | 75.60 | 2 | 2 | |
| Nozzle, 1.5"nh, 20-95 gpm | | " " 9N-12095151 | 113.35 | 1 | 1 | |
| Nozzle, 1.5"nh, Combibarrel | 1082 | 4210-01-167-1123 | 38.81 | 2 | 2 | |
| Pack, Complete Field, FFTR | 1372 | 8465-01-169-3996 | 53.43 | 15 | 10 | |
| Pack, Day, Hot Line | | Wildf.Pac.,13-FP100-R | 77.50 | 3 | 3 | |
| Pack, Personal (Red Bag) | 1855 | 8465-01-141-2321 | 44.07 | 8 | 5 | |
| Packsack, Equipment, Green | 0744 | 8465-00-205-3493 | 35.20 | 8 | 3 | |
| Pack, Frame, Camp Trails | | Forestry Sply, 35913 | 90.00 | 4 | 2 | |
| Pulaski Tool | 0146 | 5120-00-293-3467 | 41.79 | 8 | 2 | |
| Pump, Back Pack, Bladder | 1149 | 4320-00-289-8912 | 91.58 | 8 | 2 | |
| Pump, Waterous Floto 1.5"nh | | Wildf.Pac.,1-1350 | 1,267.95 | 3 | 2 | |
| Pump, Homelite Centrifugal | | Local | | 2 | 2 | |
| Purging Fluid | 0700 | 6850-01-144-9871 | 2.46 | 6 | 0 | |
| Rake, Fire (Council Tool) | 1807 | 4210-00-540-4512 | 18.50 | 8 | 0 | |
| Reducer, 1.5"nh to 1"npsh | 0010 | 4210-00-975-2969 | 4.33 | 20 | 14 | |
| Reducer, 1"npsh to 3/4"nh | 0733 | 4210-01-079-9286 | 4.95 | 20 | 0 | |
| Sheath, McLeod, Plastic | 1854 | 8465-01-136-4718 | 2.36 | 6 | 0 | |

| | | | | | |
|--------------------------------|------|------------------|-------|----|----|
| Sheath, Pulaski, Plastic | 0257 | 8465-01-067-9999 | 2.77 | 8 | 2 |
| Sheath, Shovel, Plastic | 1853 | 8465-01-136-4719 | 3.34 | 8 | 12 |
| Shelter, Fire w/case/liner | 0169 | 4240-01-121-8698 | 39.34 | 15 | 10 |
| Shelter, Fire, Practice w/case | 2407 | 6930-01-387-8543 | 32.53 | 15 | 0 |
| Shelter, Fire, Practice | 2408 | 6930-01-387-8487 | 12.80 | 3 | 3 |
| Shirt, Nomex Small | 0577 | 8415-00-233-5818 | 43.32 | 4 | 4 |

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CURRENT

| ITEM | NFES# | NIFC/GSA ORDER # | PRICE | NUS | INVENTORY |
|---|--------------|-------------------------|--------------|------------|------------------|
| Shirt, Nomex Medium | 0578 | 8415-00-233-5819 | 43.32 | 4 | 2 |
| Shirt, Nomex Large | 0579 | 8415-00-259-8717 | 43.32 | 8 | 4 |
| Shirt, Nomex XL | 0580 | 8415-00-259-8722 | 43.32 | 8 | 4 |
| Shovel, Fire, Size 1 | 0171 | 5120-00-965-0609 | 22.36 | 8 | 14 |
| Sign, Caution Smoke Ahead | | Forestry Supply,58051 | 54.65 | 3 | 3 |
| Signal Mirror, Sight-Grid | | “ ” 84999 | 11.50 | 8 | 3 |
| Sleeping Bag, Cool Wx | 0022 | 8465-01-119-5562 | 61.44 | 8 | 4 |
| Strainer, Suction Hose | 0217 | 4210-00-984-3460 | 121.36 | 2 | 2 |
| Stuff Sack, Sleeping Bag | 1202 | 8465-01-249-3964 | 10.85 | 8 | 4 |
| Swatter, Fire | | | | 8 | 14 |
| Tape, Filament | 0222 | 7510-00-582-4772 | 1.23 | 10 | 10 |
| Tee, 1.5"nh x 1.5"nh x 1"npsh W/Valved Branch | 0230 | 4210-01-081-0417 | 18.75 | 12 | 9 |
| Tee, 1"npsh x 1"npsh x 1"npsh W/Capped Branch | 2240 | 4210-01-080-1459 | 14.96 | 6 | 2 |
| Tent, 2 Person Genesis | | MMI Federal Marketing | 98.00 | 4 | 4 |
| Tip, Nozzle, Spray Size 6 | 0636 | 4210-00-204-3358 | 19.80 | 6 | 0 |
| Tip, Nozzle, Str.Str. 18gpm | 0737 | 4210-00-177-6135 | 4.38 | 6 | 0 |
| Torch, Drip, Panama 15" | | Forestry Supply,85011 | 155.00 | 7 | 7 |
| Torch, Drip, Panama 19" | | “ ” 85330 | 155.00 | 2 | 2 |
| Torch, Drip, Forester | | “ ” 85022 | 139.90 | 3 | 0 |
| Valve, Ball Shut-off,1"npsh | | Wildf.Pac.,9S-21078102 | 175.30 | 1 | 1 |
| Valve, Fullflow, 1"npsh | | “ ” 9S-21008102 | 148.75 | 1 | 1 |
| Valve, Ball Shut-off, 1.5"nh | | “ ” 9N-21078151 | 195.00 | 1 | 1 |
| Valve, Shut-off, 3/4"ght | 0738 | 4210-01-412-5684 | 2.25 | 12 | 0 |
| Valve, Foot, 1.5"nhf | 0212 | 4820-00-126-5114 | 30.27 | 4 | 3 |
| Valve, Wye, Gated 1.5"nh | 0231 | 4210-00-984-3475 | 80.65 | 8 | 2 |
| Valve, Wye, 3/4" ght | 0739 | 4210-01-412-6335 | 2.74 | 12 | 0 |

| | | | | | |
|-------------------------|------|------------------|-------|---|---|
| Waterbag, 1 Gl. Nylon | 1551 | 8465-01-185-5511 | 10.73 | 2 | 2 |
| Wrench, Chainsaw | | Local | 3.50 | 4 | 4 |
| Wrench, Spanner 1"-2.5" | 0235 | 5120-00-596-1427 | 5.25 | 6 | 3 |

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APPENDIX VIII-F

FIRE DISPATCH PLAN

Upon report of smoke or fire:

1. Maintain log of all radio/telephone communication (fire detection report log, Exhibit VIII-I).
2. Record the required information on the fire report log.
3. Check map location and ownership/protection status.
4. If the fire is on or threatening the refuge:
 - a. Select and dispatch a qualified IC (or the highest qualified firefighter available).
 - b. Notify appropriate County Sheriff's Dispatch Office of fire location and USFWS response.

Unless assistance of RVFDs is requested by the IC, inform Sheriff Dispatcher we are not in need of further assistance at this time, but will contact them if the situation changes.

- c. Notify Refuge FMO and Refuge Manager.
- d. Obtain and fill IC's initial resource order for initial attack resources. Receive and fill additional resource orders as they are made by the IC.
- e. If the fire danger is high, call the National Weather Service Office in Dodge City (1-800-824-9943) and request a weather forecast for the next 24 hour period. Be certain to tell them that the request is based upon a going fire at the refuge. The forecast should include any predicted changes in temperature, humidity, wind speed and direction, barometric pressure, precipitation and lightning activity. Ask them to use their best information, and let them know we will call them with on-site observations as soon as possible.
- f. Remain on duty until relieved by the IC.

5. If the fire is not on or threatening the refuge:
 - a. Notify appropriate County Sheriff's Dispatch Office. Offer assistance if needed.
 - b. Notify Refuge FMO and Refuge Manager.
6. If there is a request for assistance to Cooperators (local or interagency):
 - a. Take resource order information:
 - Nature of the incident
 - Location and access
 - What type and quantity of resources are needed
 - When are the ordered resources to report
 - Radio frequency to use
 - IC or Officer in charge and call number
 - b. Inform Cooperator that you will check what is available and call back ASAP (must be within ½ hour).
 - c. Notify Refuge FMO or Refuge Manager and get approval for dispatch.
 - d. Dispatch resources requested and approved. Additional resources can be obtained from nearby refuges if needed and available (see regional dispatch plan in back of Fire Management Handbook).
 - e. Notify Cooperator of who/what was dispatched and the estimated time of arrival.
 - f. Coordinate the filling of additional resource orders from the Cooperator.
 - g. Remain on duty until relieved by the Task Force Leader.

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APPENDIX VIII-G

INCIDENT COMMANDER (IC) PROCEDURES

1. Receive report of fire information from dispatcher.
2. Make initial resource order based on current and expected resistance to control.
 - a. Use two-person crews, or three-person if warranted.
 - b. Use primary engine first, then secondary engine.
 - c. Use engines in tandem if practical and efficient.
 - d. Utilize support personnel for tank refilling if needed.
3. Travel to fire. Use radio to brief and deploy responding resources.
 - a. Thoroughly brief resources on safety concerns including safe driving.
 - b. Remind drivers of how easy it is to get stuck in wetland and sandy areas.

- c. Instruct crews to stop and lock in 4X4 immediately before leaving hard surface roads.
- d. Approach fire from the rear or rear flanks. DO NOT approach the fire from the head.
- e. Beware of wind shifts, and notify crews of escape routes and safety zones.

4. Upon arrival, size-up the fire and deploy resources as needed.

a. Always establish an anchor point(s) and fight fire from the black whenever possible. If you must fight the fire from a significant area of unburned fuel, be certain everyone is aware of the escape routes and safety zones.

- b. Deploy resources in tandem whenever practical and efficient.
- c. Relieve any local volunteers (who are not a part of an ordered RVFD crew) on the fire.
- d. Maintain radio contact with all resources and request periodic progress checks.
- e. Keep notes on assignments and events that occur on the fire.

5. Relay size-up and initial weather observations to the dispatcher. This should include:

- a. Terrain and fuel type
- b. Fire behavior and initial evaluation of rate of spread and resistance to control.
- c. Current acreage burned.
- d. Projected fire acreage and time of control.
- e. Values at risk
- f. Current weather observations (belt weather kit)
 - temperature
 - relative humidity
 - dew point
 - wind speed and direction
 - cloud cover and comments
- g. Firefighter resources on the scene including cooperators.

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6. Insure applicable planning, finance and logistical support are provided for all resources assigned to the fire. Do not overlook the need for drinking water, meals, medical concerns, sleeping arrangements and alternate transportation as necessary.

7. Order and/or release resources as appropriate.

a. Order whatever is needed to suppress the fire. Let the dispatcher fill the order, but do not count on resources arriving on time.

b. Take care of your firefighters! Order food/drinks several hours prior to when needed.

- c. Release any RVFD resources ASAP.
 - d. Keep firefighters on the fire until mop-up is complete.
8. Order overhead resources (team or individuals) under any of the following conditions:
- a. Containment is not expected until the next day or later.
 - b. There is serious risk to life and/or structures.
 - c. Multiple fires are occurring and the IC(s) can not gain control of the situation and/or feels that they are in over their head and are uncomfortable performing their duties.
9. Complete an Escaped Fire Situation Analysis if the fire is not expected to be contained until after 10 AM the following day.
10. Effectively mop-up the fire and provide for patrols until the fire is declared out by the IC.
11. Have the fire crew informally critique the fire for any operational improvement needs.
12. Insure all equipment is made ready for the next fire before releasing crews. Report any equipment repair or replacement needs to the Refuge FMO or Manager.
13. Insure all paperwork including fire reports, time reports, accident reports and resource orders are properly completed and given to the Refuge FMO or Manager.

APPENDIX VIII-H

QUIVIRA NATIONAL WILDLIFE REFUGE
COMMUNICATIONS
(RADIOS AND FREQUENCIES)

July, 1998

High Band Radios:

(King 14 channel, 5 watt handsets (2 EPH=148-174 MHZ)(3 EPI=136-160 MHZ)
 (King 114 channel, 50 watt mobiles (Chevy Cheyenne 250 gl. slipon, International 770 gl.
 Pumper and new Ford Ranger truck)

QUIVIRA

| <u>CHANNEL</u> | <u>AGENCY AND UNIT</u> | <u>RX</u> | <u>TX</u> | <u>TONE</u> |
|-----------------------|--|------------------|------------------|--------------------|
| 1 | Quivira Fire tactical (Stafford Co. RVFD ch. 11).. | 154.280 | 154.280 | 0.0 |
| 2 | Quivira Fire tactical (Stafford Co. RVFD ch. 12).. | 168.550 | 168.550 | 0.0 |
| 3 | Stafford Co. RVFD (unit to unit)..... | 154.145 | 154.145 | 0.0 |
| | (channel 6 handsets, channel 8 mobiles) | | | |
| 4 | Stafford Co. RVFD(ch. 3)/Hwy Dep't..... | 151.040 | 159.015 | 162.2 |
| 5 | Stafford Co. Sheriff (EMS, fire)/RVFD (ch. 2)..... | 158.835 | 153.935 | 162.2 |
| 6 | Stafford Co. Sheriff (LE)/RVFD (ch. 1)..... | 159.150 | 156.030 | 162.2 |
| 7 | Reno Co./Sylvia RVFD repeater..... | 153.370 | 154.770 | 162.2 |
| 8 | Reno Co./Sylvia RVFD (unit to unit)..... | 154.370 | 154.370 | 0.0 |
| 9 | Rice County Sheriff (EMS, fire)..... | 158.760 | 153.785 | 179.900 |
| 10 | Rice County Sheriff (LE)..... | 154.755 | 159.210 | 179.900 |
| 11 | Rice County Civil Defense..... | 158.835 | 156.000 | 179.900 |
| 12 | Kansas Wildlife & Parks (LE, unit to unit)..... | 151.295 | 151.295 | 0.0 |
| 13 | Arlington RVFD (unit to unit)..... | 154.175 | 154.175 | 0.0 |
| 14 | Weather (Ellsworth/Colby/Chanute)..... | 162.400 | receive only | 0.0 |
| 15 | Weather (Wichita/Concordia)..... | 162.550 | receive only | 0.0 |
| 16 | Weather (Dodge City/Topeka)..... | 162.475 | receive only | 0.0 |

Channel 4, 5 and 6 towers are in St. John.

Low Band Radios, 30-50 MHZ:

(Motorola "MT-1000" 6 channel handsets):

| <u>CHANNEL</u> | <u>AGENCY</u> | <u>RX</u> | <u>TX</u> | <u>TONE</u> |
|----------------|----------------------------------|-----------|-----------|-------------|
| 1 | Quivira (unit to unit/base)..... | 34.83 | 34.83 | |
| 2 | Quivira (unit to unit only)..... | 34.81 | 34.81 | |

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(General Electric "S-550" 16 channel mobiles; white Dodge Dakota and Suburban):

| <u>CHANNEL</u> | <u>AGENCY/UNIT</u> | <u>RX</u> | <u>TX</u> | <u>TONE</u> |
|----------------|--|-----------|-----------|-------------|
| 1 | Quivira (unit to unit/base)..... | 34.83 | 34.83 | |
| 2 | Rice County Rural Fire (old, unit to unit)..... | 46.14 | 46.14 | |
| 3 | Staff./Reno/Rice Co. Sheriff (unit to base)..... | 39.58 | 39.70 | |
| 4 | Staff./Reno/Rice Co. Sheriff (dispatch, unit to unit)... | 39.58 | 39.58 | |
| 5 | Kansas Wildlife & Parks (L.E. unit to unit)..... | 39.20 | 39.20 | |
| 6 | Kansas Wildlife & Parks (L.E. unit to base)..... | 39.78 | 39.78 | |

(Zentor 16 channel mobile; blue Dodge):

| <u>CHANNEL</u> | <u>AGENCY/UNIT</u> | <u>RX</u> | <u>TX</u> | <u>TONE</u> |
|----------------|---|-----------|-----------|-------------|
| 1 | Quivira (unit to unit/base)..... | 34.83 | 34.83 | |
| 2 | Quivira (unit to unit only)..... | 34.81 | 34.81 | |
| 3 | Staff./Reno/Rice Co. Sheriff (dispatch,unit to unit)... | 39.58 | 39.58 | |
| 4 | Staff./Reno/Rice Co. Sheriff (unit to base)..... | 39.58 | 39.70 | |
| 5 | Kansas Wildlife & Parks (L.E. unit to unit)..... | 39.20 | 39.20 | |
| 6 | Kansas Wildlife & Parks (L.E. unit to base)..... | 39.78 | 39.78 | |

(Motorola Radius M216, 16 channel mobile; blue Ford Ranger):

| <u>CHANNEL</u> | <u>AGENCY/UNIT</u> | <u>RX</u> | <u>TX</u> | <u>TONE</u> |
|----------------|---|-----------|-----------|-------------|
| 1 | Quivira (unit to unit/base)..... | 34.83 | 34.83 | |
| 2 | Staff./Reno/Rice Co. Sheriff (dispatch,unit to unit)... | 39.58 | 39.58 | |
| 3 | Staff./Reno/Rice Co. Sheriff (unit to base)..... | 39.58 | 39.70 | |
| 5 | Kansas Wildlife & Parks (L.E. unit to unit)..... | 39.20 | 39.20 | |

6 Kansas Wildlife & Parks (L.E. unit to base).....39.78 39.78

(Motorola single channel mobiles; White Dodge Dakota, Chevy 6-pak, Chevy flatbed, Chevy Cheyenne pumper, Brown Dodge Dakota, International Pumper, Grader)

| <u>CHANNEL</u> | <u>AGENCY/UNIT</u> | <u>RX</u> | <u>TX</u> | <u>ZONE</u> |
|----------------|----------------------------------|-----------|-----------|-------------|
| 1 | Quivira (unit to unit/base)..... | 34.83 | 34.83 | |

(Motorola two channel mobile; John Deere tractor):

| <u>CHANNEL</u> | <u>AGENCY/UNIT</u> | <u>RX</u> | <u>TX</u> | <u>ZONE</u> |
|----------------|----------------------------------|-----------|-----------|-------------|
| 1 | Quivira (unit to unit/base)..... | 34.83 | 34.83 | |
| 2 | Quivira (unit to unit only)..... | 34.81 | 34.81 | VIII-H2 |

APPENDIX VIII-I

FIRE DETECTION REPORT/LOG

Initial information from reporting party:

a. Name/location:_____

b. Callback number(s):_____

c. Location of fire:_____

d. Access to fire:_____

e. Color of smoke:_____

f. Size of fire:_____

g. Type of fuel:_____

h. Fire behavior:_____

- a. Local Cooperators and/or AD/EFF firefighters.
 - b. Local vendors and/or contractors.
 - c. Neighboring USFWS refuges.
 - d. Pueblo Interagency Dispatch Center.
3. When notified that an order has been filled and that resources have been dispatched:
- a. Record information: source, order number, chief-of-party, ETA, etc.
 - b. Notify IC of chief-of-party (if any) and ETA of resources.
 - c. Track resources to make sure they arrive. If they do not meet the ETA, notify the source.
4. When resources have been released or demobed:
- a. Notify source dispatch office and determine if they are to be sent home or reassigned.
 - b. Make necessary travel arrangements including meals and lodging.
 - c. Inform chief-of-party of arrangements, insure fire report and fire time is completed.
 - c. Notify home/sending unit of transportation method, time of departure and ETA.

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APPENDIX VIII-K

DELEGATION OF AUTHORITY

Quivira National Wildlife Refuge

As of _____, _____, I have delegated authority to manage the _____,
(time) (date) (fire/incident name)
_____, Quivira NWR, to Incident Commander _____ and his/her
(fire #) (name of IC)

Incident Management Team.

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

I am assigning _____ as the line officer representative to act as liaison and
(name)

provide any help you need. This person is authorized to speak for me in the event a decision is needed.

My specific considerations for management of this fire/incident are:

1. Insure the safety of firefighters/responders, visitors and neighbors.
2. Protect private and refuge property to the extent possible.
3. Minimize damage to environmental resources.
4. Key resource considerations are: protecting rare, threatened and/or endangered species; preserving as much wildlife habitat as possible; avoiding wildlife entrapment situations; and limiting degradation of refuge aesthetic values.
5. Restrictions for suppression or other incident actions are no earth-moving equipment (dozers, discs, plows, graders) without approval of the Refuge Manager.
6. Manage the fire cost-effectively for the values at risk.
7. Provide training opportunities for USFWS personnel to strengthen our organization capabilities.

(Refuge Manager Name) _____
(Refuge Manager Signature) _____
(Date)

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APPENDIX VIII-L

FIRE-TIME ACCOUNT NUMBERS

1. Regular Base 8 for FIREPRO-Funded people: 6XXXX-9251= (Org. Code)-9251-0000
2. Suppression Base 8 for FIREPRO-Funded people: 6XXXX-9251-XXXX = (Org. Code)-9251-Fire #
3. Suppression Base 8 for Non-FIREPRO-Funded ppl: 6XXXX-9261-XXXX = (Org. Code)-9261-Fire#
4. Suppression Hazard/OT Pay for all employees: 6XXXX-9261-XXXX = (Org. Code)-9261-Fire #
5. RxFire Base 8 for FIREPRO-Funded people: 6XXXX-9263-XXXX = (Org. Code)-9263-Fire #
6. RxFire Base 8 for Non-FIREPRO-Funded people: 6XXXX-1261-XXXX=(Org. Code)-1261-Fire #
7. RxFire Overtime for all employees: 6XXXX-9263-XXXX = (Org. Code)-9263-Fire #
8. Emergency Presuppression for all: 6XXXX-9261-PE06 (Org. Code)-9261-PE Region #
9. Emergency Rehabilitation for all: 6XXXX-9262-XXXX (Org. Code)-9262-Fire #
10. Severity Funding for all: 93510-9261-XXXX (Branch Code)-9261-Branch Fire#

Organization Codes (Org. Codes) should be those of the benefitting refuge(s).

Fire #s (including Rx) are to be generated within the Fire Management Information System.

Numbers 5, 6 and 7 above outline the basic applications of the 9263 account on the Refuge. A complete guide to 9263 account utilization can be found in the USFWS Guide to 9263 Account Use.

AD/EFF accounting and payroll procedures are different than regular USFWS employees. Follow the instructions for AD/EFF Casuals in the NIFC/BLM "Emergency Firefighter Timekeeping Procedures for the USFWS" publication.

APPENDIX IX-A**References Cited:**

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