FIRE MANAGEMENT PLAN

FLINT HILLS NATIONAL WILDLIFE REFUGE

HARTFORD, KANSAS

1997

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Fire Management Plan

Fire Management Program
Flint Hills National Wildlife Refuge
Lyon County, Hartford Kansas

US Fish and Wildlife Service
Department of the Interior
Denver, Colorado

TABLE OF CONTENTS

I. ..... INTRODUCTION 1

II. ..... COMPLIANCE WITH FWS POLICY 2

A. ..... Purpose 2
B. ..... Objectives 3
C. ..... Effect of Fire Upon Complex Objectives 4

III. ..... DESCRIPTION OF AREA AND FIRE EFFECTS 5

A. ..... General Description 5
B. ..... Topography and Soils 8
C. ..... Climate 8
D. Vegetation 10
1. ..... Cropland 10
2. ..... Abandoned Cropland 10
3. ..... Seasonally Flooded Areas 10
4. ..... Riparian Timber 10
5. ..... Hardwood Forest 11
6. ..... Seeded Grasslands 11
7. ..... Native Grasslands 11
8. ..... Open Water 11
E. ..... Noxious Weeds and Other Problem Species 12
F. ..... Threatened, Endangered, and Special Concern Species 12
G. ..... Birds 13
H. ..... Mammals 13
I. ..... Fish, Reptiles, and Amphibians 14
J. ..... Insects 14
K. ..... Cultural Resources 15
L. ..... Improvements 16
M. ..... Wilderness 17
N. ..... Smoke Management 17
O. ..... Fire Environment and History 17
1. ..... Fuel Types 17
2. ..... Fire Behavior 18
3. ..... Fire Occurrence / History 19

IV. FLINT

A. General 23
B. Refuge Fire Management Goals 24
C. Refuge Fire Management Objectives 24

V. FIRE MANAGEMENT STRATEGIES 24

VI. FIRE MANAGEMENT UNITS 26

A. Faunal Road East FMU 27
1. Unit Fire Objectives 28
2. Suppression Strategies & Techniques 29
B. Neosho River South FMU 29
1. Unit Fire Objectives 30
2. Suppression Strategies & Techniques 30
C. Neosho River North FMU 31
1. Unit Fire Objectives 32
2. Suppression Strategies & Techniques 32

VII. FIRE MANAGEMENT ORGANIZATION AND RESPONSIBILITIES 32

A. Refuge Manager 33
B. Refuge Operations Specialist 33
C. Supervisory Range Technician 33
D. Biological Technician 34
E. Seasonal & Collateral Duty Firefighters 34
F. Wildfire Incident Commander 35
G. Prescribed Burn Boss 35
H. Fire Cooperators 36

VIII. WILDLAND FIRE PROGRAM 36

A. Fire Prevention 36
B. Fire Behavior 37
C. Fire Preparedness Planning 37
1. General 37
2. Personnel 40
3. Training 41
4. Equipment 41
D. Impacts of Drought and Preparedness Levels 42
E. Emergency Preparedness 43
F. Severity Funding and Emergency Presupression Funding 43
G. Detection 44
H. Pre-Attack Plan 44

..... I. Fire Su
1.....General 45
2.....Initial Reporting and Dispatch 45
3..... Initial Attack 46
4..... Escaped Fires/Extended Attack 46
I. ..... Mop-up Standards and Emergency Stabilization and Rehabilitation 47
J. ..... Records and Reports 48

IX. .....PRESCRIBED FIRE PROGRAM 48

A..... Resource Management Prescribed Fire 48
B.....Hazard Fuel Reduction Prescribed Fire 49
C..... Planning 49
D.....Training 51
E. .....Complexity 51
F. ..... Monitoring and Evaluation 51
G.....Prescribed Fire Impacts 52
1..... Environmental Impacts 52
2.....Social and Economic Impacts 52
H.....Reporting and Documentation 53

X..... FIRE USE 53

XI. .....AIR QUALITY 54

XII. .....FIRE RESEARCH AND MONITORING 54

XIII..... PUBLIC SAFETY 54

XIV. ..... PUBLIC INFORMATION AND EDUCATION 55

A..... Wildfire Suppression 55
B..... Prescribed Fire 55
C.....Fire Prevention 56

XV..... ARCHEOLOGICAL/CULTURAL/HISTORIC RESOURCES 56

XVI. ..... FIRE CRITIQUES AND PLAN REVIEW 58

A.....Wildfire 58
B..... Prescribed Fire 58

XVII. CONSULTATION AND COORDINATION.....58

XVIII. APPENDICES

A. Flint Hills NWR Station Purposes, Mission, Goals, and Objectives A 1
B. Environmental Assessment B 1
C. Threatened and Endangered Species C 1
1. Coffey County, Kansas C 1
2. Lyon County, Kansas C 3
3. Critical Habitat - Bald Eagle C 5
4. Critical Habitat - Neosho Madtom C 6
D. Flint Hills NWR Bird List D 1
E. Kansas State Open Burning Regulations E 1
1. Coffey County Open Burning Exemption Permit E 3
2. Lyon County Open Burning Exemption Permit E 5
F. Pre-Attack Plan F 1
1. Delegation of Authority F 1
2. Radio Frequencies F 2
3. Memorandum of Understanding - Coffey County District 1 F 3
4. Memorandum of Understanding - Lyon County District 5 F 6
5. Escaped Fire Situation Analysis (EFSA) F 10
6. Fire Management Unit (FMUs) Map F 11
7. Faunal Road East FMU Prescribed Fire vs Suppression Areas F 12
8. Neosho River South FMU Prescribed Fire vs Suppression Areas F 13
9. Neosho River North FMU Prescribed Fire vs Suppression Areas F 14
G. Step-Up Plan G 1
H. Fire Dispatch Plan H 1
1. Fire Dispatch Plan H 1
2. Flint Hills NWR Personnel Directory H 7
3. Responce Zone - Flint Hills NWR H 10
4. Fire Directory H 11
5. Dispatcher Resource List H 13
6. Local Services H 16
7. Adjacent Landowners - Coffey County H 19
8. Adjacent Landowners - Lyon County H 20
9. Residences Within 1 Mile of Flint Hills NWR - Coffey County H 21
10. Residences Within 1 Mile of Flint Hills NWR - Lyon County H 24
11. Assisting the Volunteer Fire Departments on Wildfires H 27
12. Incident Commander Procedures H 31
I. Equipment Inventory I 1
J. Bibliography J 1

XIX. ..... TABLES
Table 1. ..... Climatic Data - Burlington, KS (1951-1980) 9
Table 2. ..... Wildfire Frequency and Size on Flint Hills NWR 22
Table 3. Appropriate Management Response 27

XX. ..... EXHIBITS
Exhibit 1 ..... Vicinity Map of Flint Hills NWR 7

I. INTRODUCTION

Flint Hills National Wildlife Refuge (NWR) was established in 1966 on land owned by the U.S. Army Corps of Engineers and is managed through a cooperative agreement. The Refuge is located along the Neosho River on the floodplain of John Redmond Reservoir. This causes flooding to be a large problem for the Refuge.

Before the 20th century, the area now known as Flint Hills NWR was dominated by prairie cordgrass prairie and tall grass prairie. Fire played a major role in continued restoration of these communities by restoring vigor to plant growth, releasing nutrients, reducing accumulated litter, increasing seed production, and eliminating woody invasions.

By the time the Refuge was established, most of the land the Refuge is located upon was being farmed. The Refuge has reduced farming and re-seeded former croplands to native grasses or converted to moist soil management areas. These areas have a propensity to be invaded by woody vegetation. The use of prescribed fire, especially in these areas, would increase the health and vigor of vegetation. Proper management of the Refuge's habitats is essential to meeting refuge objectives and Service bio-diversity mandates. The use of fire to manipulate habitat will increase management flexibility to meet management goals.

A. This Fire Management Plan is written to update the 1990 Fire Management Plan and help achieve resource management objectives of Flint Hills National Wildlife Refuge as defined in the Master Plan (1980) and other established operational plans.

B. This plan meets NEPA/NHPA compliance. An environmental assessment (EA) (Appendix B) for prescribed fire management at Flint Hills NWR was completed in 1984 and is on file. The Flint Hills Comprehensive Conservation Plan was approved by the Regional Director on September 27, 2000. As part of the planning process, a Section 7 Biological Determination was completed and a Finding of No Significant Impact and Environmental Action Memorandum was signed by the Regional Director. A copies can be found in Appendix B. These two documents meet the requirements stipulated in NEPA. A new EA will not be completed for prescribed fire due to new regulations published in the Federal Register (62 FR 2375) on January 16, 1997. The new regulation categorically excludes prescribed fire (when used for habitat improvement purposes and conducted in accordance with local and State ordinances and laws). Wildfire suppression actions and prescribed fire are both now categorically excluded, as outlined in 516 DM 2 Appendix 1.

C. The Department of Interior Manual, Part 620 DM-1, requires that all refuges with burnable vegetation have a written Fire Management Plan. This plan provides

fire management guidelines for Flint Hills NWR.

D. Authority and guidance for implementing this plan are found in:

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. 315).

3. Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856, 1845a and b).

4. National Wildlife Refuge System Administrative Act of 1966 as amended (80 Stat. 927; 16 U.S.C. 1601).

5. Disaster Relief Act of May 22, 1974 (88 Stat. 143; U.S.C 5121).

6. Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C. 2201).

7. Federal Grants and Cooperative Act of 1977 (Pub. L. 95-244, as amended by Pub. L. 97-258, September 13, 1982. 96 Stat. 1003 31 U.S.C. 6301-6308).

8. Wildfire Suppression Assistance Act of 1989 (Pub. L. 100-428, as amended by Pub. L. 101-11, April, 1989).

9. Department of the Interior Manual, Part 620 DM-1, Wildland Fire Management (April 10, 2000).

10. United States Fish and Wildlife Service Wildland Fire Management Handbook (December 2, 2000).

11. United States Fish and Wildlife Service Refuge Manual, 621 FW1-3, Fire Management (February 7, 2000).

II. COMPLIANCE WITH FWS POLICY

A. Purpose

Establishment of Flint Hills NWR occurred September 1, 1966 upon execution of a cooperative agreement with the U.S. Army Corps of Engineers which specifies portions of the John Redmond Reservoir, Kansas to be administered as the Flint Hills National Wildlife Refuge. The stated purpose is:

"... shall be administered by him (Secretary of Interior) directly or in

accordance with cooperative agreements ... and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife, resources thereof, and its habitat thereon, ..." 16 U.S.C. et. seq. 664 (Fish and Wildlife Coordination Act).

The primary purpose of the refuge is to provide for the needs of migrating and wintering waterfowl, including food, sanctuary, and water. A secondary purpose is to provide the public with opportunities to observe, enjoy, and learn more about wildlife in a natural setting.

Cultural listings for National Register of Historic Places on or near Flint Hills Refuge include: 1. Neosho River Bridge (Rainbow Bridge) east of Hartford; 2. Hartford Collegiate Institute Building in Hartford; and 3. an old homestead barn located adjacent to the southern refuge boundary (Coon Hammond Area). All of these areas need to be protected from the threat of fire.

The refuge contains many archeological sites - one of which is on the National Register of Historic Places and two of which are nominated. It has been determined that a fire will not affect the value of the sites or artifacts (Prescribed Fire Environmental Assessment - 1984).

Two federally listed threatened and endangered birds are known to occur on the refuge. Unless Section 7 consultation is approved, endangered species habitats must be protected from fire.

Flint Hills Refuge improvements must also be protected from fire. These include buildings as well as public use improvements located throughout the refuge.

B. 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 Flint Hills NWR.

Flint Hills NWR goals and objectives include managing, endangered species, migratory birds, public use and recreation, and optimizing abundance and diversity of wildlife and plant species. The Master Plan (1980) for Flint Hills NWR emphasized waterfowl management and public use. A complete list of Refuge goals and objectives (Refuge Management Information System) can be found in Appendix A.

The Flint Hills Refuge is an overlay on Corps of Engineers land and is managed under an agreement with that agency. The Corps has retained rights to manage all leases, such as grazing and haying, and also maintains rights of way on the project for the completion of their mission. The Refuge is restricted from interfering with the purpose of the project, which is flood control.

C. Effect of Fire Upon Complex Objectives

The Comprehensive Conservation Plan, which was approved in 2000, provides specific guidance for the fire management program.

Objective 1: Restore and maintain native grassland and riparian communities within the Refuge to meet the need of native flora and fauna.

Strategy:

- Utilize available management tools to control noxious weeds on the Refuge. These tools include but are not limited to ...prescribed fire...

- Within 10 years, restore 400 acres of native prairie sites that have been invaded by noxious weeds. Biological control would be the preferred method but chemical, mechanical, and burning methods as well as reseeding may need to be utilized.

Objective 4: Utilize appropriate fire management strategies and tactics to maintain, protect, and/or restore Refuge habitats. Fire management would comprise approximately 10 percent of the total annual habitat management capabilities on the Refuge.

Strategy:

- Suppress wildfires, including trespass fires, in a safe, efficient, cost effective manner consistent with resources and values at risk. These will vary from aggressive initial attack to allowing fires to burn themselves out.
- Utilize minimum impact strategies and tactics to minimize environmental impacts on both wildfire suppression and prescribed fire operations.
- Prescribed fire will be used to modify vegetative communities for improved habitat for native flora and fauns, ecosystem function, and hazard fuel reduction.
- Cooperate with other agencies in wildfire suppression and prescribed fire operations.

Various operational plans such as the Refuge Safety Plan include objectives which pertain to fire.

The Refuge Safety Plan objectives are:

- provide safe working conditions for employees
- provide safe environments for the visiting public
- protect and insure safety of government equipment
- define equipment available and location
- identify responsibilities
- identify sources of help
- provide documentation
- promote a healthy safety attitude

The Fire Management Plan will provide direction to accomplish safety objectives during wildfire suppression actions and prescribed fire activities.

The objective of the Water and Marsh Management Plan (1987) is to “provide high quality food and cover for migrating waterfowl and other wildlife.” The Fire Management Plan will assist in achieving Water and Marsh Management Plan Objectives by allowing the use of fire to reduce undesirable vegetation invasions.

III. DESCRIPTION OF AREA AND FIRE EFFECTS

A. General Description

The Flint Hills National Wildlife Refuge is located in Lyon and Coffey counties

in southeastern Kansas. The refuge's 18,463 acres are situated on the broad, relatively flat floodplain of the Neosho River, upstream from John Redmond Reservoir, and located within the Osage Plain Section of the Central Lowland Province. Flint Hills NWR is located on the Arkansas/Red River Ecosystem. The refuge is managed through a cooperative agreement from the U.S. Army Corps of Engineers. The relative location is depicted in the Vicinity Map (Exhibit 1).

Dominant areas within the Refuge include cropland, riparian areas, re-seeded grasslands, and moist soil management areas. Agricultural areas dominate the

EXHIBIT 1 - VICINITY MAP OF FLINT HILLS NWR

surrounding landscape. These areas include cropland, hayland, grassland, and shelter belts.

B. Topography and Soils

Three basic physiographic areas are found on the refuge. They are: (1) rolling uplands along the peripheral border primarily underlain with limestone; (2) the bottom lands comprised mostly of recent alluvial deposits along the Neosho River and its tributaries; and (3) gentle to moderate sloping river valley walls comprised of shales, sandstone, or limestone. Elevation on the refuge ranges from 1026 to 1130 M.S.L. with an average of 1050 M.S.L.

Soils are predominately Class II (Class II soils range from nearly level loamy land adjacent to stream channels to nearly level upland areas with silt loam surface soils to tight silty clay bottoms). Soil associations for Flint Hills NWR include: 1. Chase-Osage association; 2. Osage-Verdigris-Lanton association; 3. Woodson-Kenoma-Dennis association; and 4. Kenoma-Ladysmith association. The Chase-Osage and Osage-Verdigris-Lanton are flood plain associations; while Woodson-Kenoma-Dennis and Kenoma-Ladysmith are upland associations (Soil Survey of Coffey County, Kansas; Soil Survey of Lyon County, Kansas).

Soil erosion resulting from prescribed fire or suppression is generally not a problem on the Refuge.

C. Climate

A typical continental climate exists at Flint Hills NWR with warm summers and moderately cold winters. Winters are generally mild until December when occasional blizzards may produce short periods of severe weather. Snowfall averages 14 inches per year, and the area averages 20 days per year with measurable accumulations.

Summer lasts for about 6 months with prevailing winds from the south. Periods of high, variable winds can be expected in March, April, and May. Severe thunderstorms can occur anytime from early spring to late fall; however, they are most likely to occur in May and June.

The refuge is in the path of a fairly dependable current of moisture-laden air from the Gulf of Mexico. Precipitation is heaviest in spring and early summer. Most of this precipitation falls from late evening or nighttime thunderstorms. These conditions generally produce poor distribution of precipitation. Normally, approximately 75% of the annual precipitation occurs during the growing season

(Soil Survey, Lyon County, Kansas).

The average frost-free period for the area is approximately 188 days, generally lasting from April 15 through October 20. Areas that lack good air circulation are especially susceptible to local frost when low air stratification permits cold air to fill local depressions.

Table 1 - Climatic Data - Burlington Kansas (data 1951 - 1980) shows the normal precipitation and mean daily maximum and minimum temperatures at the U.S. Weather Station at Burlington, KS, ten miles southeast of refuge headquarters.

TABLE 1. CLIMATIC DATA - BURLINGTON, KANSAS

MONTH	MEAN DAILY MAX. TEMP.	MEAN DAILY MIN. TEMP	PRECIPITATION
JANUARY	42.2	20.5	1.19"
FEBRUARY	46.8	23.4	1.25"

TABLE 1. CLIMATIC DATA - BURLINGTON, KANSAS			
MARCH	57.8	32.5	2.59"
APRIL	69.1	43.9	3.78"
MAY	77.3	53.6	5.34"
JUNE	86.4	62.9	4.87"
JULY	92.2	66.8	4.23"

TABLE 1. CLIMATIC DATA - BURLINGTON, KANSAS

AUGUST	91.9	65.9	4.04"
SEPTEMBER	83.9	57.7	4.38"
OCTOBER	72.6	46.0	2.99"
NOVEMBER	57.5	33.0	1.94"
DECEMBER	45.1	24.1	1.41"

TABLE 1. CLIMATIC DATA - BURLINGTON, KANSAS			
ANNUAL	**68.6**	**44.2**	**38.01"**

D. Vegetation

Comprehensive surveys of plant species have not been accomplished. Flint Hills NWR has eight predominant habitat types. Listed below are brief descriptions of each as well as characteristic plant species. Fire's effect on vegetation depends on plant species, timing of burn, type of burn, and burn intensity.

1. Cropland

Fourteen cooperators farm 3850 acres. The main crops are wheat, milo, soybeans, and corn with several fields planted to oats and clover. These fields are managed for food use of migratory birds. Fire use in the cropland program is usually to remove wheat stubble in preparation for late planting of soybeans. The purpose of the burn is two fold; weed control and to remove moisture absorbing straw.

2. Abandoned Cropland

Abandoned cropland totals 4278 acres. Invaders and successional stages vary according to the amount of flooding each area receives. Forbs, grasses, sedges, and willow or cottonwood are characteristic plants. Several of these fields have been reseeded to native grasses or hardwoods. Some management with fire will be used to maintain habitat conditions where trees are not desirable.

3. Seasonally Flooded Areas

Thirty-six wetlands (natural and constructed) covering 5000 acres are located on Flint Hills NWR. These areas generally consist of two wetland types - Type 1 and Type 3 (Stewart and Kantrud, 1971). Dominant species consist of common millet, barnyard grass, smartweed, and annual sedges. Fire may be used after drawdown to set back succession to maintain ideal conditions.

4. Riparian Timber

Riparian timber areas along the Neosho River and its tributaries constitute about 2000 acres of Flint Hills NWR. Areas that inundated annually are dominated by cottonwood, sycamore, maple, locust, and boxelder. Species occurring on drier areas include cottonwood, ash, pecan, sycamore, hackberry, locust, walnut, elm, sugar maple, bur oak, and hickory. Prescribed fire may be used in these areas for control of eastern

red cedar, or other uses depending on resource management objectives.

5. Hardwood Forest

The refuge has approximately 3000 acres of hardwood forest. These areas are only located on the higher, well drained soils. Trees are mature with a well developed canopy resulting in a fairly open understory. Dominant species are oaks, sugar maple, and bitternut hickory. Prescribed fire may be used in these areas for control of eastern red cedar, or other uses depending on resource management objectives.

6. Native Prairie

There are approximately 300 acres of non-flooded native grassland that remain on Flint Hills NWR. Characteristic species include prairie cordgrass, switchgrass, big bluestem ,and little bluestem. Prairie cordgrass prairie was once the climax vegetation on Refuge floodplain. Prescribed burning is one of the management tools that will be used to preserve the integrity of these remnant tracts.

7. Seeded Grasslands

Flint Hills Refuge has re-seeded about 300 acres of abandoned crop fields to native grasses. Species of grass planted include reed canarygrass, switchgrass, big bluestem, and indiangrass. These areas are susceptible to invasions of woody species and noxious weeds. Prescribed fire will be used in these areas to eliminate and/or retard these invasions.

8. Open Water

When John Redmond Reservoir is at conservation pool of 1039.00 M.S.L., there are approximately 1400 acres of open water on the Refuge. This includes that portion of the reservoir within Refuge boundaries, the Neosho River, and associated creeks.

E. Noxious Weeds and Other Problem Species

Johnson - grass (*Sorghum halepense*) and sericea lespedeza (*Lespedeza cuneata*) are the two nonendemic species of noxious weeds found on Flint Hills Refuge. Most habitat types on the Refuge have one or both of these noxious weeds present to varying degrees. State law dictates control efforts for noxious weeds and the Refuge voluntarily participates in control programs, including the use of

prescribed fire. Prescribed fire or wildfire can increase the spread and density of some noxious weeds depending on environmental and phenological conditions.

Cottonwoods and willows are two species which continually invade abandoned croplands, annually flooded areas, native grasslands, and seeded grasslands. Smooth brome invades native grasslands and seeded grasslands, and abandoned croplands. Eastern red cedar is invading the hardwood forest, native grasslands, seeded grasslands, and abandoned croplands. The control of these species is the main goal of the Refuge's prescribed fire program.

F. Threatened, Endangered, and Special Concern Species

Flint Hills NWR contains or has the potential to contain a number of threatened, endangered, and special concern species. The Refuge will implement its fire management program within the restraints of the Endangered Species Act (1973), as amended, and will take appropriate action to identify and protect from adverse impacts any rare, threatened, or endangered species and its habitats located within the Refuge. Fish and Wildlife Service policy requires that State T&E species and species of concern will be incorporated into all planning activities. Appendix C is a list of T&E species known or likely to occur in Coffey County, Kansas, and Lyon County, Kansas.

Currently, five T&E species - the bald eagle (*Haliaeetus leucocephlus*), the peregrine falcon (*Falco peregrinus*), the least tern (*Sterna antillarum*), the piping plover (*Charadrius melodus*), and the Neosho madtom (*Noturus placidus*) are known to inhabit the refuge. Peregrine falcons are observed migrating through the area in the spring and fall. Both least tern and piping plovers are also migrants through the area. The Neosho madtom is a member of the catfish family that is found in riffles and along sloping gravel bars in the Neosho and Cottonwood Rivers. Bald eagles arrive with waterfowl during fall migration and spend the winter around John Redmond Reservoir and surrounding areas. The EA for Prescribed Burning states that "optimum critical habitat is the areas on northwest end of the John Redmond Reservoir. This area is characterized by dead standing trees along the shoreline. The acceptable habitat for the bald eagle is located in the delta area of the Neosho River that flows into the lake, with the minimum habitat along the Neosho River. These areas of timber (live or dead) would not be prescribed for fire" (Appendix B, page 13; and Appendix C, page 5).

In 1993, a bald eagle nest was found near lower bench wetland unit on Flint Hills NWR. However, herons took over this area and the eagles abandoned the nest site. In 1996, some building of a bald eagle nest again occurred in the same tree but was abandoned. The reservoir at Wolf Creek Nuclear Power Plant has had a nesting pair of bald eagles since 1994 and it is believed that this is the same pair that attempted nesting on the Refuge in 1993. Critical habitat has been designated for the Neosho Madtom. The area designated within the Flint Hills NWR is the

mainstem of the Neosho River downstream to the Lyon/Coffey County line (Appendix C, page 6).

G. Birds

Two hundred ninety four (294) species of birds have been observed on Flint Hills NWR. Of these, 90 are known to nest on the Refuge. Flint Hills NWR has spectacular numbers of migratory waterfowl from late fall through spring with most species in the Central Flyway represented. Also present during certain times of the year are large numbers of shorebirds, gulls, terns, herons, and passerines. Populations of bobwhite quail, eastern turkeys, and greater prairie chicken are also present on the Refuge. A list of bird species observed on the Refuge is found in Appendix D.

Bird species evolving with fire may show fire adapted behavior and responses, whereas other species exposed infrequently to fire in their evolutionary history may be severely inhibited by it (Best 1979). Hawks and purple martins are attracted to fire and use the fire front to locate prey (Lehman and Allendorf 1989). Edwards and Ellis (1969) observed four bobwhite quail flying directly to a burn and landing within a few meters of the flames. However, Tester and Marshall (1961) indicate that bobolinks, savannah sparrows, and LeConte's sparrows all avoided recently burned grassland. Fire's direct and indirect effect to bird species's depends upon each individual species of bird.

H. Mammals

Comprehensive inventories of mammal species have not been completed for Flint Hills NWR. The Refuge's habitats support healthy populations of game mammals such as white-tailed deer, cottontail rabbit, and fox squirrels. Significant numbers of beaver, coyote, fox, opossum, raccoons, and skunks are also present. Several years ago, river otters were released into the Cottonwood River upstream from the Neosho River and the Refuge. Sightings of river otters on Flint Hills Refuge occur about twice a year, primarily along Eagle Creek and Troublesome Creek. Armadillos have been confirmed in this part of Kansas via road kills. Several species of small mammals are also common, including; deer mice, voles, and shrews. For a complete listing of mammals which may occur on Flint Hills NWR see Mammals in Kansas (Bee et al 1981).

Fire tends to have little direct effect on large mammals mainly due to their ability to move. The major indirect effect to large mammals is an increase in available forage. Fire removes standing dead vegetation making new growth more accessible to grazers. In addition to bison, elk, pronghorn, and "rabbits" concentrate on burned areas in North American grasslands (Lewis 1973, Evans and Probasco 1977). Burning up to 70% of a home range did not cause deer to change their range (Ivey and Causey 1984).

Small mammals are generally unable to run from a fire and thus must otherwise

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

I. Fish, Reptiles, and Amphibians

Several species of fish, reptiles and amphibians are located on Flint Hills Refuge. However, comprehensive inventories have not been completed. For a complete listing of fish that may be found on Flint Hills NWR see Fishes in Kansas (Cross and Collins 1975); and, for reptiles and amphibians see Amphibians and Reptiles in Kansas (Collins 1982).

Fire's effect on fish should be minimal except for potential of increased erosion from recently burned areas.

Reference on the effects of fire on reptiles and amphibians in grasslands is limited (Mushinsky 1985). These animals try to escape fire by going below ground when possible. However, caught above ground, the physiological and morphological status of herpetofauna makes these animals particularly susceptible to being killed in a fire, perhaps because their body temperature rapidly reaches a lethal level (Bragg 1994). Bullsnakes and "blue racers" tended to survive prescribed fire in Nebraska Sandhills Prairie while ornate box turtles were far more susceptible (personal observation).

J. Insects

Insect life and range of occurrence all not well documented at Flint Hills NWR. Effects of burning on insects is quite variable. As a group, insects do not appear to experience a severe decline following fire, suggesting that they have adaptations that allow at least some individuals to survive periodic burning (Bragg 1994). Inappropriately timed fires, however, can result in the extirpation of butterflies and other prairie insects in isolated areas (Panzer 1988).

Grasshoppers and leafhoppers have been shown to increase with burning in tallgrass prairie in Kansas, Illinois, and Minnesota (Knutson and Campbell 1976). Varying fire conditions effected the response of these organisms. Early-spring

burns in tallgrass prairie resulted in more grasshoppers than late-spring burns (Evans 1984).

Ants have also been found to increase with burning. Ants spend much of their time below ground, thus, at least some of the colony survives. In addition, their scavenging behavior and general adaptation to hot, dry conditions make them one of the animals that most rapidly increases in population size in burned areas (Bragg 1994).

Spiders, centipedes, and millipedes are species that are drastically reduced by fire (Bragg 1994).

K. Cultural Resources

Fire management activities at Flint Hills NWR will be implemented in accordance with the regulations and directions governing the protection of cultural resources as outlined in Departmental Manual Part 519 (519M), Code of Federal Regulations (36 CFR 800), the Archeological Resources Protection Act of 1979, and the Archeological and Historic Preservation Act of 1974. National Historic Preservation Act of 1966 section 106 clearance will be followed for any fire management activity that may affect historic structures or archeological resources.

Flint Hills NWR has had extensive archeological surveys conducted. A total of 104 sites have been examined on the Refuge. All of the sites are identified on maps located at Flint Hills NWR headquarters. The Williamson Site (14CF330) is listed on the National Register of Historic Places. Two additional sites (14CF369 and 14CF1320) have been nominated.

Excavations at The Williamson Site establish a stratified cultural sequence for the Neosho River valley. The earliest habitation occurred near 1600 B.C.. In addition to cultural debris, two human skeletons and a dog skeleton were also found at the site. One of the burial sites was radiocarbon dated to 1650 B.C. (Schmits et al 1980).

Three historic structures are located near Flint Hills NWR. These structures are: 1. Neosho River Bridge (Rainbow Bridge) east of Hartford; 2. Hartford Collegiate Institute Building in Hartford; and 3. an old homestead barn located adjacent to the southern refuge boundary (Coon Hammond Area).

Heat from grassland fires rarely penetrates more than a centimeter into the soil. Impacts of grassland fires on artifacts and other materials in subsurface settings

will be negligible even if they are buried only a centimeter or less below the ground surface (Wright and Bailey 1982, Vogl 1974). Research conducted by Sayler, Seablom, and Ahler in North Dakota indicate that fire related impacts to surface exposed artifacts will be significant, depending on fire conditions and artifact type and size. Damage includes scorching, fracturing, charring, and spalling. Secondary impacts are created by erosion and vandalism. The severity of fire effects can be controlled and diminished to some degree by controlling the fireline intensity at the time of the burn.

Files and records of cultural resources should be consulted by the fire management team when planning prescribed burns, pre-attack, and 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. Protective blackline may be used around sensitive sites. The use of earth moving equipment for wildfire suppression must be approved by the Refuge Manager, and these resources will be considered in the approval process.

Fire suppression and prescribed fire actions involve construction of blackline and scratchline, use of swatters, and direct attack with engines, all primarily in fine fuels. Ground disturbance is minimal and not likely to adversely effect cultural resources. At Flint Hills NWR most archeological sites have previously been farmed or inundated by flooding from John Redmond Reservoir. In conversations with Tulsa District Army Corps of Engineers (Theresa Arman and Frank Winchell), prescribed fire at archeological sites on Flint Hills Refuge would not pose a problem unless standing structures were located at these sites (personal contact).

L. Improvements

Wildfire damage to improvements on and off the Refuge is a primary concern. While developments can generally be protected from fire damage, dispersed improvements, particularly fences, public use facilities, and gates, are likely to be damaged by severe or large fires. The refuge has office/maintenance/visitor center facilities located just northwest of Hartford (est. total value $2.5 million). Other facilities located within the Refuge include improved nature trails, gates, and water control structures (estimated value $200,000).

Wildfire damage to non FWS public property can occur to wooden utility poles and utility junction boxes located on or near the Refuge. A natural gas pipeline (Panhandle Eastern Pipeline) also traverses diagonally across the northern corner of the Refuge. This pipeline is predominantly below ground except for control valves located just north of Flint Hills NWR boundary adjacent to Highway K-130. Adjacent land ownership to the Refuge is almost entirely private. Wildfires

or escaped prescribed fires could damage adjacent private structures, equipment, and grazing/hay/cropland. Private landowners in this area of Kansas are very tolerant of fire. Most private landowners annually burn winter wheat fields and grassland.

M. Wilderness

Flint Hills NWR does not have areas established as wilderness. Wilderness areas will not be established on the Refuge because the Refuge doesn't have areas that meet wilderness criteria.

N. Smoke Management / Air Quality

The management of smoke is incorporated into the planning of prescribed fires, and to extent possible, in suppression of wildfires. Sensitive areas are identified and precautions are taken to safeguard local neighbors and visitors. Smoke dispersal is a consideration in determining whether or not a prescribed fire is within prescription. Generally, the fine grass fuels and small burn size (1 - 500 acres) generate low volumes of smoke for a short duration (4-5 hours).

Fire management activities at Flint Hills Refuge which result in the discharge of pollutants (smoke, carbon monoxide, particulate, and other pollutants from fire) are subject to and must comply with all applicable Federal, State, and local air pollution control requirements as stated in Section 118 of the Clean Air Act, as amended 1990.

The Kansas Department of Health and Environment implements the requirements of the Clean Air Act. Open burning for agricultural purposes (including wildlife) are exempted from K.A.R. 28-19-648 (Open Burning Prohibited) providing conditions are met (Appendix E, page 1). Burning of timber is an exception to the exemption. According to Lynn Ranabarger (Kansas Department of Health and Environment), understory burns in standing timber do not need to have a permit; however, piles of slash or flood debris must have a permit before the burn is initiated. Individual counties can impose more restrictive controls. Appendix E, Pages 3-6 are open burning permits for Lyon County and Coffey Counties.

O. Fire Environment and History

1. Fuel Types

Fuel Model 1/3 - Grass. Acreage in these two fuel models is highly variable depending on time of year. Fuel model 1 consists of short grasses which have generally been recently grazed heavily, mowed, or harvested. Grass areas that have not been manipulated and unharvested crops fall into Fuel model 3 (tall grass). Total acreage involved is approximately 12,000 acres.

Fuel Model 5/6 - Short to mid-height shrubs. Habitat types on Flint Hills NWR that are characteristic of these fuel types include seasonally flooded areas that are highly invaded with young cottonwood and willow; as well as areas that are designated "go back" to riparian timber. Approximately 1200 acres are involved in these two fuel models.

Fuel Model 8/9 - Timber. Hardwoods growing in riparian areas with an understory which may be any combination of brush grass or litter. Habitat types associated with these fuel models include riparian timber and hardwood forest. The Refuge has approximately 4500 acres in these fuel models.

Fuel Model 13 - Slash. Flint Hills NWR contains piles of logs caused by flooding. This flooding debris is generally associated with the riparian timber habitat type, and mostly located in the Faunal Road East Fire Management Unit (FMU). Flint Hills NWR has about 1200 acres of fuel model 13.

2. Fire Behavior

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

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

Fire behavior in this fuel model is directly related to fine fuel moisture and windspeed. Rates of spread can reach 446 chains/hour and flame lengths of 10' with a fine dead fuel moisture of 3% and midflame windspeed of 10 mph. Spot fires are generally not produced because fuels are consumed rapidly. Fire fronts tend to become irregular as topography, fuel loads, wind, or natural barriers speed up or slow movements. Depending on windspeed, resistance to control is low to moderate.

Fuel Model 3 - tallgrass. Fire in this model is the most intense of grass fuel models and displays high rates of spread under the influence of wind. Wind may drive fire into the upper heights of the grass and across standing water. Fuel loads consist of fine and course dead fuels average

3.0 tons/acre with a fuel bed depth of 2.5 feet.

Rates of spread can reach 387 chains/hour and flame lengths of 25’ with a fine dead fuel moisture of 3% and midflame windspeed of 10 mph. Short range spotting (500') is common. Resistance to control is very high to extreme.

Fuel Model 5 - shrub. Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and grasses or forbs in understory. The fires are low intensity because surface fuel loads are light, the shrubs are young with very little dead material, and the foliage contains little volatile substances. Total fuel load (<3") averages 3.5 tons/acre with only 1 ton/acre dead (0.25"). The fuel bed depth is 2 feet. Rates of spread are generally slow, approximately 10 chains/hour with flame lengths from 1 to 3 feet.

Fuel Model 6 - shrub. Fires carry through the shrub layer where the foliage is more flammable than fuel model 5, but this requires moderate winds, greater than 8 mph at mid-flame height. Generally, fire will drop to ground in openings or when wind speed diminishes. Total fuel loadings (<3") average 6.0 tons/acre with about 1.5 tons/acre dead (0.25"). Fuel bed depth is 2.5 feet. Resistance to control can be high to extreme.

Fuel Model 8 - timber. Slow burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional jackpot of fuels. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards. Total fuel loadings (<3") are about 5.0 tons/acre with about 1.5 tons/acre dead (0.25"). The fuel bed depth for this fuel model is approximately 0.2 feet. Resistance to control is low except during drought conditions.

Fuel Model 9 - timber. This model displays moderate to low fire intensity. Fires are carried by dead loosely compacted leaves. Flame lengths in this fuel model are higher than fuel model 8. Concentrations of dead downed woody material will contribute to more intense burning and spotting. Resistance tocontrol is low except during drought conditions. Total fuel loadings (<3") are about 3.5 tons/acre with a dead fuel load (0.25") at 2.9 tons/acre. The fuel bed depth is 0.2 feet.

Fuel Model 13 - slash. Large quantities of fuel greater than 3" are present. Fire spreads quickly through fine fuels and intensity slowly builds as larger fuels begin burning. Active flaming is sustained for a long period of time with a large number of fire brands generated. Resistance to

control is extreme. Total fuel loadings (<3") are 58.1 tons/acre with a dead fuel load (0.25") of 7.0 tons/acre.

3. Fire Occurrence/History

Wildfire is one of the primary natural forces which created native prairie. Historic records describe huge prairie fires started by lightning or humans. Fires consumed millions of acres of prairie vegetation as there were few natural firebreaks and no suppression. Wright and Baily (1982) estimate fire frequency in pre-settlement tallgrass prairie ranged from every 5 - 10 years; however, Hulbert (1973) estimated fire frequency to be two to five times every 10 years.

Historical reviews indicate the July-August period, to varying degrees, as a seasonal fire peak (Hamilton 1996). Moore (1972) reports for the southern plains region that October and then July-August as the peak fire seasons with a smaller season in April-May.

The primary lightning season for Flint Hills Refuge is July-August - a pattern which holds for most of the continental United States. Orville (1991) reported 13.4 million lightening ground flashes in 1989 in the contiguous U.S., of which 50% occurred in the July-August period. In 1989, the Flint Hills region of Kansas and Oklahoma had the highest density of lightning strikes (6-8/km^2) in the United States west of the Mississippi River (Hamilton 1996).

Obviously, lightning was an important source of fire in the central grasslands. However, fires during July and August are generally small due to tallgrass prairie being lush and green, thereby reducing fire spread and intensity.

Conversely, fires during the dormant season of spring and fall (while of lower frequency) had a larger spacial influence on the pre-settlement landscape. Rates of fire spread and intensity have been measured as high as 15 to 20 times the July-August period (Steuter 1986).

Fire records for Flint Hills Refuge exist from 1985 to present. For the years 1985 through 1996 a total of 237 fires were reported. Of the 237 fires, 84 were wildfires (40 wildfires and 44 natural outs) and 153 were prescribed fires. Flint Hills NWR averaged seven (7) wildfires and 13 prescribed fires per year for the period 1985 through 1996. Human caused ignition accounted for 99% of all recorded fires. Only two (2) lightning

ignitions are recorded. Fifty-two percent (52%) of wildfires occurring on the Refuge were the result of field burning. The agricultural field burning season occurs in the spring and again in late June to early July. Private landowners are not subject to the same burning regulations as government agencies; and thus, many fields are often ignited and left unattended. Two (2) Refuge prescribed fires escaped and became wildfires.

The largest prescribed fire that has occurred on Flint Hills NWR to date encompassed 275 acres in April 1990. The largest wildfire on record consumed 400.5 acres (400 acres on Refuge) and took five (5) days to control (April 1989). Most fires on Flint Hills Refuge are controlled within the first burning period. An exception to this occurred in April 1989 when two (2) fires required seven (7) days (one of which was an escaped prescribed fire) and two (2) required five (5) days. Many of the wildfires on Flint Hills NWR have been suppressed with the assistance of volunteer fire departments or solely by volunteer fire departments.

TABLE 2. WILDFIRE FREQUENCY AND SIZE ON FLINT HILLS NWR

Year	Number of Fires	Acres Burned *	Range of Acres Burned
1985	0	0.0	0.0 - 0.0
1986	0	0.0	0.0 - 0.0
1987	2	85.0	15.0 - 70.0
1988	2	332.0	40.0 - 292.0
1989	6	967.5	0.5 - 400.5
1990	10	220.8	0.1 - 80.0
1991	15	438.6	0.1 - 124.0
1992	10	89.2	0.0 - 35.0
1993	9	166.1	0.1 - 55.0
1994	14	241.8	0.5 - 40.5
1995	8	19.2	0.1 - 7.0
1996	8	338.6	0.5 - 160.1
Total	84	2898.8 **	0.0 - 400.5

12 Year Average: 7.0 fires / year
34.5 acres / fire
241.6 acres burned / year

* Includes fires outside Refuge boundary that were a potential threat to the Refuge and required a response of Refuge personnel and equipment.

** Includes Refuge and private land.

IV. FLINT HILLS FIRE MANAGEMENT POLICY AND OBJECTIVES

A. General

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 below.

The following considerations influenced the development of the Refuge's fire management goals and objectives. The previous sections of this plan have established that:

1. Fire is an essential natural part of Flint Hill's native biotic communities.

2. Uncontrolled wildfire has the potential for negative impacts on and off the Refuge.

3. Positive or negative effects of prescribed fire on vegetation, wildlife, and cultural resources depend on burning conditions and species involved.

4. Use of "minimum tool" concept to minimize environmental and cultural damage.

5. Rapid rates of spread and fire suppression response time pose significant suppression problems and increase the likelihood of escape onto adjacent lands.

B. Refuge Fire Management Goals

1. Protect life, public and private property, and cultural and natural resources from wildfire.

2. Use prescribed fire as a tool to accomplish Flint Hills NWR habitat management objectives.

C. Refuge Fire Management Objectives

1. Safely suppress all wildfires using strategies and tactics appropriate to safety considerations, values at risk, and in accordance with Service policy.

2. Minimize the cost and impact of suppression activities.

3. Prevent human-caused wildfires.

4. Use prescribed fire to the fullest extent possible within or near Refuge development zones, wildfire sensitive resources, and boundary areas to reduce the risk from wildfire damage.

5. Use prescribed fire to restore and perpetuate native wildlife species, by maintaining a diversity of plant communities.

6. Maintain prairie by retarding the invasion of woody species and noxious weeds.

7. Educate the public regarding the role of prescribed fire within the Refuge.

V. FIRE MANAGEMENT STRATEGIES

The following will be employed to meet fire management 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. Conduct all fire management programs in a cost effective manner, consistent with applicable laws, policies, and regulations.

C. Utilize prescribed fire as a tool for hazard fuel reduction and meeting resource management objectives. As much as possible, hazard fuel reduction prescribed fires will be used only when they compliment resource management objectives. Resource management prescribed fire will be used to accomplish specific objectives established for individual units.

D. Initiate cost effective fire monitoring which will inform managers if objectives are being met. Monitoring information will also be used to refine prescribed fire plans to better meet objectives.

E. Due to low numbers of personnel, low amounts of equipment, and the Refuge's proximity to towns, local fire agencies (volunteer fire departments) will be utilized for initial attack on wildfires. Memorandums of Understanding (MOU) with local fire agencies will be maintained to provide for cooperative suppression actions.

F. Limits to Strategies

1. Other than to save human life, heavy equipment (bulldozers, discs, plows, and graders) will only be used in fire suppression with approval of the Refuge Manager

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

Flint Hills NWR has been divided into three fire management units which are the same for both wildland and prescribed fires. The decision to divide the Refuge into three FMUs was based on: (1) differences in fuel types, loading, and access; (2) differences in public use; and (3) differences in values at risk (i.e. endangered species habitat, cultural and archeological resources, and urban interface). These FMUs may be changed in the future to better meet Refuge goals and objectives in the Comprehensive Management Plan. A map of FMUs on Flint Hills NWR can be found in Appendix F, page 11.

Wildfires will be managed using the Appropriate Management Response concept and all wildfires will be suppressed consistent with values at risk. Strategies employing a range of suppression options depending on the situation will be used. Minimum impact suppression tactics (MIST) will be used, where appropriate.

Table 3: Appropriate Management Response

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

A. Fauna Road East FMU

The Fauna Road East Unit includes all refuge lands east of Fauna Road in Coffey County. This area is characterized by dead flooded timber, large quantities of flood debris, and riparian timber with some moist soil management areas and grasslands. This area is considered critical habitat for the threatened bald eagle. The Fauna Road East Unit has the largest amount of 100 hour and 1000 hour fuels on the Refuge.

The appropriate management response concept will be used in this unit to meet refuge fire management goals. Low impact suppression should be given high priority when fire intensity and spread is minimal. However, fires occurring during drought conditions pose high resistance to control due to fuel types, and lack of access. Furthermore, fires occurring in this area have a high potential to cross onto private land due to large amount of pasture and hay land north of this

area. Suppression areas and prescribed fire areas are shown on a map (Appendix F, page 12). The map is currently based on critical habitat for T & E species. More detailed maps will be produced showing roads, fuels, archeological and cultural resources, and values at risk.

Keech-Byrum Indexes (KBI) greater than 400 (or Palmer Drought Index (PDI) of greater than -2.5) for an extended length of time would allow drift piles and other downed 100 and 1000 hour fuels to burn. Another consideration is a KBI that has been above 400 for an extended length of time, then falls rapidly due to a precipitation event. The downed 100 and 1000 hour fuels are still dry internally and a fire occurring during this time could generate enough heat to dry the outside of these fuels causing them to ignite.

Water levels in John Redmond Reservoir and flows within the Neosho River drainage will also have to be monitored via Corps of Engineers flow station readings. Precipitation events occurring upstream of the Refuge on the Neosho River drainage will many times cause areas of the Faunal East FMU to be flooded. This would eliminate much of the 100 and 1000 hour fuels from fire considerations even though the Refuge may be in drought conditions.

1. Unit Fire Objectives

    a. Provide for firefighter safety first.

    b. Minimize damage to refuge resources.

    c. Manage the fire in the most cost effective manner consistent with values at risk.

    d. Prevent fire from burning off Refuge lands.

    e. Protect critical habitat for T & E species.

    f. Use of prescribed fire to meet unit resource management objectives.

2. Suppression Strategies and Techniques

a. Utilize existing roads and natural barriers as primary control lines, safety zones, escape routes, and anchor points whenever possible.

b. When possible, use backfires from existing roads and natural breaks to halt fire spread.

c. All constructed fireline will be rehabilitated prior to departure from the fire.

d. Use burnouts to strengthen fire control lines.

e. A series of old roads in this area will be annually mowed for use as fire breaks. Maps will be created indicating these control lines and copies given to cooperators.

B. Neosho River South FMU

The Neosho River South Unit is all Refuge land south of the Neosho River and west of Fauna Road. This area has all of the cultural resources that are listed on the Register and most of the urban interface. In addition, this area has the highest amount of public use. A 200' wide strip along the Neosho River has been designated as a buffer strip. This buffer strip within Lyon County is critical habitat for the Neosho Madtom. Fuels in Neosho River South consist mostly of grasslands and moist soil vegetation with deciduous riparian areas along the river and creeks.

The appropriate management response concept will be used in this unit to meet refuge fire management goals. Low impact suppression should be given high priority when fire intensity and spread is minimal. Fires occurring in this area have a lower potential to cross onto private land due to large amounts of cropland south of this area. The extensive road system in this unit also provides good access to most fires. Suppression areas and prescribed fire areas are shown on a map (Appendix F, page 13). The map is currently based on critical habitat for T & E species. More detailed maps will be produced showing roads, fuels, archeological and cultural resources, and values at risk.

Keech-Byrum Indexes (KBI) greater than 400 (or Palmer Drought Index (PDI) of greater than -2.5) for an extended length of time would allow scattered drift piles and other downed 100 and 1000 hour fuels to burn. Another consideration is a KBI that has been above 400 for an extended length of time, then falls rapidly due

to a precipitation event. The downed 100 and 1000 hour fuels are still dry internally and a fire occurring during this time could generate enough heat to dry the outside of these fuels causing them to ignite.

Water levels in John Redmond Reservoir and flows within the Neosho River drainage will also have to be monitored via Corps of Engineers flow station readings. Precipitation events occurring upstream of the Refuge on the Neosho River drainage or Eagle Creek drainage will occasionally cause areas of the Neosho River South FMU to be flooded. This would eliminate much of the 100 and 1000 hour fuels from fire considerations even though the Refuge may be in drought conditions. These flood conditions are of shorter duration than in Faunal Road East FMU.

1. Unit Fire Objectives

    a. Provide for firefighter safety first.

    b. Minimize damage to refuge resources.

    c. Manage the fire in the most cost effective manner consistent with values at risk.

    d. Prevent fire from burning off Refuge lands.

    e. Use of prescribed fire to meet unit resource management objectives.

    f. Protect structures in urban interface. Service policy restricts wildland firefighters from engaging in structural firefighting activities while employed by the Service. Policy does allow use of wildland firefighters for structural (exposure) protection.

    g. Protection of cultural resources.

2. Suppression Strategies and Techniques

    a. Utilize existing roads and natural barriers as primary control lines, safety zones, escape routes, and anchor points whenever possible.

b. When possible, use backfires from existing roads and natural breaks to halt fire spread.

c. All constructed fireline will be rehabilitated prior to departure from the fire.

d. Use burnouts to strengthen fire control lines.

C. Neosho River North FMU

The Neosho River North Unit is all Refuge land north of the Neosho River and west of Fauna Road. Fuels in Neosho River North consist mostly of grasslands and moist soil vegetation with deciduous riparian areas along the river and creeks. A 200' buffer strip has been designated along the Neosho River as a buffer strip. This buffer strip in Lyon County has been designated critical habitat for the Neosho Madtom.

The appropriate management response concept will be used in this unit to meet refuge fire management goals. Low impact suppression should be given high priority when fire intensity and spread is minimal. Fires occurring in this area have a high potential to cross onto private land due to large amounts of pasture and hay land north of this area. The extensive road system in this unit provides good access to most fires. Suppression areas and prescribed fire areas are shown on a map (Appendix F, page 14). The map is currently based on critical habitat for T & E species. More detailed maps will be produced showing roads, fuels, archeological and cultural resources, and values at risk.

Keech-Byrum Indexes (KBI) greater than 400 (or Palmer Drought Index (PDI) of greater than -2.5) for an extended length of time would allow scattered drift piles and other downed 100 and 1000 hour fuels to burn. Another consideration is a KBI that has been above 400 for an extended length of time, then falls rapidly due to a precipitation event. The downed 100 and 1000 hour fuels are still dry internally and a fire occurring during this time could generate enough heat to dry the outside of these fuels causing them to ignite.

Water levels in John Redmond Reservoir and flows within the Neosho River drainage will also have to be monitored via Corps of Engineers flow station readings. Precipitation events occurring upstream of the Refuge on the Neosho River drainage will occasionally cause areas of the Neosho River North FMU to be flooded. This would eliminate much of the 100 and 1000 hour fuels from fire considerations even though the Refuge may be in drought conditions. These flood conditions are of shorter duration than in Faunal Road East FMU.

1. Unit Fire Objectives

    a. Provide for firefighter safety first.

    b. Minimize damage to refuge resources.

    c. Manage the fire in the most cost effective manner consistent with values at risk.

    d. Prevent fire from burning off Refuge lands.

    e. Use of prescribed fire to meet unit resource management objectives.

2. Suppression Strategies and Techniques

    a. Utilize existing roads and natural barriers as primary control lines, safety zones, escape routes, and anchor points whenever possible.

    b. When possible, use backfires from existing roads and natural breaks to halt fire spread.

    c. All constructed fireline will be rehabilitated prior to departure from the fire.

    d. Use burnouts to strengthen fire control lines.

VII. FIRE MANAGEMENT ORGANIZATION AND RESPONSIBILITIES

The Refuge Manager at Flint Hills NWR is responsible for planning and implementing an effective fire management program at Flint Hills NWR. The Refuge Manager is also the official ultimately responsible for all fire management decisions concerning both wildfire and prescribed fire.

All wildfires must receive some type of initial attack response. The initial attack forces are located at Refuge headquarters near Hartford. The most fire qualified individual available will be in charge of suppression efforts.

Currently, the Refuge's fire management team consists of the Refuge Manager, who is ultimately responsible for all fire management decisions; one Refuge Operations Specialist, who is responsible for the day to day operations of the Refuge; one Supervisory Range Technician; who is responsible for the day to day operations of the fire program; and one Biological Technician, who is responsible for the biological program at the Refuge. In total, four (4) permanent staff employees and two (2) seasonal firefighters are red-carded for arduous duty and one (1) permanent employee is classified as moderate duty.

The Normal Unit Strength (NUS) for Flint Hills NWR will be determined during the late fall of 1997. The NUS of the Refuge is defined as "the amount of non-capitalized fire fighting equipment needed by a refuge to meet 70 percent of suppression needs".

A. Refuge Manager

1. Responsible for the overall management of the Refuge, including the fire program.
2. Insure that Department, Service, and Refuge policies are followed and maintained.
3. Insure sufficient collateral duty firefighters meeting Service standards are available for initial attack.
4. Supervise the writing of prescribed burn plans for the Refuge.
5. As available, serve as prescribed fire burn boss..

B. Refuge Operations Specialist

1. Supervise the maintenance, biological, and fire staff.
2. Supervise the resource management activities on the Refuge including the selection of objectives and tools to be used in achieving objectives (including prescribed fire).
3. Supervise the writing of prescribed fire plans.
4. As available, serve as prescribed fire burn boss.
5. Prepares annual FireBase budget request, approves and tracks use of FireBase accounts.

C. Supervisory Range Technician

1. Delegated the responsibility for coordination and supervision of the fire

management program by the Refuge Operations Specialist.

2. Responsible for planning, coordinating, and directing preparedness activities including:
    a. Fire training.
    b. Physical fitness testing and Interagency Fire Qualification System (IFQS) data entry.
    c. Fire cache and equipment inventory accountability, maintenance, and operation.
    d. Cooperation with cooperative agencies. Revises cooperative agreements as necessary.
    e. Insures step-up plan is followed.
3. Insures fire management policies are observed.
4. Has lead responsibility for managing the prescribed fire program including:
    a. When available, serve as prescribed fire burn boss.
    b. Propose prescribed fire projects.
    c. Write prescribed fire plans.
5. Assist Refuge Biological Technician with fire effects monitoring.
6. Prepares a Refuge fire prevention plan, and coordinates fire prevention with other employees.
7. Maintains liaison with Regional Fire Management Coordinator and Zone Fire Management Officer.
8. Updates the Fire Management Plan, maintains fire records, reviews fire reports (DI-1202) for accuracy, and enters fire reports into FMIS.
9. Maintain engines in state of readiness.

D. Biological Technician

1. Coordinates fire monitoring program to determine if resource management prescribed fires accomplish objectives.
2. Provide technical/biological support to managers in selecting appropriate resource objective, and the best tool to use in accomplishing resource objectives, including the use of prescribed fire.
3. Reviews all proposed units to be burned to ensure sound biological principles are being followed, management objectives are valid, and sensitive resources are not being impacted.

E. Seasonal and Collateral Duty Firefighters

1. Maintain assigned fire equipment in ready state and use required safety gear.
2. Responsible for their personal protective equipment and physical conditioning.
3. Qualify annually on the step test or 1.5 mile run before March 1, or within two weeks of EOD date. Begining January 1, 1998, all fitness tests will switch to the pack test.
4. Assist Supervisory Range Technician with maintaining accurate records.

F. Wildfire Incident Commander (as assigned)

1. The Incident Commander (IC) will be responsible for the safe and efficient suppression of the assigned fire.
2. Fulfill the duties described for the IC in the Field Operations Guidelines (IC-420-1).
3. Notify dispatch and/or Zone FMO of all resource needs and situation updates, including the need for an extended attack.
4. Ensure that personnel are qualified for the job their performing.
5. Ensure 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.
6. Identify and protect sensitive areas.
7. Utilize minimum impact strategies whenever possible.
8. Ensure that the fire site is fully rehabilitated or that the management of rehabilitation has been assigned.
9. Submit completed DI-1202 wildfire report, crew time sheets, and a listing of any other fire related expenditures or losses to Supervisory Range Technician within 7 days of fire being declared out.

G. Prescribed Burn Boss (as assigned)

1. Implement approved prescribed burn plans within prescriptions.
2. Assist with the administration, monitoring, and evaluation of prescribed burns.
3. Document weather and fire behavior (including rates of spread and flame length) and submit to Supervisory Range Technician.
4. Document necessary information to complete DI-1202 (fire report) and submit to Supervisory Range Technician.

H. Fire 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:

1. Provide assistance in suppression of wildfires as defined in cooperative agreements and memorandums of understanding. Appendix F, pages 2 - 4 is a Memorandum of Understanding (MOU) with Coffey County District 1 VFD, and Appendix F, pages 5 - 8 is a MOU with Lyon County District 5 VFD. Interagency cooperators can be found in the Dispatch Plan (Appendix H, pages 10 - 11.
2. Assist, as needed, in the investigation of suspicious fires.

VIII. WILDFIRE PROGRAM

A. Fire Prevention

With 99% of wildfires (1985 through 1996) occurring on Flint Hills NWR being human caused, a fire prevention plan needs to be developed. Human caused ignitions have the potential to be the most damaging because they can occur at a time of year when fewer initial attack forces are available and fuels are cured. Agricultural field burning occurs in the spring (which is predominantly pastures) and summer (which is predominantly wheat fields). When assistance is requested, the Refuge assigns fire crews to watch/patrol the Refuge boundary in cooperation with neighboring landowners while they are burning land that is adjacent to the Refuge. Fire use for agricultural purposes, land clearing, and slash burning have accounted for 47 wildfires from 1985 through 1996.

Flint Hills NWR currently allows overnight camping and campfires anywhere on the Refuge. Generally, this involves fishing at night along the Neosho River and John Redmond Reservoir. The following regulations are currently in effect

regarding campfires on the Refuge: (1) campfires must be attended at all times; (2) use of campfires is forbidden during State and/or County burn bans; and (3) campfires do not need to be in a fire ring or in an area devoid of vegetation. Three (3) wildfires have resulted from campfires burning a total of four (4) acres of Refuge land. Campfires will not be classified as wildfires and entered into FMIS unless escape occurs or has occurred.

As a reminder to the public and visitors, the Refuge will do the following:

Signing.

Public contacts via press releases and verbal contacts.

Contacts with adjoining private landowners.

Closures of the Refuge when necessary.

Implementation and following of State regulations and restrictions.

Enforcement of regulations and prosecution of violators.

Employee training and awareness.

Two other fire prevention measures are the multi-annual mowing of public use roads and the annual mowing of fire breaks especially in the Dove Roost Area (Fauna Road East Fire Management Unit).

B. Fire Behavior

See Section III Part O.

C. Fire Preparedness Planning

1. General

The Refuge Manager, Refuge Operations Specialist, and Supervisory Range Technician are responsible for coordinating preparedness planning. The Step-up Plan (Appendix G) which is currently based on the Rangeland Fire Index lists specific duties. The fire season (wildfire and prescribed fire) will start February 20 and run through June 9. The wildfire season as calculated by FireBase analysis is 100 days (March 2 through June 9).

As part of the planning process, Refuge planners will review the affects of fire management activities and incoprorate contingency planning elements

into each fire management operation.

a. Impacts of Fire Management Activities

Flint Hills NWR is located within a highly fragmented landscape that is dominated by agricultural interests. These agricultural interests include mainly row crop production and livestock production; therefore, adjoining lands are dominated by cropfields, pastures, and hay land. Many of the pastures and hay meadows are burned on nearly an annual basis in the spring (late March to mid April) for grass production. In addition, many cropfields are also burned especially those planned for double cropping with winter wheat followed by soybeans.

Refuges lands are very similar to the surrounding area. Prior to Refuge establishment, most of the area was cultivated. The Refuge has continued this practice with currently about 3000 acres in cultivation.

The impact of Refuge fire management activities on adjacent agricultural land could have an adverse impact on adjacent landowners, especially escaped prescribed fires in the fall. An escaped prescribed fire during the fall would reduce the amount of vegetation available for livestock grazing or could burn unharvested row crops. A Refuge escaped prescribed fire in the spring would most likely have far less impact to adjoining landowners as Refuge tends to burn areas that are virgin tallgrass prairie adjacent to Refuge boundary earlier than adjoining landowners burn.

The effects of adjacent landowner burns crossing onto the refuge have both positive and negative affects. For most of the Refuge's history, these prairies adjacent to private land were not burned by Refuge personnel. The adjoining private landowner would burn their pasture and allow fire to cross onto Refuge where it would be extinguished naturally within timber areas adjacent to creeks. These trespass fires reduced woody invasions and kept these areas in tallgrass prairie. However, since most of these trespass fires occurred in early to mid April, they have had negative effects to these prairies as well. Native cool season forb species are negatively impacted by these trespass fires as they are actively growing when these fires occur. These forb species are tolerant of occasional late spring fires; however, the almost annual burning of these areas could lead to a reduction in species diversity as some of these species could be eliminated.

Flint Hills NWR also has areas of wildland urban interface located adjacent to the Refuge. These areas consist of small communities as well as scattered farmsteads. Fire management activities conducted by the Refuge could have serious impacts on these wildland urban interface areas. A wildfire on Refuge land could threaten an entire community and/or isolated farmsteads.

The Refuge has Memorandums of Understanding (MOU) with two volunteer fire departments (Lyon County Fire 5 and Coffey County District 1). Currently, these MOU's do not cover incident command within the wildland urban interface.

Another impact in the wildland urban interface is smoke generated from both prescribed fires and wildfires. This smoke could cause adverse health effects to the local population as well as damaging private property (home furnishings etc).

b. Contingency Planning Elements

Due to fragmented habitats on the Refuge, the possibility of fires requiring contingency forces is fairly low. Numerous barriers (both man-made and natural) and changes in fuels exist on the Refuge. These barriers are utilized extensively in both wildfire suppression and prescribed fire operations.

If contingency forces are needed, they include additional refuge personnel and local Volunteer Fire Departments. If additional resources are needed to contain the escape, other refuge personnel should be called upon first for assistance. If needed, outside cooperative resources can be ordered directly through Lyon or Coffey County Sheriff's Offices as follows:

Lyon County

1. By calling either 911 or 316-342-5545 directly or;
2. Contacting refuge office by radio (164.625 Mhz) and having refuge staff call Lyon Co Sheriff Office.
3. The Sheriff Office will then contact Lyon County Fire 5 or other emergency service for response.
4. In the event Lyon County Fire 5 VFD is contacted, radio frequency will switch to Lyon Fire 5 (154.355 R/T) (Channel 2 on refuge radios).

Coffey County

1. By calling either 911 or 316-364-2123 directly or;

1. Contacting refuge office by radio (164.625 Mhz) and having refuge staff call Coffey County Sheriff Office.

2. The Sheriff Office will then contact Coffey County District 1 or other emergency service for response.

3. In the event Coffey County District 1 is contacted, radio frequency will switch either Lebo Frequency (453.675 R and 458.675 T - Channel 3 on Refuge UHF radios) or Burlington (453.675 R and 458.675 - Channel 4 on Refuge UHF radios).

Sheriff's Offices for the respective county(s) are notified prior to conducting a prescribed fire. Information relating to location of prescribed fire, size of prescribed fire, and estimated start time are provided to the offices. In addition, the offices are contacted when the prescribed fire is completed. The notification of contingency forces will follow the Contingency Section of the approved prescribed fire plan.

Personnel and equipment required to be on-site within an approved prescribed fire plan will be on-site prior to initiation of the burn; unless an amendment to the prescribed fire plan has been approved by Project Leader (or person designated by Project Leader).

2. Personnel

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.

Only qualified employees meeting the fitness and training requirements (red carded) of assigned positions will be dispatched to fires. Other personnel not meeting requirements may be used in support activities but will not be permitted on the fire line. The FWS Fire Management Handbook and Wildland Qualification Subsystem Guides (Wildfire and Prescribed Fire) should be referenced for specific policies and qualifications. The Fire Directory (Appendix H, pages 7 - 9) displays qualification levels (wildfire and prescribed fire) for staff stationed at Flint Hills NWR. All attempts will be made to maintain the following minimum fire qualification levels.

Position	# Needed
Incident Commander Type 4 (ICT4)	1
Incident Commander Type 5 (ICT5)	2
Engine Boss (ENGB)	2
Engine Operator (ENOP)	2
Firefighter Type 2 (FFT2)	3

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.

3. Training

Service policy sets training, qualification, and fitness requirements for all firefighters and prescribed fire positions (collateral and fire). All firefighters will be provided with the training required to meet Service job qualification standards for the jobs they are expected to perform. Interagency training opportunities will be utilized whenever possible.

All firefighters will be required to participate in an annual firefighter refresher to remain qualified. Refreshers will concentrate on local needs as well as Standards for Survival or Look Up, Look Down, & Look Around, and fire shelter training.

4. Equipment

Engines are the primary initial attack resource on the Refuge because of the predominance of fine fuels and access roads. Earth moving equipment is available and can be used in areas that have been disturbed in the past (i.e. abandoned croplands, reseeded grasslands, etc) provided that permission is granted by Refuge Manager, and that cultural artifacts will not be effected.

Currently, Flint Hills NWR maintains the following equipment at Refuge headquarters.

Equipment	Amount
Light engines 200 gallon (Type 6x)	1
Water Tender 1000 gallon with BB-4 pump (stored at VFD in Hartford)	1
D-6 Dozer (Type 2)	1
Tractor (Type 4)	1
Tractor (Type 3)	2
Tractor (Type 2)	1
Equipment and PPE cache (on going) (NUS will be determined late fall 1997)	

D. Impacts of Drought and Preparedness Levels

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 Refuge many times uses timbered areas as fuel breaks. However, the Incident Commander or Burn Boss must be aware of cumulative effects of drought on these fuel models. The burn plan will state that if precipitation is significantly below normal, Palmer Drought Index indicates the area is in "Moderate Drought" (- 2 to - 2.9 on scale), and/or Keetch-Byram Drought Index is greater than 400, mitigation measures may require the use of additional holding personnel, wider control lines, or the use of more foam and water. If KBDI is greater than 600 or PDI is greater than - 4 (Extreme Drought), the burn will be postponed until either a time when weather conditions improve, or to the following year.

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. Emergency Preparedness

The Step-up Plan is currently based on the Rangeland Fire Danger Index. The Rangeland Fire Index is calculated daily during fire season by the National Weather Service in Topeka, Kansas. Greenness factors of fuels are calculated by an Advanced Very High Resolution Radiometer (AVHRR) onboard NOAA weather satellites. Satellite calculated greenness factors are combined with forecasted winds and relative humidities to obtain the index. The data is accurate enough to calculate greenness on a county by county basis. The Rangeland Fire Index is broadcast daily on NOAA weather radio through July 15 as well as anytime the index is in the high, very high, or extreme categories.

The Refuge Team Managers will monitor current and predicted fire weather reports and take appropriate actions as listed in the Step-up Plan (Appendix G).

F. Severity and Emergency Presuppression Funding

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

Emergency Presuppression and Severity funds will be requested in accordance with the guidance provided in the Service's Fire Management Planning Handbook. As a general guide, Severity funding will be requested if a severe drought is indicated by a Palmer Drought Index reading of -4.0 or less or a Keetch-Byram Drought Index of 600 or greater and a long-range forecasts calling for below average precipitation and/or above average temperatures. Drought

Indices can be located at: http://www.boi.noaa.gov/fwxweb/fwoutlook.htm.

G. Detection

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

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.

H. Pre-Attack Plan

Pre-attack planning continues to be compiled by Supervisory Range Technician and seasonal fire staff. Parts of the pre-attack plan have been completed and are found in Appendix F. Once finished, pre-attack plans will be included in Appendix F and copies placed in each engine. Final pre-attack plans will include:

1. Response Maps
    - Roads, gates, and fences
    - Fire stations/caches
    - Airports
    - Helispots
    - Water sources (type and flow)
    - Mutual aid zones/fire cooperator districts
    - Land ownership maps

2. Hazard/Risk Map
    - High potential fire occurrence zones
    - Potential values at risk zones (high, medium, low)
    - Hazard potential zones (high, medium, low)

3. Natural and Cultural Resources Map

4. Structure Assessments

5. Closure/Evacuation Procedures

I. Fire Suppression

1. General

Service policy requires the Refuge to utilize the ICS system and firefighters meeting NWCG qualifications for fires occurring on Refuge property. All suppression efforts will be directed towards safeguarding life and public and private property while protecting the Refuge's resources from harm. Mutual aid resources responding from fire departments to Service fires will not be required to meet NWCG standards, but must meet the standards of their department. Mutual aid resources will report to the IC (in person or by radio) and receive their duty assignment. Mutual aid forces will be first priority for release from the fire. Occasionally, individuals that are not members of a fire department and are not qualified to fight fires will arrive at a fire scene. These individuals are not to be used as firefighters. Flint Hills NWR has staff employees which are also members of Lyon County District 5 Volunteer Fire Department. If these employees are not fire qualified for Refuge fires, they cannot pose as off-duty volunteer firefighters on fires occurring on Flint Hills NWR. If additional firefighters are needed, appropriate procedures will be used to acquire them.

2. Initial Reporting and Dispatching

All fires occurring within or adjacent to (within two miles) the Refuge will be reported to Flint Hills NWR headquarters. The person receiving the report will be responsible for implementing the Fire Dispatch Plan (Appendix H) and assume duties of Fire Dispatcher.

Requests for assistance by cooperators on fires not threatening the Refuge must be made to Refuge Operations Specialist or designee. Only qualified and properly equipped resources will be dispatched off of the Refuge.

For local fires, the Fire Dispatcher will stay on duty until: (1) all Refuge resources return; (2) relieved by another dispatcher; or (3) advised by IC that he/she can leave. The Fire Dispatcher will not be required to stay on duty if the fire occurs outside Refuge radio coverage. However, the

dispatcher must notify Lyon and Coffey County dispatchers and/or Lyon County District 5 Fire Department when he/she leaves and leave a telephone number.

The Fire Dispatcher will be responsible for coordinating the filling and delivery of any resource orders made by the IC including engines, aircraft, tools, supplies, and meals. The IC will place all resource orders through the Dispatcher, and specify what is needed, when it is needed, and where it is needed. The Dispatcher will promptly determine if the resource orders can be filled or procured locally and notify the IC. If a resource order can not be filled locally, the Dispatcher will place the order with the Pueblo Dispatch Center Dispatcher. The Zone FMO or FMO at Quivira NWR will generally be able to assist with ordering resources from outside the area.

3. Initial Attack

All fires occurring on the Refuge and staffed with Service employees will be supervised by a qualified incident commander (IC). The IC will be responsible for all management aspects of the fire. If a qualified IC is not available, one will be ordered through Pueblo Dispatch Center. All resources will report to the IC (either in person or by radio) prior to deploying to the fire and upon arrival to the fire. The IC will be responsible for: (1) providing a size-up of the fire to dispatch as soon as possible; (2) determine the resources needed for the fire; and (3) advising dispatch of resource needs on the fire.

The IC will receive general suppression strategy from the Fire Management Plan, but appropriate tactics used to suppress the fire will be up to the IC to implement. Minimum impact tactics should be used whenever possible. The use of earth moving equipment for suppression activities (dozers, graders, plows) on the Refuge will not be permitted without the approval of the Refuge Manager.

4. Escaped Fires/Extended Attack

The IC will notify the Zone FMO whenever it appears a fire will escape initial attack efforts, escape Service lands, or when fire complexity will exceed the capabilities of command or operations. The Zone FMO will be responsible for coordinating extended attack operations including:

Completion of WFSA (Wildland Fire Situation Analysis) (Appendix F, page 9) for Refuge Manager.

Completion of Delegation of Authority (Appendix F, page 1) if needed.

Assignment or ordering of appropriate resources.

5. The IC will be responsible for mop-up and rehabilitation actions on Refuge fires. Refuge fires will be monitored until declared out.

J. Mop up Standards and Emergency Stabilization and Rehabilitation

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

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

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

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

- **Rehabilitation** is the use of appropriate rehabilitation techniques to improve natural resources as stipulated in approved refuge management plans and the repair or replacement of minor facilities damaged by the fire. Total "rehabilitation" of a burned area is not within the scope of the Emergency Rehabilitation funding. Emergency Rehabilitation funding can be use to begin the rehabilitation process if other funding is committed to continue the rehabilitation

throughout the life of the project (beyond the initial 3 years of Emergency Rehabilitation funding). Major facilities are repaired or replaced through supplemental appropriations of other funding

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

K. Records and Reports

The IC will complete a DI-1202 Fire Report as well as Crew Time Reports for all personnel assigned to the fire, and return those documents to the Supervisory Range Technician . The IC should include a list of all expenses and/or items lost on the fire and a list of personnel assignments on the DI-1202. The Supervisory Range Technician will enter all data into the FMIS computer database within 10 days from when the fire is declared out. The Supervisory Range Technician will also inform the timekeeper of all time and premium pay to be charged to the fire and ensure expended supplies are replaced.

IX. PRESCRIBED FIRE PROGRAM

Flint Hills Refuge has been using prescribed fire as a management tool since 1981. From 1985 through 1996, 9,808.5 acres have been treated with prescribed fire (153 prescribed fires). Prescribed fires averaged 64 acres. Records indicate that two prescribed fires became wildfires. These two escaped prescribed fires burned 324 acres of Refuge land and 1 acre of private land. The Refuge uses prescribed fire as a tool in two management areas - resource management and hazard fuel reduction.

A. Resource Management Prescribed Fire

Resource management prescribed burning is used to restore, create, and/or maintain a diversity of plant communities in order to restore and perpetuate native plant and wildlife species. The goals of resource management prescribed fire are:

1. Restoration of native grass species.

2. Reduction /control of non-native species (smooth brome).
3. Control of woody invasions into grasslands and moist soil management units (Cottonwoods, willows, sumac, cedar, etc.).
4. Periodic reduction of dense cattail growth in small wetlands.
5. Aid in control of noxious weeds (Johnson grass and sericea).
6. Assist the Refuge farming program by burning small grain stubble and burning for site preparation of grass seeding projects.
7. Maintain/rejuvenate nesting cover for waterfowl and other native birds.
8. Preserve and/or stimulate endangered species habitat.

Achieving many of the goals will require repeated burn cycles for an indefinite length of time. Burn frequency will vary from annually to 15 years dependent on management objectives, historic fire frequency, and funding.

B. Hazard Fuel Reduction Prescribed Fire

Flint Hills NWR may use hazard fuel reduction prescribed burns within or near Refuge development zones, sensitive resources, and boundary area to reduce the risk from wildfire damage. To the greatest extent possible, hazard reduction prescribed fires will only be used when they compliment resource management objectives.

The Faunal Road East FMU has a substantial amount of flood debris within it caused by flooding of the Neosho River. This flood debris consists of piles of tree trunks, limbs, and other debris. Since the Neosho River floods quite often, it is not cost effective to burn or mechanically remove this debris. Current management practice is to use a series of old roads in the area as fire breaks. These roads will have to be mowed at least once per year. Accurate maps of the area will be created for use by Refuge personnel and cooperators.

C. Planning

The Refuge Operations Specialist is responsible for supervising the development of resource management objectives for individual units. The Refuge staff will provide assistance in selection of the appropriate management tool needed to meet objectives. Prescribed fire is just one of a combination of tools available. If needed, the Zone FMO, Quivira NWR FMO, or regional prescribed fire specialist will be consulted for assistance in accomplishing the desired objectives.

A burn plan will be written that will document objectives and the plan of action for achieving them. The burn plan will follow the format in the FWS Fire

Management Handbook. The plan must also meet all training, personnel, equipment, and other requirements as specified in the FWS Fire Management Handbook. All burn plans will be reviewed by Refuge Operations Specialist, Refuge Manager, Zone ZMO, and regional office prior to implementation. Burn plans can be written by any qualified burn boss. Each burn plan will include or address appropriate contingency elements outlined in Section VAAA - C - 1.

The Supervisory Range Technician and fire crew will be responsible for preparing all fire equipment used for prescribed burning prior to February 15. Prescribed burn units may require preparation including; mow lines, disclines, blacklines, and public relations. Preparation of prescribed burn units will be handled on an individual basis with site preparation identified in the burn plan for that unit.

Prescribed burns can be conducted at any time of year depending on resource objectives and prescription; however, the normal prescribed fire season begins approximately February 20 and ends by May 7 due to bird nesting.

At Flint Hills NWR, most agricultural and resource management prescribed fires use timbered areas for fuel breaks because they are green/wet. However, the burn boss must be aware of cumulative effects of drought on these fuel models. The burn plan will state that if precipitation is significantly below normal, Palmer Drought Index indicates the area is in "mild drought" (-1 to -2 on scale), and/or Keech-Byrum Drought Index is greater than 300 that additional mitigation measures such as wider mow lines or disc lines will be installed before the burn commences. Flint Hills NWR is located in the Rocky Mountain Area. Prescribed fires cannot be ignited when the Rocky Mountain Area is in a fire danger preparedness level V and/or the National Preparedness level is V, unless approved by the Regional Fire Management Coordinator and the Rocky Mountian Area Coordination Group. In addition, the Refuge will not ignite prescribed fires when: (1) either adjacent counties or the State of Kansas has instituted burning bans; or (2) Palmer Drought Index is in the "extreme drought" (greater than -4) category and/or Ketch-Bram Drought Index is greater than 600.

Most agricultural burns (including wildlife habitat) are exempted from obtaining open burning permits in the State of Kansas. Regulations regarding open burning can be found in Appendix E, page 1. Procedures to follow for obtaining permits is located in Appendix E, pages 3-6.

Multiple prescribed fires may be initiated at the same time within the Refuge. A qualified Prescribed Fire Manager will coordinate multiple burns. The maximum number of simultaneous burns will depend upon the cumulative impacts of smoke on sensitive targets and the availability of the prescribed equipment and personnel. The Refuge may also assist private landowners with prescribed burning to improve the value of their land as wildlife habitat. A Wildlife Extension Agreement with a written provision for the use of prescribed fire must

be approved prior to implementing burns on private lands. Such assistance is subject to guidance provided within the Fire Management Handbook, private lands program policies, and funding and staffing restraints.

D. Training

The Refuge will at minimum meet policy requirements of the FWS prescribed fire qualification system. The Refuge FMO will be responsible for ensuring Refuge personnel maintain the qualifications necessary to implement the prescribed fire program. The Refuge will develop and maintain a minimum of two employees qualified at the burn boss III (RXB3) level. Additional training will be obtained for Refuge resource managers in fire effects and monitoring for prairie and woodland ecosystems in order to implement emerging Service ecosystem management strategies.

E. Complexity

Prescribed fires on Flint Hills NWR can range from low to high complexity as determined by the Region 6 Complexity Analysis Guide. The complexity of a prescribed fire is dependent upon fuels/vegetation, objectives, smoke management, values at risk, burn boundaries, size, and number of personnel involved. All prescribed fires currently are of low complexity. Moderate and high complexity burns will only be undertaken if a burn boss II (RXB2) or burn boss I (RXB1) and adequate resources are available.

F. Monitoring and Evaluation

Past monitoring and evaluation of prescribed fires has been limited due to funding and staffing limitations. Burn prescriptions and timing are based on past research (Bragg, Hulbert, and others) as well as staff and local knowledge. Pre-burn evaluation has been limited to general photographs and/or qualitative evaluation of fuel conditions and green up conditions. Burn day evaluations document weather (many times not on site), some fire behavior, and objective related measurements (visual) such as fuel consumed and scorch heights. Post burn evaluation has been limited to general photographs and qualitative estimates of native species response and effectiveness in achieving objectives.

Fire monitoring protocols for the Region or Service will be adopted by Flint Hills NWR when they are finalized. If the fire management program proposed by this Fire Management Plan is fully funded, a more quantitative monitoring program will be implemented. The FTE increase proposed in this plan will be used to establish vegetative monitoring in each of the habitat types being prescribed

burned. Species composition and percent cover will be the primary information used to determine if burn objectives are being met and to monitor long term vegetation responses.

G. Prescribed Fire Impacts

1. Environmental Impacts

Environmental impacts of the prescribed fire program have been discussed in previous sections of this Fire Management Plan.

2. Social and Economic Impacts

Social and economic impacts are as follows. Flint Hills NWR lies within Lyon and Coffey Counties which have a combined population of nearly 45,000. Emporia is the largest city (20 miles northwest of the Refuge) with a population of about 25,000. The main industry in the area is agriculture and most other industry is agricultural related.

Flint Hills NWR has an extensive cooperative farming program. Land is planted to row crops; and when harvested, some is left for waterfowl which reduces depredation on private land. In addition, some haying occurs on the Refuge. Both of these programs are viewed positively both socially and economically.

The majority of neighbors accept the fact the Flint Hills NWR first priority is management for waterfowl, and most have a general appreciation for the value of wildlife. However, these neighbors expect the land to be managed for wildlife and not ignored. If the Refuge land is ignored, noxious weeds and trees will invade and public opinions will become negative. However, if Refuge land is managed for the best interest of wildlife and habitat conditions are maintained or improved, these opinions become positive and wildlife benefits both on and off the Refuge. Prescribed fire is one of the tools necessary to manage Refuge lands.

The majority of recreational use occurring on Flint Hills NWR is centered around hunting, fishing, and bird watching. Hunters and bird watchers come from all over the United States to visit the Refuge. Annual visitation is estimated at 100,000 per year. Negative impact to the local economy could result if habitat conditions decline resulting in decreases in wildlife populations. The number of hunters and bird watchers traveling to the area could decrease; thus, reducing income for the local economy.

Fall prescribed fires, conducted for the first time in 1999, within Refuge moist soil units and wet meadow habitats, generated both positive and

negative comments. The vast majority of comments came from the hunting community and dealt with fall burns on hunting side of refuge. A few waterfowl hunters felt these prescribed fires consumed waterfowl foods, but most negative comments from waterfowl hunters dealt with the removal of cover utilized as waterfowl hunting blinds. When the reasons for fall burning (seeds of plants were not consumed by fire and were more readily available as a waterfowl food source; dealing with woody invasions; and that these areas are usually wet in spring), most of the waterfowl hunters understood why the Refuge was burning them in fall. Deer hunters comments were mostly positive as these burns opened up areas which allowed for increased visibility which leads to easier deer hunting. Additional public outreach may be needed for fall burning which should reduce the few negative comments that were received.

Escaped prescribed fires pose a threat to adjacent life and property. However, proper planning, prescriptions, use of qualified personnel, and continency planning will mitigate this threat. Temporary air quality impacts from smoke may occur, but are mitigated by small burn unit size, consultation with State and County air quality personnel, and generally fine fuels.

Public opinion to prescribed burning on Flint Hills NWR is generally positive. Most private landowners annually burn grassland and cropland; and thus, burning on the Refuge is not viewed negatively.

H. Reporting and Documentation

Individual prescribed burn plans will be the primary document used to record prescribed fire information. Burn plans document personnel, costs, fire behavior, weather, and burn critique information. Prescribed burns will also be recorded on Individual Fire Report (DI-1202) and enter into FMIS within 10 days of the fire being declared out.

X. WILDLAND FIRE USE FOR RESOURCE BENEFIT

Flint Hills NWR has chosen to suppress all wildland fires and will not use resource benefits to determine the appropriate management response for the following reasons:

G Rapid rates of spread in fine fuels would create high probability of escape to private land.

G Conflicting land uses within Refuge boundaries (ie. haying and farming)

XI. AIR QUALITY

Previously discussed in Section III. N. of this Fire Management Plan.

XII. FIRE RESEARCH AND MONITORING

The effects of fire on the Refuge's plants and animals needs to be better understood. Through applied research and careful application of fire, data collected can provide managers with a better understanding of the natural ecological effects of fire, and the information needed to refine prescriptions to meet resource objectives.

Fire behavior data will be collected on all fires occurring on Flint Hills NWR. Monitoring will comply with accepted scientific methods. This data, along with information gathered through research studies, will be used to improve the effectiveness of the fire management program. The Refuge will continue to encourage fire related research on FWS lands where research operations will not conflict with resource management objectives.

Fire research that is needed at Flint Hills Refuge includes:

Comprehensive assessment of the Refuge's hazard fuel, and the identification and prioritization of hazard fuel units.

Assessment of hazard fuel management options, and their effects upon Refuge resource objectives.

Assessment of long and short term fire effects in the Flint Hills with recommendations for using prescribed fire in conjunction with other management tools to meet resource objectives.

Assessment of fire effect monitoring needs and preparation of fire effect monitoring plan.

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 Section VIII. G. This section will deal with public safety.

Fire fronts in grass fuel models move rapidly and are dangerous. However, most of the grass units on Flint Hills NWR are small; therefore, entrapment by public users is not a big threat. A larger threat is neighbors who initiate their own suppression without proper training, equipment, or communication. The Refuge staff will attempt to keep the fire scene clear of people except for Service firefighters and cooperating volunteer fire departments.

Smoke from a Refuge fire could impair visibility on roads and become a hazard. During wildfires, the IC is responsible for managing traffic hazards from smoke. Smoke from prescribed fires is included in the prescribed burn plan and is the responsibility of the burn boss. Actions to manage smoke include: use of road guards and pilot car, signing, altering ignition techniques and sequence, halting ignition, suppressing the fire, and use of local law enforcement as traffic control.

Wildfires which might escape FWS land and spread to inhabited private property are also a concern. The IC is responsible for warning and evacuating the public from potentially dangerous situations. Additionally, the Refuge will use prescribed fire and other management techniques to manage hazard fuels in high risk areas.

XIV. PUBLIC INFORMATION AND EDUCATION

Informing the public is an important part of fire suppression, fire prevention, prescribed fire, and the FWS mission. Information and education are critical to gaining public support for the Refuge's fire management programs. There are several different aspects to this task.

A. Wildfire Suppression

During wildfire suppression, the IC is in charge of dispersal of information to the press and or public. The IC may delegate this responsibility if needed.

B. Prescribed Fire

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

the burns to the public. The following will be used to promote the prescribed fire program to the public:

Talks in local schools.

Attendance at local volunteer fire department meetings.

Including the prescribed fire message in Refuge interpretive publications and materials.

Personal contacts with bystanders during prescribed burns.

Follow prescriptions in burn plans to prevent escapes.

Developing a quantitative fire effects monitoring program and sharing the results with the public.

C. Fire Prevention

A Refuge Fire Prevention Plan will need to be written. However, a list of fire prevention measures can be found in part VIII. A. of this Fire Management Plan.

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 CRITIQUE AND PLAN REVIEW

The Fire Management Plan will be reviewed annually to ensure the fire program advances and evolves with the FWS and the Refuge's mission.

A. Wildfire

Wildfires will be critiqued by the IC. The Zone FMO will conduct formal critiques in the event of:

- Significant injury or accident.
- Significant property or resource damage.
- Significant safety concerns are raised
- An extended attack is necessary.

B. Prescribed Fire

Prescribed fires will be critiqued by the burn boss and documented in the prescribed burn plan. The Zone FMO will conduct formal critiques in the event of:

- Significant injury or accident.
- An escaped prescribed fire occurs.
- Significant safety concerns are raised.
- Smoke management problems occur.

XVII. CONSULTATION AND COORDINATION

All fire management program activities will be implemented in cooperation and coordination with the State of Kansas Department of Health and Environment, and rural fire protection districts. Other agencies and organizations will be consulted as needed.

General program consultation and coordination will be sought from Quivira NWR FMO, Zone FMO, the Regional Fire Management Coordinator, Regional Prescribed Fire Specialist, and National Interagency Fire Center (NIFC).

Copies of this Fire Management Plan will be sent to the following parties for comment:

Volunteer Rural Fire Protection Districts

- Lyon County District 5
- Coffey County District 1

State of Kansas

- Department of Health and Environment
- Department of Wildlife and Parks

US Fish & Wildlife Service

- Regional Office - Region 6
  - Regional Fire Management Coordinator
  - Prescribed Fire Specialist
- Ecological Service - Manhatten

The following were consulted in the development of this plan.

Phil Street, Region 6 Fire Management Coordinator

Carl Douhan, Prescribed Fire Specialist

Jim Kelton, Zone FMO Nebraska and Kansas

Morgan Beveridge - FMO Quivira NWR

Fire Management Plan - Ft. Niobrara - Valentine NWRC

Fire Management Plan - Charles M. Russell NWR

Fire Management Plan - Arrowwood NWR

APPENDIX A

APPENDIX B

APPENDIX C

KANSAS DEPARTMENT OF WILDLIFE AND PARKS

THREATENED AND ENDANGERED SPECIES KNOWN OR LIKELY TO OCCUR IN COFFEY COUNTY, KANSAS

American Burying Beetle *(Necrophorus americanus)* - **Endangered:** May occur in suitable grasslands and upland woodlands. **Endangered nationally.**

Bald Eagle *(Haliaeetus leucocephalus)* - **Endangered:** Known to occur as a regular winter resident along the Neosho River and John Redmond Reservoir and visitant at other impoundments where prey species is abundant. **Endangered nationally.**

Butterfly Mussel *(Ellipsaria lineolata)* - **Threatened:** An obligate riverine mussel preferring clean water with good current over gravel substrate. Currently has been documented in much reduced numbers in the Neosho River.

Common Map Turtle *(Graptemys geographica)* - **Threatened:** Semi-aquatic in nature, this turtle inhabits large streams, lakes, and oxbows having abundant basking sites, slow to moderate current, soft substrate with much aquatic vegetation, and tree-lined banks.

Eastern Spotted Skunk *(Spilogale putorius interrupta)* - **Threatened:** May occur at woodland edges, rocky brushy grasslands, old debris piles, or little used farm buildings.

Eskimo Curlew *(Numenius borealis)* - **Endangered:** Formerly a regular spring transient. May still occur as a rare seasonal transient. Prefers to feed on overgrazed grasslands and bare fields. **Endangered nationally.**

Flat Floater Mussel *(Anodonta suborbiculata)* - **Endangered:** This fresh water mussel may occur in permanent oxbow lakes along the Neosho River.

Fluted-shell Mussel *(Lasmigona costata)* - **Threatened:** An obligate riverine mussel dependent upon clean riffles comprised of small to medium size gravel with clean water having moderate current. Currently known only in the Neosho River. Critical habitat has been designated.

Least Tern *(Sterna antillarum)* - **Endangered:** Known to occur at wetlands and impoundments as an occasional transient or summer visitant. **Endangered nationally.**

Coffey County Threatened and Endangered Species - Page 2

Neosho Madtom *(Noturus placidus)* - **Threatened:** Known to occur at riffles and gravel bars in the main stem Neosho River. Critical habitat has been designated. **Threatened nationally.**

Neosho Mucket Mussel *(Lampsilis rafinesqueana)* - **Endangered:** An obligate riverine mussel preferring shallow clean-flowing water over a substrate of fine to medium size gravel. Currently known in much reduced numbers in the Neosho River. Critical habitat has been designated.

Ouachita Kidneyshell Mussel *(Ptychobranchus occidentalis)* - **Threatened:** An obligate riverine mussel requiring clean-flowing water over gravel substrate. May occur in the main stem Neosho River. Critical habitat has been designated.

Peregrine Falcon *(Falco peregrinus)* - **Endangered:** Known to occur as an occasional winter visitant at areas where waterfowl or other bird life concentrate. **Endangered nationally.**

Piping Plover *(Charadrius melodus)* - **Threatened:** Known to occur as a rare seasonal transient at wetlands and impoundments. Prefers sparsely vegetated shorelines. **Threatened nationally.**

Rabbitsfoot Mussel *(Quadrula cylindrica cylindrica)* - **Endangered:** A riverine mussel requiring clear streams with sandy gravel substrates and moderate currents. Currently known in the lower Neosho River. Critical habitat has been designated.

Redspot Chub *(Nocomis asper)* - **Threatened:** May occur in perennial tributaries of the Neosho River having deep pools and runs with gravel bottoms and some aquatic vegetation.

Snowy Plover *(Charadrius alexandrinus)* - **Threatened:** Known to occur as an occasional seasonal transient or summer visitant at wetlands and impoundments. Prefers bare to sparsely vegetated shorelines.

Western Fanshell Mussel *(Cyprogenia aberti)* - **Endangered:** An obligate riverine mussel found in mud, sand, gravel, and cobble substrate, generally associated with riffles with less than three feet of water depth. Historically occurred in the Neosho River.

Whit-faced Ibis *(Plegadis chihi)* - **Threatened:** Known to occur as an occasional seasonal transient or summer visitant at wetlands and impoundments.

Whooping Crane *(Grus americana)* - **Endangered:** Known to occur as an infrequent seasonal transient. **Endangered nationally.**

Effective January 1993

KANSAS DEPARTMENT OF WILDLIFE AND PARKS

THREATENED AND ENDANGERED SPECIES KNOWN OR LIKELY TO OCCUR IN LYON COUNTY, KANSAS

American Burying Beetle *(Necrophorus americanus)* - **Endangered:** May occur in suitable grasslands and upland woodlands. **Endangered nationally.**

Bald Eagle *(Haliaeetus leucocephalus)* - **Endangered:** Known to occur as a regular winter resident along the Neosho River and John Redmond Reservoir and visitant at other impoundments where prey species is abundant. **Endangered nationally.**

Eastern Spotted Skunk *(Spilogale putorius interrupta)* - **Threatened:** May occur at woodland edges, rocky brushy grasslands, old debris piles, or little used farm buildings.

Eskimo Curlew *(Numenius borealis)* - **Endangered:** Formerly a regular spring transient. May still occur as a rare seasonal transient. Prefers to feed on overgrazed grasslands and bare fields. **Endangered nationally.**

Fluted-shell Mussel *(Lasmigona costata)* - **Threatened:** An obligate riverine mussel dependent upon clean riffles comprised of small to medium size gravel with clean water having moderate current. Currently known only in the Neosho River. Critical habitat has been designated.

Least Tern *(Sterna antillarum)* - **Endangered:** Known to occur at wetlands and impoundments as an occasional transient or summer visitant. **Endangered nationally.**

Neosho Madtom *(Noturus placidus)* - **Threatened:** Known to occur at riffles and gravel bars in the main stem Neosho River. Critical habitat has been designated. **Threatened nationally.**

Neosho Mucket Mussel *(Lampsilis rafinesqueana)* - **Endangered:** An obligate riverine mussel preferring shallow clean-flowing water over a substrate of fine to medium size gravel. Currently known in much reduced numbers in the Neosho River. Critical habitat has been designated.

Ouachita Kidneyshell Mussel *(Ptychobranchus occidentalis)* - **Threatened:** An obligate

riverine mussel requiring clean-flowing water over gravel substrate. May occur in the main stem Neosho River. Critical habitat has been designated.

Peregrine Falcon *(Falco peregrinus)* - **Endangered:** Known to occur as an occasional winter visitant at areas where waterfowl or other bird life concentrate. **Endangered nationally.**

Lyon County Threatened and Endangered Species - Page 2

Piping Plover *(Charadrius melodus)* - **Threatened:** Known to occur as a rare seasonal transient at wetlands and impoundments. Prefers sparsely vegetated shorelines. **Threatened nationally.**

Redspot Chub *(Nocomis asper)* - **Threatened:** May occur in perennial tributaries of the Neosho River having deep pools and runs with gravel bottoms and some aquatic vegetation.

Snowy Plover *(Charadrius alexandrinus)* - **Threatened:** Known to occur as an occasional seasonal transient or summer visitant at wetlands and impoundments. Prefers bare to sparsely vegetated shorelines.

Western Fanshell Mussel *(Cyprogenia aberti)* - **Endangered:** An obligate riverine mussel found in mud, sand, gravel, and cobble substrate, generally associated with riffles with less than three feet of water depth. Historically occurred in the Neosho River.

Whit-faced Ibis *(Plegadis chihi)* - **Threatened:** Known to occur as an occasional seasonal transient or summer visitant at wetlands and impoundments.

Effective January 1993

CRITICAL HABITAT - BALD EAGLE

CRITICAL HABITAT - NEOSHO MADTOM

APPENDIX D - BIRDS OF FLINT HILLS NWR

SEASONS
ABUNDANCE

S - Spring (March - May)
S - Summer (June - August)
F - Fall (September - November)
W - Winter (December - February)

* Species which nest on the Refuge

SEASONAL

a - abundant
c - common
u - uncommon
o - occasional
r - rare
x - accidental

SPECIES	S	S	F	W
LOONS				
Common Loon	u	r	u	
GREBES				
* Pied-billed Grebe	c	o	c	o
Horned Grebe	o		o	
Eared Grebe	o		u	
Western Grebe			r	
Clark's Grebe	a		a	
PELICANS				
American White Pelican	c	o	c	
CORMORANTS				
* Double-crested Cormorant	c	u	c	

SPECIES	S	S	F	W
HERONS AND ALLIES				
American Bittern	u	o	u	
* Least Bittern	o	o	r	
* Great Blue Heron	c	c	c	u
Great Egret	u	u	u	
Snowy Egret	u	u	u	
Little Blue Heron	u	u	c	
Cattle Egret	o	o	o	
* Green-backed Heron	c	c	c	
Black-crowned Night-heron	u	o	u	
Yellow-crowned Night-heron	o	o	o	
White-faced Ibis	r		r	
SWANS				
Tundra Swan	r		r	r
GEESE				
Greater White-fronted Goose	c		c	u
Snow Goose	a		a	u
Ross's Goose			r	
* Canada Goose	a		a	u

SPECIES	S	S	F	W
DUCKS				
* Wood Duck	c	c	c	r
Green-winged Teal	a	o	a	o
American Black Duck	u		u	o
* Mallard	a	u	a	a
Northern Pintail	a	o	a	u
* Blue-winged Teal	a	r	a	
Cinnamon Teal	x		x	
Northern Shoveler	c	o	c	
Gadwall	c	r	c	r
Eurasian Widgeon	r			
American Widgeon	a	r	a	u
Canvasback	u	r	u	r
Redhead	c	r	c	r
Ring-necked Duck	c	r	c	r
Lesser Scaup	a	r	a	r
Oldsquaw	x		x	
Common Goldeneye	u		o	u
Bufflehead	u		u	o
Hooded Merganser	o		u	r
Common Merganser	a		c	a
Red-breasted Merganser	u		u	r
Ruddy Duck	c	r	c	r
VULTURES				
* Turkey Vulture	c	c	c	
OSPREY				
Osprey	o		o	
KITE				
Mississippi Kite	r	r		

SPECIES	S	S	F	W
HAWKS, EAGLES				
* Bald Eagle	c		c	c
Golden Eagle	o		o	o
* Northern Harrier	c	u	c	c
Sharp-shinned Hawk	u	r	u	u
Cooper's Hawk	o	o	u	o
Northern Goshawk				r
Red-shouldered Hawk	r	r	r	
Broad-winged Hawk	u	r	u	
Swainson's Hawk	u	o	u	
* Red-tailed Hawk	a	a	a	a
Ferruginous Hawk			r	r
Rough-legged Hawk	u		u	c
FALCONS				
* American Kestrel	c	c	c	c
Merlin	o		o	r
Peregrine Falcon	o		o	r
Prairie Falcon	u		u	u
GALLINACEOUS BIRDS				
* Turkey	u	u	u	u
* Greater Prairie Chicken	c	c	c	c
* Northern Bobwhite	a	a	a	a
* Ring-necked Pheasant	o	o	o	o

SPECIES	S	S	F	W
RAILS				
King Rail	o	r	o	
Virginia Rail	u	o	u	
Sora	u	u	c	
Purple Gallinule	r			
Common Moorhen	r		r	
American Coot	a	o	a	o
CRANES				
Sandhill Crane	r		r	
PLOVERS				
Black-bellied Plover	o		o	
American Golden Plover	u		o	
Snowy Plover	r			
Semipalmated Plover	o		o	
Piping Plover	r		r	
* Killdeer	a	a	a	u
AVOCETS				
American Avocet	u		u	

SPECIES	S	S	F	W
SANDPIPERS				
Greater Yellowlegs	u	o	u	
Lesser Yellowlegs	c	o	c	
Solitary Sandpiper	u		u	
Willet	o		o	
Spotted Sandpiper	c	u	c	
* Upland Sandpiper	a	a	c	
Long-billed Curlew	r		r	
Hudsonian Godwit	o		r	
Marbled Godwit	u		o	
Ruddy Turnstone	x			
Sanderling	r		r	
Semipalmated Sandpiper	c	r	c	
Western Sandpiper	u	r	o	
Least Sandpiper	c	o	c	
White-rumped Sandpiper	u	r	u	
Baird's Sandpiper	c	r	c	
Pectoral Sandpiper	u	o	u	
Dunlin	o	r	o	
Stilt Sandpiper	u	r	u	
Short-billed Dowitcher	x		x	
Long-billed Dowitcher	a	u	a	
Common Snipe	c	r	c	r
American Woodcock	r	r	r	
PHALAROPES				
Wilson's Phalarope	c	o	c	
JAEGERS				
Parasitic Jaeger			r	

SPECIES	S	S	F	W
GULLS				
Franklin's Gull	a		a	
Little Gull	r		r	
Bonaparte's Gull	o	r	r	
Ring-billed Gull	c	u	c	c
Herring Gull	u	r	u	u
Glaucous Gull				r
Great Black-backed Gull				r
Black-legged Kittiwake			r	
Thayer's Gull			a	
TERNS				
Caspian Tern	o		o	
Forster's Tern	u		u	
Least Tern	r		r	
Black Tern	c	u	u	
DOVES				
* Rock Dove	u	u	u	u
* Mourning Dove	a	a	a	o
CUCKOOS				
* Black-billed Cuckoo	c	u	u	
* Yellow-billed Cuckoo	c	c	c	
OWLS				
* Common Barn Owl	o	o	u	o
* Eastern Screech Owl	u	u	u	u
* Great Horned Owl	a	a	a	a
Snowy Owl				r
Burrowing Owl	o		o	
* Barred Owl	c	c	c	c
Long-eared Owl				u
Short-eared Owl	u		u	u
Northern Saw-whet Owl				o

SPECIES	S	S	F	W
GOATSUCKERS				
* Common Nighthawk	c	c	c	
* Chuck-will's-widow	u	u	u	
Whip-poor-will	u	o	u	
Poor-will	r	r	r	r
SWIFTS				
* Chimney Swift	a	a	a	
HUMMINGBIRDS				
* Ruby-throated Hummingbird	c	c	c	
KINGFISHERS				
* Belted Kingfisher	c	c	c	o
WOODPECKERS				
* Red-headed Woodpecker	c	c	c	u
* Red-bellied Woodpecker	a	a	a	a
Yellow-bellied Sapsucker	u		u	u
* Downy Woodpecker	a	a	a	a
* Hairy Woodpecker	c	c	c	c
* Northern Flicker	c	c	c	c
* Pileated Woodpecker	o	o	o	o

SPECIES	S	S	F	W
FLYCATCHERS				
Olive-sided Flycatcher	o		o	
* Eastern Wood-Pewee	c	c	c	
Yellow-bellied Flycatcher	r	r		
Acadian Flycatcher	u	u	u	
Alder Flycatcher	u		u	
Willow Flycatcher	u		u	
Least Flycatcher	u		u	
* Eastern Phoebe	c	c	c	
Say's Phoebe		r		
* Great Crested Flycatcher	c	c	c	
* Western Kingbird	c	c	u	
* Eastern Kingbird	a	a	a	
* Scissor-tailed Flycatcher	c	c	c	
LARKS				
* Horned Lark	a	c	a	a
SWALLOWS				
* Purple Martin	c	c	c	
* Tree Swallow	c	o	c	
* Northern Rough-winged Swallow	c	u	c	
Bank Swallow	u		u	
Cliff Swallow	u	u	u	
* Barn Swallow	a	a	a	
JAYS AND CROWS				
* Blue Jay	a	a	a	a
* American Crow	c	c	c	c
CHICKADEES				
* Black-capped Chickadee	a	a	a	a
* Tufted Titmouse	c	c	c	c
NUTHATCHES				
Red-breasted Nuthatch			o	u
* White-breasted Nuthatch	c	u	c	c

SPECIES	S	S	F	W
CREEPERS				
Brown Creeper	c		u	c
WRENS				
Rock Wren			r	
* Carolina Wren	u	u	u	r
* Bewick's Wren	u	u	u	
* House Wren	a	a	c	
Winter Wren				o
Sedge Wren	o		u	
Marsh Wren	u	u	u	r
THRUSHES, BLUEBIRDS, KINGLETS				
Golden-crowned Kinglet	c		c	u
Ruby-crowned Kinglet	u		c	o
* Bluegray Gnatcatcher	c	c	c	
* Eastern Bluebird	c	c	c	u
Townsend's Solitaire	o			o
Veery	u			
Gray-cheeked Thrush	u			
Swainson's Thrush	a		u	
Hermit Thrush	u		u	
* Wood Thrush	c	c	u	
* American Robin	a	a	a	u
THRASHERS, MOCKINGBIRD				
* Gray Catbird	c	c	c	
* Northern Mockingbird	c	c	c	u
* Brown Thrasher	c	a	a	r
PIPITS				
Water Pipit	c		c	
Sprague's Pipit	o		o	

SPECIES	S	S	F	W
WAXWINGS				
Cedar Waxwing	c		u	u
Bohemian Waxwing				r
SHRIKES				
Northern Shrike				r
* Loggerhead Shrike	c	c	c	c
STARLINGS				
* European Starling	a	a	a	a
VIREOS				
White-eyed Vireo	u	u	o	
* Bell's Vireo	c	c	c	
Solitary Vireo	u		u	
Yellow-throated Vireo	o		o	
* Warbling Vireo	c	c	c	
Philadelphia Vireo	u		o	
* Red-eyed Vireo	c	u	c	

SPECIES	S	S	F	W
WARBLERS				
Blue-winged Warbler	r		r	
Tennessee Warbler	c		u	
Orange-crowned Warbler	a		a	r
Nashville Warbler	c		c	
Northern Parula	u	r	u	
* Yellow Warbler	c	u	c	
Chestnut-sided Warbler	u		u	
Magnolia Warbler	u		o	
Cape May Warbler	r			
Black-throated Blue Warbler	r			
Yellow-rumped Warbler	a		a	r
Black-throated Green Warbler	u		o	
Blackburnian Warbler	u		o	
Yellow-throated Warbler	x			
Palm Warbler	r			r
Bay-breasted Warbler	o		o	
Blackpoll Warbler	u		u	
Cerulean Warbler	u			
Black-and-white Warbler	u		u	
American Redstart	c	r	o	
* Prothonotary Warbler	o	r	o	
Worm-eating Warbler	x			
Ovenbird	u		u	
Northern Waterthrush	u		o	
* Louisiana Waterthrush	o		u	
* Kentucky Warbler	u		o	
Mourning Warbler	u		c	
* Common Yellowthroat	a	c	c	
Wilson's Warbler	u		u	
Canada Warbler	r			
Yellow-breasted Chat	o	r	r	

SPECIES	S	S	F	W
TANAGERS				
Summer Tanager	o		o	
Scarlet Tanager	r		r	
GROSBEAKS/BUNTINGS				
* Northern Cardinal	c	c	c	c
Evening Grosbeak				r
* Rose-breasted Grosbeak	o	o	o	
* Blue Grosbeak	u	u	o	
Lazuli Bunting	r			
* Indigo Bunting	c	c	c	
* Painted Bunting	o	o	r	
* Dickcissel	c	c	c	

SPECIES	S	S	F	W
TOWHEES AND SPARROWS				
* Eastern Towhee	u	u	u	u
Spotted Towhee	u		u	u
American Tree Sparrow	a		a	a
Chipping Sparrow	c		c	
Clay-colored Sparrow	u		u	
* Field Sparrow	c	u	c	r
Vesper Sparrow	c		c	
* Lark Sparrow	c	c	u	
Lark Bunting	o			
Savannah Sparrow	c		c	
* Grasshopper Sparrow	c	c	c	
* Henslow's Sparrow	r	r	r	
LeConte's Sparrow	u		u	x
Sharp-tailed Sparrow		r		
Fox Sparrow	u		u	u
Song Sparrow	c		c	c
Lincoln's Sparrow	c		c	o
Swamp Sparrow	u		u	r
White-throated Sparrow	c		c	u
White-crowned Sparrow	c		c	c
Harris' Sparrow	a		a	a
Dark-eyed Junco	a		c	a
Lapland Longspur	c		c	a
Smith's Longspur	o		r	r
Chestnut-collared Longspur	r		r	
Snow Bunting				r

SPECIES	S	S	F	W
BLACKBIRDS AND ORIOLES				
Bobolink	o		r	
* Red-winged Blackbird	a	a	a	a
* Eastern Meadowlark	a	a	a	a
Western Meadowlark	u	o	o	u
Yellow-throated Blackbird	u		u	
Rusty Blackbird	u		u	u
Brewer's Blackbird	c		c	c
* Great-tailed Grackle	r		r	
* Common Grackle	a	a	a	u
* Brown-headed Cowbird	a	c	a	c
* Orchard Oriole	c	c	u	
* Northern Oriole	a	a	u	
FINCHES				
Common Redpoll				r
Purple Finch	u		u	u
Pine Siskin	o	r	o	u
* American Goldfinch	c	c	c	a
Red Crossbill				r
SPARROW				
* House Sparrow	a	a	a	a

APPENDIX E - KANSAS STATE
OPEN BURNING REGULATIONS

PAGE 2 BURNING REGS

COFFEY COUNTY OPEN BURNING EXEMPTION

LYON COUNTY OPEN BURNING EXEMPTION

PAGE 3 LYON CO PERMIT

APPENDIX F - PRE-ATTACK PLAN
DELEGATION OF AUTHORITY

Flint Hills National Wildlife Refuge
Hartford, Kansas

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

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

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

My specific considerations for management of this fire are:

1. Ensure the safety of firefighters, visitors, and neighbors.

2. Protect private and refuge property to the extent possible.

3. Minimize damage to environmental resources

4. Key resource considerations are: protecting rare, threatened, and endangered species; preserving as much wildlife habitat as possible; avoiding wildlife entrapment situations; and limiting degradation of the Complex's aesthetic values.

5. Restrictions for suppression actions are no earthmoving equipment (dozers, discs, plows, graders) without approval of the Refuge Manager.

6. Manage the fire cost-effectively for the values at risk.

7. Provide training opportunities for U. S. Fish and Wildlife personnel is requested to strengthen our organizational capabilities.

(signed)

Jerre Gamble
Project Leader
(date)

COMMUNICATION FREQUENCIES

VHF RADIO

OWNER	CHANNEL	RECEIVE	TRANSMIT
Flint Hills NWR	1	164.625	164.625
Lyon Co. Distr. 5	2	154.355	154.355
NOAA Wx Radio	3	162.475	N.A.
Corps of Engineers	4	163.4375	163.4375
Olpe VFD	5	154.175	154.175

UHF RADIO

OWNER	CHANNEL	RECEIVE	TRANSMIT	RX (PL)	TX (PL)
Emporia - Lyon Co. Fire	1	453.775	458.775	5A	5A
Emporia Fire TA	2	453.775	453.775	5A	5A
Lebo Fire	3	453.675	458.675	3Z	4Z

OWNER	CHANNEL	RECEIVE	TRANSMIT	RX (PL)	TX (PL)
Burlington / Gridley Fire	4	453.675	458.675	3Z	3Z
Lebo/Burlington Gridley Fire TA	5	453.675	453.675	3Z	3Z
Greenwood Co. Fire	6	453.200	453.200	C5	C5
Greenwood Co. Fire TA	7	453.200	453.200	C5	C5

OWNER	CHANNEL	RECEIVE	TRANSMIT	RX (PL)	TX (PL)
Reading Fire	8	453.350	458.350	67.0	67.0
Reading Fire TA	9	453.350	453.350	67.0	67.0
Lyon Co. Sheriff Office	10	453.400	458.400	5A	5A
Coffey Co. Sheriff Office North	11	453.300	458.300	4B	6A
Coffey Co. Sheriff Office South	12	453.300	458.300	4B	4B

TA = Talk Around PL = Private Line

MEMORANDUM OF UNDERSTANDING

COFFEY COUNTY DISTRICT 1

MEMORANDUM OF UNDERSTANDING

LYON COUNTY DISTRICT 5

ESCAPED FIRE SITUATION ANALYSIS (EFSA)

TO DE DRAFTED AT A LATER DATE

FLINT HILLS NWR - FIRE MANAGEMENT UNITS

FAUNAL ROAD EAST FMU - PRESCRIBED FIRE vs SUPPRESSION AREAS

NEOSHO RIVER SOUTH FMU - PRESCRIBED FIRE vs SUPPRESSION AREAS

NEOSHO RIVER NORTH FMU - PRESCRIBED FIRE vs SUPPRESSION AREAS

APPENDIX G - STEP-UP PLAN

The following step-up plan will guide fire preparedness operations and use of emergency preparedness funding. The plan utilizes the National Weather Service **Rangeland Fire Index** as a fire danger rating; but will be revised to the National Fire Danger Rating System - Burning Index when the Weather Information Management System can calculate BI's for the Refuge.

STAFFING CLASS MATRIX

Staffing Class I - Rangeland Fire Index = **LOW**

* Primary engine staged (un-staffed) at Flint Hills NWR HQ

Staffing Class II - Rangeland Fire Index = **MEDIUM**

* Primary engine staged (un-staffed) at Flint Hills NWR HQ

Staffing Class III - Rangeland Fire Index = **HIGH**

* All Staffing Class II actions plus:
* Step-up to Staffing Class IV if lightening activity is predicted or during periods of high public use.

Staffing Class IV - Rangeland Fire Index = **VERY HIGH**

* All Staffing Class III actions plus:
* Manager opens emergency preparedness account and notifies RFMC
* Staff firefighters may be assigned to engine or detection patrol
* Tour of Duty may be changed at Manager discretion
* Notify Volunteer Fire Departments that Refuge crew is on standby
* Fire crews restricted to fires on Refuge and within 2 mile initial attack zone.

Staffing Class V - Rangeland Fire Index = **EXTREME**

* All Staffing Class IV actions plus:
* Non-fire paid personnel may be placed on standby

* Notify Volunteer Fire Departments that Refuge tanker is on standby

FLINT HILLS NWR FIRE STEP-UP PLAN

Lightning Activity	**Public Use**	**Rangeland Fire Index**				
		L	**M**	**H**	**VH**	**EX**
None	Low	Class I	Class I	Class II	Class III	Class IV
Probable	High	Class III	Class III	Class IV	Class V	Class V

PREPAREDNESS ACTIONS	**STAFFING CLASS**				
	I	**II**	**III**	**IV**	**V**
FIRE STAFF					
Maintain Radio Contact	X	X	X	X	X
Carry PPE while on duty, dress in nomex & boots			X	X	X
Maintain response time of: (minutes)	30	30	20	5	5
Remain with assigned engine					X
Monitor volunteer fire department radio frequency				X	X
Tours of duty changed at Manager's discretion				X	X
REFUGE STAFF FIREFIGHTERS					
Carry PPE while on duty				X	X
May be assigned to an engine or detection patrol				X	X
Tour of duty changed at Manager's discretion				X	X
FIRE EQUIPMENT					
Type 6 Engine in ready status*	X	X	X	X	X
Type 3 Water Tender (Hartford VFD) on standby					X
MISCELLANEOUS EMERGENCY PREPAREDNESS ACTIONS					
Detection patrol following lightning activity and around high public use areas				X	X

PREPAREDNESS ACTIONS	STAFFING CLASS				
	I	II	III	IV	V
Increase one staffing class if lightning activity is probable			X	X	X
RFMC notified, emergency preparedness account opened				X	X
Notify Pueblo Dispatch of staffing class and status				X	X
Notify VFD dispatch that Refuge crew is on standby				X	X
Refuge fire crews restricted to fires on Refuge or within 2 mile attack zone				X	X
Notify Zone FMO of Staffing Class				X	X

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

Step-up plan does not apply when refuge resources are assigned to fires. Resources assigned to fires may prevent some staffing actions. Team managers should use common sense when determining to fill behind dispatched resources.

APPENDIX H - FIRE DISPATCH PLAN

FLINT HILLS NATIONAL WILDLIFE REFUGE

Upon report of smoke or fire:

I Record as much information as possible from the caller below.

II. Maintain log of all radio and telephone communication (log form attached).

Initial information from reporting party:

A. Name:
B. Callback number:

C. Location of smoke or fire:

D. Access to fire:

E. Color of smoke:

F. Size of fire:

G. Type of vegetation:

H. Fire behavior:

I. Improvements threatened:

J. Anyone on the fire:

K. See anyone in area or vehicles leaving area:

III. Check map for ownership/protection status.

IV. If fire is on refuge or within 2 mile initial attack zone:

A. After regular working hours use **Fire Personnel Directory** for contacting Refuge staff. Start with Refuge Manager and work down list till someone is contacted.

B. During regular working hours:

1. Notify Refuge Manager.

2. Utilize office automation clerk if available or use other refuge staff as dispatcher.

3. Select and dispatch an Incident Commander (should be qualified IC or the highest qualified firefighter available).

4. IC to follow procedures outlined in Appendix H, page 29.

5. Dispatch appropriate resources. Do not dispatch unqualified resources or incidental firefighters without approval of Refuge Manager.

6. Notify Lyon County District 5 VFD (316) 392- 5521 or 911 and/or Coffey County District 1 (316) 364-2300 or 911 depending on fire location. Also advise them of Refuge response and resources sent from Refuge.

7. If fire danger is high, request a spot weather forecast for the next 24 hours from National Weather Service - Topeka (913) 234-2592. Ask them to use their best information and that we will call with on site weather observations as soon as possible. The forecast should include any predicted changes in temperature, humidity, wind direction, wind speed, barometric pressure, precipitation, and lightning activity.

8. If fire is threatening public use areas or direct route to fire is through a public use area, dispatch law enforcement personnel (refuge, state, or county) to evacuate and close area.

9. Remain on duty and dispatch further assistance as requested by IC.

C. If fire is on Refuge but involves a structure:

1. Contact Lyon County District 5 Dispatch (392-5521 or 911) and ask for assistance.

2. Structural firefighting is not the functional responsibility of FWS; however, refuge personnel may assist in structure protection on an

emergency basis to save human life. Refuge personnel may assist in protecting wildlands around the structure when such actions can be accomplished safely. Water or retardant chemicals may be applied to a structure from the outside in an effort to safeguard it from an advancing wildfire.

D. If there is a hazardous material spill on or near the refuge:

1. Contact Lyon County Sheriff (316) 342-5545 (or 911) or Coffey County Sheriff (316) 364-2123 (or 911) and have them dispatch appropriate resources.

2. Clear area of all people.

3. Dispatch law enforcement (refuge, county, state) personnel to assist in keeping area clear.

4. Close area to public use if necessary.

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

A. If mutual aid request from Lyon County District 5 or Coffey County District 1:

1. Take resource order information:

- Nature of incident.
- Location and access to fire.
- What type and quantity of resources are needed.
- When they are to report.
- Radio Frequency and IC/Officer in Charge call sign

2. Inform cooperator that you will check what is available and call back ASAP (must be within 1 hour).

3. Notify Refuge Manager and get approval for dispatch. Refuge staff limited to fires within 2 mile protection zone during Staffing Class IV and V.

4. Dispatch resources requested and approved by Refuge Manager. Additional resources can be obtained from nearby refuges if needed and available (see regional dispatch plan in back of Fire Management Handbook).

5. Notify cooperator of what was dispatched and an estimated time of arrival.

6. Coordinate the filling of additional resource orders from the Cooperator.

7. Remain on duty until relieved by Task Force Leader.

B. If refuge first agency contacted and fire not on or threatening refuge:

1. Notify appropriate county dispatch.

2. Dispatch resources if approved by appropriate county dispatch and Refuge Manager.

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

C. Interagency dispatch request.

1. Take resource order information:

- Nature of incident.
- What type and quantity of resources are needed.
- Reporting location.
- Specific location of the incident.
- Reporting time.
- Travel instructions.
- Resource order number and request number.
- Agency responsible for incident.

2. Inform cooperator that you will check what is available and call back ASAP (must be within 1 hour).

3. Notify Refuge Manager and get approval for dispatch.

4. Dispatch resources requested and approved by Refuge Manager. Additional resources can be obtained from nearby refuges if needed and available (see also Region 6 Wildland Fire Mobilization Plan).

5. Notify cooperator of what was dispatched and an estimated time of arrival at reporting location.

FIRE LOG

TIME	TX	RX	TRANSMISSION

FILLING RESOURCE ORDERS

1. Determine from the IC:

    a. Exactly which type of resources are needed.

    b. How many of each type of resources are needed.

    c. When and where should the resources be delivered.

2. Begin locating and ordering resources from the closest sources.

    a. Local cooperators.

    b. Local vendors and/or contractors.

    c. Neighboring USFWS refuges (Region 6 Fire Mobilization Plan).

    d. Pueblo Dispatch Center - Pueblo, CO.

3. When notified that an order has been filled and that resources have been dispatched:

    a. Record info - source, order number, eta, etc.

    b. Notify IC of ETA

    c. Track resources to make sure they arrive. If they do not meet their ETA, notify the source dispatch office.

4. When resources have been released or demobed:

    a. Notify source dispatch office and determine if they are sent home or reassigned.

    b. Make necessary travel arrangements including lodging and food.

c. Notify home unit of ETA.

FIRE DIRECTORY
FLINT HILLS NWR
FIRE PERSONNEL DIRECTORY - 1998

FIRE REPORTING OR ASSISTANCE REQUEST:

NAME	**WORK PHONE**	**HOME PHONE**
1. Jerre Gamble - Project Leader	(316) 392-5553 ext. 102	(316) 475-3940
2. Terry Kostinec - Refuge Operations Specialist	392-5553 ext. 103	(316) 342-0977
	Cellular	(316) 344-1384
3. Rich Sterry - Supervisory Range Technician	392-5553 ext. 106	(316) 364-3441
	Cellular	(316) 344-4485
4. Lyle Hancock - Biological Technician	392-5553 ext. 105	(316) 392-5655

WHEN A FIRE IS REPORTED, OBTAIN THE FOLLOWING INFORMATION:

PERSON REPORTING THE FIRE.
LOCATION OF THE FIRE.
BEST ACCESS TO FIRE.
VALUES THREATENED.
LANDOWNER - PROTECTION STATUS.
SIZE.
SUSPECTED CAUSE.

STAFF FIREFIGHTERS - FLINT HILLS NWR:

OFFICE: 316-392-5553 CELL PHONE # (316) 341-0202

RICH STERRY	316-364-3441
MATT FREIS	316-364-2967
T.J. COOPER	913-242-6140
TERRY KOSTINEC	316-342-0977
JERRE GAMBLE	316-475-3940

STAFF FIREFIGHTERS - MARAIS DES CYGNES NWR

BILL PETERSON 913-352-8956 CELL PHONE # (316) 223-9361

SUPPORT STAFF: (SUPPORT SERVICES AND LIMITED SUPPRESSION CAPABILITY ON REFUGE FIRES)

* LYLE HANCOCK	316-392-5655
* RON THUMA	316-392-5822
GERALD LAWS	316-392-5837
EVELYN BURTON	316-392-5647
JIM MINNERATH	********** (NO HOME PHONE)

* MEMBER OF LYON COUNTY DISTRICT 5 VFD

FLINT HILLS NWR ENGINE PLACEMENT:

HEADQUARTERS	2 TYPE 6X ENGINES
LYON CO. DISTR. 5 HARTFORD	1 1000 GALL. WATER TENDER

WILDFIRE QUALIFIED

NAME	QUALIFIED AS:
Jerre Gamble	ENOP (Engine Operator) FFT2 (Firefighter Type 2)
Terry Kostinec	ENGB (Engine Boss) ENOP (Engine Operator) FFT1 (Firefighter Type 1) FFT2 (Firefighter Type 2)
Rich Sterry	ICT4 (Incident Commander Type 4)

	ENGB (Engine Boss) ENOP (Engine Operator) FFT1 (Firefighter Type 1) FFT2 (Firefighter Type 2)
Bill Peterson	ENOP (Engine Operator) FFT2 (Firefighter Type 2)
Matt Freis	FFT2 (Firefighter Type 2)
T.J. Cooper	FFT2 (Firefighter Type 2)

PRESCRIBED FIRE QUALIFIED

NAME	**QUALIFIED AS:**
Jerre Gamble	ENOP (Engine Operator) FFT2 (Firefighter Type 2)
Terry Kostinec	RXB3 (Burn Boss Type 3) RXI2 (Ignition Specialist Type 2) ENGB (Engine Boss) ENOP (Engine Operator) FFT1 (Firefighter Type 1) FFT2 (Firefighter Type 2)

PRESCRIBED FIRE QUALIFIED (Cont.)

NAME	**QUALIFIED AS:**
Rich Sterry	RXB3 (Burn Boss Type 3) ENGB (Engine Boss) ENOP (Engine Operator) FFT1 (Firefighter Type 1) FFT2 (Firefighter Type 2)
Bill Peterson	ENOP (Engine Operator) FFT2 (Firefighter Type 2)
Matt Freis	FFT2 (Firefighter Type 2)
T.J. Cooper	FFT2 (Firefighter Type 2)
Gerald Laws	ENOP (Engine Operator)
Lyle Hancock	ENOP (Engine Operator)

RESPONSE ZONE - FLINT HILLS NWR

FIRE DIRECTORY

Cooperators:

Lyon County District 5	**316-392-5521**
Fire Chief; Troy Friend	316-342-7643
Coffey County District 1	**316-364-2305**
Fire Chief; Mike Feiner	316-364-2961
Other area fire departments	
Emporia	316-343-4230
Fire Chief; James Woydziak	316-343-6370
Pueblo Dispatch Center, Pueblo,CO	**719-545-1454**
Kirwin NWR	**913-543-6673**
Refuge Manager; Bill Schaff	913-543-3088 (Home)
Quivira NWR	**316-486-2393**
FMO; Morgan Beveridge	316-664-5445 (Home)
Refuge Manager: Dave Hilley	316-486-2389 (Home)
Region 6 Fire Management Office (Denver)	**303-236-8145**
RFMC; Phil Street	**Ext. 676**
	303-933-6851 (Home)
Rx Fire Spec.; Carl Douhan	**Ext. 618**
	303-978-1349 (Home)
Region 6 Zone FMO's	
NE & KS; James Kelton	**402-376-3789 (Work)**
	402-376-1132 (Home)
ND & SD; Brian McManus	**701-768-2548 (Work)**
	701-263-4948 (Home)

MT, WY, & UT; Mike Granger	**406-538-8706** **Ext. 224 (Work)** 406-538-5286 (Home)

FWS National Fire Management Coordinator

Roger Erb	208-387-5596 (Work) 208-853-0529 (Home)
Carlos Mendiola	208-387-5502 (Work) 208-368-0354 (Home)

DISPATCHER RESOURCE LIST		
RESPONSE TIME	RESOURCE	AGENCY/LOCATION
Less than 0.5 hour	1 - Type 6X Engine (1995 Grass Truck) - 200 gallon tank (BB4 pump) - 400' 1.5" hose - 100' 1" reel hose - 25' 2.5" hose - Chainsaw - Floto pump - Foam	Flint Hills Refuge HQ Hartford
	1 - Type 6X Engine (1997 Grass Truck) - 200 gallon tank (BB4 pump) - 600' 1.5" hose - 300' 1" hose - 100' 1" reel hose - 350' 3/4" garden hose - 25' 2.5" hose - Foam	Flint Hills Refuge HQ Hartford
	1 - Type 3 Tender (Unit 57) (Refuge) - 1000 gallon tank (BB4 pump) - 150' 1.5" hose - 150' 1" reel hose - 75' 2.5" hose - 2100 gallon porta-tank	Lyon County District 5 Hartford
	1 - Grass Truck - (Unit 58 - Chevy) - 350 gallon tank - 50' 1.5" hose - 100' 1" reel hose	Lyon County District 5 Hartford

DISPATCHER RESOURCE LIST		
Less than 0.5 hr	1- Grass Truck (Unit 56) - 300' 2.5" hose - 200' 1" hose - Generator and lights - SCBA (3 sets)	Lyon County District 5 Hartford
	1 - Grass Truck (Unit 53 - Jeep) - 200 gallon tank - 100' 1.5" hose - 250' 1" hose - Foam	Lyon County District 5 Hartford
	1 - Structure Engine (Unit 51) - 1000 gpm pump - 800' 1.5" hose - 1000' 2.5" hose	Lyon County District 5 Hartford
	1 - Tender (Unit 65) - 2000 gallon tank - 150' 1.5" hose - 150' 2.5" hose - 2100 gallon porta-tank	Lyon County District 5 Neosho Rapids
	1- Structure Engine (Unit 66) - 1000 gpm pump - 500' 1.5" hose - 800' 2.5" hose	Lyon County District 5 Neosho Rapids
	1 - Grass Truck (Unit 69) - 350 gallon tank - 25' 1.5" hose - 100' 1" reel hose	Lyon County District 5 Neosho Rapids

DISPATCHER RESOURCE LIST		
	1 - Mini pumper (Unit 62) - 300 gallon tank - 300 gpm pump - 100' 1.5" hose - 150' 1" reel hose - 350' 2.5" hose - foam compatible w/ 10 gal. foam - Chainsaw	Lyon County District 5 Neosho Rapids
	2 - Grass Trucks (Unit 74 and Unit 70) - 250 gallon tanks (each)	Lyon County District 5 Jacobs Creek

Note: awaiting information from Coffey County District 5.

LOCAL SERVICES

Drinks, Snacks, and Groceries

Hartford Market	217 Commercial St.	Hartford	392-5511
Hoovers Thriftway	314 Cross St.	Burlington	364-5444
Dillion Stores	902 E. 12th	Emporia	343-2360
Dillion Stores	1312 Industrial Rd.	Emporia	343-7321
Food-4-Less	1602 Industrial Rd.	Emporia	343-7848

Convenience Stores

Casey's	129 N. Main	New Strawn	364-5808
Casey's General Store	2 E. Broadway St.	Lebo	256-6897
Casey's General Store	1006 N. 4th St.	Burlington	364-5434
Country Mart	701 S. 4th St.	Burlington	364-2901
U-Do Stores	224 S. 4th St.	Burlington	364-8435

Meals, Take-out & Restaurant

Love's	Commercial St.	Hartford	392-5548
Longhorn Steakhouse	320 Neosho St.	Burlington	364-2012
Dairy Queen	324 Cross St.	Burlington	364-8966
Pizza Hut	901 N. 4th St.	Burlington	364-8375
Sonic Drive-In	1105 N. 4th St.	Burlington	364-8622
Subway	Hwy. 75	Burlington	364-8585

Emporia - Many Places

Lodging

Best Western	3181 W. US Hwy. 50	Emporia	342-7587
Comfort Inn	2511 W. 18th Ave.	Emporia	343-7750
Days Inn	3032 W. US Hwy. 50	Emporia	342-1787
Holiday Inn	2700 W. 18th Ave.	Emporia	343-2200
Hospitality House	3181 W. US Hwy. 50	Emporia	342-7587
Motel 6	2630 W 18th Ave.	Emporia	343-1240
Quality Inn	3021 W. Hwy 50	Emporia	342-3770

Ramada Inn	1839 Merchant St.	Emporia	342-8850
Ranch House Motel	4215 W. US Hwy. 50	Emporia	343-7920
Rocking R Motel	N. Hwy 75	Burlington	364-5321
Super 8 Motel	2913 W. US Hwy. 50	Emporia	342-7567
Twilight Motel	614 S. 4th St.	Burlington	364-5391
Universal Inn	100 Bree Dr.	Lebo	256-6395

Fuel Delivery

Brecheisen Oil Co.	Plum & Commercial	Hartford	392-5577

Tire Service

Brecheisen Oil Co.	Plum & Commercial	Hartford	392-5577
Express Tire & Auto LLC	806 E. 12 St.	Emporia	343-9994
Flint Hills Tire Inc.	2715 W 15th Ave.	Emporia	342-8165

Mechanics

Brecheisen Oil Co.	Plum & Commercial	Hartford	392-5577
Emporia Motors Inc.	2815 W. Hwy 50	Emporia	343-6723
John North Ford Inc.	3002 W. Hwy 50	Emporia	343-1700
Western Motor	2910 W. Hwy 50	Emporia	343-1155

Small Engine Parts & Repair

Brecheisen Oil Co.	Plum & Commercial	Hartford	392-5577
S & L Rental Sales & Serv.	2026 W 6th	Emporia	342-6582

Hardware

Bill's Hardware & Electric	Commercial	Hartford	392-5573
Bluestem Farm/Ranch Supp.	2611 W US Hwy 50	Emporia	342-5502
Chrisman Hardware	1125 N 4th St.	Burlington	364-5542
Pioneer True Value	101 N. 3rd St.	Burlington	364-8441
Waters True Value Hardw.	801 6th Ave.	Emporia	343-2800

Airports

Coffey County Airport	1899 Us Hwy 75	Burlington	364-5346
Emporia Airport	1005 Road 120	Emporia	342-3598

Medical Services

Coffey County Hospital	801 N. 4th St.	Burlington	364-2121
Newman Memorial Co. Hos.	1201 W. 12th Ave	Emporia	343-6800

Ambulances

Coffey County Ambulance	801 N 4th	Burlington	364-5346
Lyon County Ambulance	118 E 5th Ave.	Emporia	342-5400

Sheriff Dept.

Coffey County Sheriff		Burlington	364-2123
Lyon County Sheriff	5th & Mechanic	Emporia	342-5545

State Patrol

Highway Patrol Office	Turnpike Interchange	Emporia	343-2067

ADJACENT LANDOWNERS

Coffey County
Lincoln S. Township

Atherly, Donald	364-2957
Barnes, Levi	
Baysinger, Dale A. Sr.	392-5880
Conkle, Ivan	256-6812
David, Constance L.	
Darbyshire, Ileene	
Elliot, Carl E.	392-5765
Freund, Carl R.	256-6735
Freund, Jack	256-6257
Gilkison, Orville H.	437-2968
Hock, Donald L.	
Jones, Evan C.	
Mark, James	342-5954
Metzler, Marie	364-5637
Miller, Glen	256-6595
Mulsow, Dale	392-5641
Newkirk, Haxel	
Rich, Edgar	364-8449
Ruf, David D. Jr.	
Samulson, Steven	343-6490
Sauder, Virginia	
Sayre, Merle	392-5730
Spielman, Kenneth	256-6406
Warren Farms Inc.	

Coffey Co.

Coffey County
Lincoln N. Township

Shaner, Marion	

Coffey County
Pleasant N. Township

Billings, Edward	364-8695
Cristy, Earl	
Crouch, William	392-5897
Gilkison, Orville H.	437-2968
Griffiths, Clifford	
Hammond, Clifford	
Evans, D.W.	256-6492
Herrick, Dorthy	
Jirak, Leonard	364-5552
Kramer, Janice	
McGrew, Mary	
Paxson, Geraldine	
Scoggin, Eugene	392-5790
Slead, Mildred.	
Tomaino, Vincent Jr.	
Truelove, Earl K.	392-5833
Truelove, Larry	392-5795
Wilson, Dean	392-5812
Wilson, Eula	
Wilson, Laurence	392-5829

Pleasant S. Township

Allen, Ida Lois
Fitch, Duane 913-733-2322
Theobald, W. Dorman
Thomsen, Floyd V. 364-5486
Wilson, Viola
White, Glen R.

ADJACENT LANDOWNERS

Lyon County
Jackson S. Township

Beemer, Fayetta	
Boosinger, Leona	342-7773
Buckle, Thomas W. & Ima	256-6628
Carlson, Betty	
Edwards, Larry	392-5632
Gilbert, Kathryn L.	
Hodges, Dennis	256-6668
Hodges, Velda F.	
Lambert, Marvin	
Owens, Rowena	
Pearson, Donald	342-5436
Peterson, Audrey	
Rhoads, James	
Rosenquist, George	342-8872
St. Bonnett, Charles	342-4286
Slaymaker, Ronald	342-6789
Wellnitz, Kevin	342-9431

Lyon County
Elmendaro E. Township

Herrick, Frederick	392-5533
Peterson, James R. & Jon A.	341-9139
Reimer, Lester D.	256-6433
Smith, Lloyd & Christina	475-3309
Walliser, James & Ruby	392-5649
Wilson, Eula	

RESIDENCES WITHIN ONE MILE OF FLINT HILLS NWR

Coffey County

Lincoln N. Township

Blue, Frank.....	Lebo	256-6514	T19S R14E Sec. 33
Combes, Gale.....	Lebo	256-6601	T19S R14E Sec. 32
Shaner, Arlene.....	Lebo		T19S R14E Sec. 32

Lincoln S. Township

Down, Clair.....	Lebo	256-6761	T20S R14E Sec. 05
Freund, Carl.....	Lebo	256-6735	T20S R14E Sec. 03
Wolf, Jim.....	Burlington	256-6171	T20S R14E Sec. 23

Pleasant N. Township (Jacobs Creek)

Bent, Bessie.....	Jacobs Creek	364-2090	T20S R14E Sec. 33
Billings, Edward.....	Jacobs Creek	364-8695	T20S R14E Sec. 33
Bond, Author.....	Jacobs Creek	364-5879	T20S R14E Sec. 33
Cartmell, R.O.....	Jacobs Creek	364-8095	T20S R14E Sec. 33
Casey, Ronald & Lana.....	Jacobs Creek	364-5141	T20S R14E Sec. 33
Connor, Jim & Nancy.....	Jacobs Creek	364-8965	T20S R14E Sec. 33
Denny, John.....	Jacobs Creek	364-2769	T20S R14E Sec. 33
Eddings, Michael.....	Jacobs Creek	364-2966	T20S R14E Sec. 33
Emmons, Terry.....	Jacobs Creek	364-2717	T20S R14E Sec. 33

Bent, Bessie.....	Jacobs Creek	364-2090	T20S R14E Sec. 33
Feltner, Mark.....	Jacobs Creek	364-2072	T20S R14E Sec. 33
Gannon, Elmer.....	Jacobs Creek	364-	T20S R14E Sec. 33

Gosney, Wayne.....	Jacobs Creek	364-2609	T20S R14E Sec. 33
Gosney, William.....	Jacobs Creek	364-2753	T20S R14E Sec. 33
Hand, Richard.....	Jacobs Creek	364-	T20S R14E Sec. 33
Harris, Mark.....	Jacobs Creek	364-	T20S R14E Sec. 33
Johnson, Joseph K.....	Jacobs Creek	364-8797	T20S R14E Sec. 33
Jirak, Leonard.....	Jacobs Creek	364-5552	T20S R14E Sec. 33
Lafferty, Dorothy.....	Jacobs Creek	364-8279	T20S R14E Sec. 33
Lane, Edward.....	Jacobs Creek	364-8374	T20S R14E Sec. 33
McPherson, Leroy.....	Jacobs Creek	364-2859	T20S R14E Sec. 33
Pearson, Ron.....	Jacobs Creek	364-2680	T20S R14E Sec. 33
Propst, Leroy.....	Jacobs Creek	364-	T20S R14E Sec. 33
Ricketts, Robert.....	Jacobs Creek	364-2471	T20S R14E Sec. 33
Sterling, Margaret.....	Jacobs Creek	364-5741	T20S R14E Sec. 33
Trent, Hardy.....	Jacobs Creek	364-5480	T20S R14E Sec. 33
Vaugh, William.....	Jacobs Creek	364-	T20S R14E Sec. 33
Wheeler, Thomas.....	Jacobs Creek	364-5812	T20S R14E Sec. 33
Wistrom, Rick.....	Jacobs Creek	364-5422	T20S R14E Sec. 33
Woods, Robert.....	Jacobs Creek	364-8598	T20S R14E Sec. 33

Pleasant N. Township

Gilligan, B.J.....	Hartford	392-5736	T20S R13E Sec. 35
Scoggin, Eugene.....	Hartford	392-5790	T20S R13E Sec. 23
Smith, Gary.....	Jacobs Creek	364-8380	T20S R14E Sec. 29
Truelove, Gary.....	Hartford	392-5828	T20S R13E Sec. 23
Truelove, Larry.....	Hartford	392-5795	T20S R13E Sec. 33
Wilson, Dean.....	Hartford	392-5812	T20S R13E Sec. 35
Wilson, Larry.....	Hartford	392-5829	T20S R14E Sec. 31
Wistrom, Larry.....	Jacobs Creek	364-2625	T20S R14E Sec. 29

Pleasant S. Township

Griffin, Norman.....	Burlington	364-8395	T21S R14E Sec. 04
Scoggin, Donald.....	Burlington	364-2084	T21S R14E Sec. 04
Wilcox, Donald.....	Burlington	364-2488	T21S R14E Sec. 03

RESIDENCES WITHIN ONE MILE OF FLINT HILLS NWR

Lyon County

Jackson S. Township

Beemer, E.C.....	Hartford	392-5692	T20S R13E Sec. 08
Beemer, Richard & Jackie.....	Hartford	392-5784	T20S R13E Sec. 05
Carson, Richard.....	Neosho Rapids	392-5693	T20S R13E Sec. 06
Dill, John K.....	Hartford	392-5737	T20S R13E Sec. 07
Dill, Kenneth B. (Ben).....	Neosho Rapids	342-8399	T19S R13E Sec. 28
Edwards, Larry.....	Hartford	392-5632	T20S R13E Sec. 08
Graham, Bill.....	Emporia	342-8802	T19S R13E Sec. 32
Kidd, Guy & Carrol.....	Neosho Rapids	342-8234	T19S R13E Sec. 29
Lambeth, Paul M.....	Neosho Rapids	342-5132	T19S R13E Sec. 32
McAvoy, Paul Sr.....	Hartford	392-5820	T20S R13E Sec. 06
Neosho Rapids (Town)			T19S R13E Sec. 29
Owens, Larry.....	Neosho Rapids	392-5721	T19S R13E Sec. 34
St. Bonnet, C.N.....	Neosho Rapids	342-4286	T19S R13E Sec. 28
Smith , Gary D.....	Neosho Rapids	342-9431	T19S R13E Sec. 32
Strunk, Jon & Susan.....	Neosho Rapids	343-2753	T19S R13E Sec. 29
Wellnitz, Kevin.....	Neosho Rapids	342-9431	T19S R13E Sec. 31

Elmendora E. Township

Bess, David.....	Hartford	392-5831	T20S R13E Sec. 16
Burton, Bill & Evelyn.....	Hartford	392-5897	T20S R13E Sec. 16
Burton, Earl & Ellen.....	Hartford	392-5743	T20S R13E Sec. 16
Crane, Lyle & Neva.....	Hartford	392-5722	T20S R13E Sec. 33
Darbyshire, Dennis.....	Hartford	392-5526	T20S R13E Sec. 28
Darbyshire, Melvin.....	Hartford	392-5770	T20S R13E Sec. 33
Darbyshire, Mike.....	Hartford	392-5748	T20S R13E Sec. 33
Elliott, Carl.....	Hartford	392-5765	T20S R13E Sec. 22
Edwards, Eugene.....	Hartford	392-5706	T20S R13E Sec. 15
Hageman, Philip.....	Hartford	392-5636	T20S R13E Sec. 15
Hartford (Town)			T20S R13E Sec. 15
Herrick, Fred.....	Hartford	392-5533	T20S R13E Sec. 34
Leihsing, John T.....	Hartford	392-5639	T20S R13E Sec. 16
Lillian, A.W.....	Hartford	392-5881	T20S R13E Sec. 33
Nelson, Daniel.....	Hartford	392-5650	T20S R13E Sec. 27
Roberts, Donald E.....	Hartford	392-5621	T20S R13E Sec. 16
Roberts, E.P.....	Hartford	392-5654	T20S R13E Sec. 15
Romeiser, Gary.....	Hartford	392-5634	T20S R13E Sec. 16
St. Bonnett, Ron.....	Hartford	392-5685	T20S R13E Sec. 15
Schoeder, Chad.....	Hartford	392-5766	T20S R13E Sec. 15
Schneider, Charles.....	Hartford	392-5676	T20S R13E Sec. 33
Scoggin, George.....	Hartford	392-5868	T20S R13E Sec. 17
Scoggin, Jack.....	Hartford	392-5658	T20S R13E Sec. 16
Scoggin, Jerry.....	Hartford	392-5775	T20S R13E Sec. 16
Smith, Lloyd J.....	Hartford	392-5705	T20S R13E Sec. 27

Tollett, David.....	Hartford	392-5838	T20S R13E Sec. 17
Walliser, James R.....	Hartford	392-5649	T20S R13E Sec. 17
Wilson, Robert & Elizabeth.....	Hartford	392-5564	T20S R13E Sec. 17
Windle, Francis J.....	Olpe	475-3944	T20S R13E Sec. 34
Wood, Howard.....	Hartford	392-5686	T20S R13E Sec. 22

FLINT HILLS NATIONAL WILDLIFE REFUGE

ASSISTING THE VOLUNTEER FIRE DEPARTMENTS ON WILDFIRES

If a volunteer fire department needs/requests assistance with wildfires **off-refuge**, it can be accomplished in two (2) ways.

1. Fire is within two (2) miles of refuge boundary:

   Fire qualified* employees may respond with refuge fire truck **with out** managers approval any day of week.

2. Fire is outside the two (2) mile response zone:

   A request must come from the volunteer fire department **and receive approval** from one of the following:

   Refuge Office # 316-392-5553

   1. Refuge Manager - Jerre Gamble H(316) 475-3940
   2. Asst. Manager - Terry Kostinec H(316) 342-0977
      Cell Phone (316) 344-1384

   One of these people will then dispatch the appropriate refuge personnel.

No refuge employee or equipment (except tanker) will be approved for use on a structure fire off-refuge.

Any negotiations between the volunteer fire departments and the refuge concerning the fire fighting agreement will be between the Refuge Manager or Assistant and the Volunteer Fire Department Chief.

* The refuge employees will know who is fire qualified.

Insert March 29, 96 letter here

insert march 8 letter here

INCIDENT COMMANDER PROCEDURES

DISPATCH AND TRAVEL TO FIRE

1. Gathers initial attack data about fire.
   a. Data includes fire location, behavior, access, and resources threatened.
   b. Receives a briefing from dispatch in person or by radio.
2. Assembles and dispatches initial attack forces.
   a. A minimum of 2 person engine crews.
   b. Engines should be dispatched in pairs whenever possible.
   c. Brief crews on fire location and give direction for travel to fire.
3. Safely travel to fire.
   a. Approach fire from rear or rear flanks.
   b. Flag best access to fire for other resources to follow.
   c. Identify possible water sources on way to fire.
4. Observe pertinent information while en route to fire.

   Observe and record information about fire relating to fire cause, weather, fire behavior, resources available, safety hazards, and oppurtunities for effective control.
5. Locate and arrive safely at fire.
   a. Arrive within acceptable travel time.
   b. If fire not located, measures taken to try to locate fire before returning to base.

SIZE UP

1. Size-up the fire situation.
   a. Include fire size, rate of spread, fire intensity, values at risk, point of origin, and possible cause.
   b. Protect point of origin if cause other than natural is suspected.
2. Determine potential fire behavior.

   Analyze the current fire environment including fuels, topography, and weather.
3. Determine control force capabilities.

   Line construction rates are based on resistance to control at various portions of the fireline.
4. Plan the attack and control of fire.
5. Report to dispatch with current fire situation.

   Include potential threats to life, property, and natural resources; ability to control the fire; and need for additional resources.

DEPLOYMENT, ESCAPED FIRE, AND CONTAINMENT

1. Brief and assign forces on the fire.
    a. Tactical plan including what, where, when, who, and how.
    b. Priorities for attack.
    c. Safety procedures on the fireline.

2. Direct the attack in a safe and effective manner.
    a. Maintain communication with all resources on fire.
    b. Monitor environmental conditions, fireline progress, condition or status of various control forces assigned to or on standby for the fire.
    c. Make adjustments to current and expected fireline conditions.
    d. Priorities will be based on potential threats to life, property, and natural resources.
    e. Order overhead resources if containment is not expected until the nest day or later, there is serious risk to life or structures, multiple fires are occurring and the incident commander can not gain control of the situation.
    f. Complete and Escaped Fire Situation Analysis if the fire is not expected to be contained by 10:00 am the following day.

CONTROL, MOP-UP, AND MANAGEMENT

1. Coordinate fire control activities with cooperators, resource managers, and the general public.
2. Watch out for health and welfare of people.
    a. Applies to personnel assigned to fire and others that may be threatened by fire.
    b. Provide for essential needs of personnel (food, water, etc).
3. Keep dispatch advised of progress, unusual problems, resources threatened or destroyed.
4. Secure fireline and complete mop-up before departing.
    a. Attempt to release rural fire departments first.
    b. Keep a minimum of personnel on the fire after control to mop-up and patrol.
    c. Release other federal agencies and home unit resources last.
    d. Ensure all equipment is ready for next fire before releasing crews.

ADMINISTRATIVE REQUIREMENTS

Complete all administrative requirements as soon as possible.

1. Obtain a fire number.
2. Maintain a log of all personnel time.
3. Log all equipment used on the fire and any damages occurred during suppression activities.
4. Complete a fire report (DI-1202) within 10-days of the fire being declared out.
5. Log and track any expenditures which can be charged to the fire.

POST FIRE ANALYSIS

Critique fire suppression operations with personnel.

1. Identify problems, and provide solutions for events that occurred on the fire.
2. Recommend formal and on-the-job training for self and assigned fire personnel to gain desired fire qualifications.

APPENDIX I - EQUIPMENT INVENTORY

ITEM	NFES #	NIFC/GSA ORDER #	CURRENT INVENTORY	REORDER	NUS
ADAPTER, 1.5" NH x 1.5" NPSH	0007	4210-01-079-9284	1		
ADAPTER, 1.5" NPSH x 1.5" NH	0006	4210-01-079-9283	1		
AXE, SINGLE BIT	0707	5110-00-293-2339	2		
BAG, SLEEPING COLD Wx	0022	8465-01-119-5562	0		
BATTERY, SIZE AA	0030	6135-00-985-7845	40		
BATTERY, SIZE D	0033	6135-00-835-7210	24		
BELT, EQUIPMENT	1530	8465-01-175-7169	8		
BOTTLE, FUEL	1535	7240-01-351-2133	2		
BOOK, FIRE WEATHER RECORD	1159	BIFC	3		
BRUSH HOOK	1273	3750-00-240-2120	2		
BRIEFCASE, NYLON DUCK	1526	8460-01-193-9769	3		
CANTEEN, 1 QT.	0038	8465-01-062-5854	37		
CAP, WITH CHAIN 1.5" NH-F	2210	4210-01-081-8751	10		
CAP, WITH CHAIN 2" NPSH		CASCADE #11123	4		
CHAPS, PROTECTIVE SIZE 32	0045	8415-00-286-7507	3		
CHAPS. PROTECTIVE SIZE 36	0078	8415-01-028-5575	2		
CLAMP, HOSE SHUT-OFF	0046	4210-00-767-7123	2		
COAT, BRUSH SIZE MEDIUM		W.PACIFIC #12-BC101	2		

COAT, BRUSH SIZE LARGE		W.PACIFIC #12-BC102	4
COAT, BRUSH SIZE X-LARGE		W.PACIFIC #12-BC103	2
COMPASS, SMOKE CHASER	1814	6605-00-553-8795	10
CORD, NYLON PARACHUTE 1/4"x 600'	0533	4020-00-240-2146	200'
COUPLING, DOUBLE FEMALE 1"	0710	4210-01-080-1457	1
COUPLING, DOUBLE FEMALE 1.5"	0857	4210-01-081-8749	3

ITEM	NFES #	NIFC/GSA ORDER #	CURRENT INVENTORY	REORDER	NUS
COUPLING, DOUBLE MALE 1.5"	0856	4210-01-079-9285	1		
CREW TIME REPORT BOOKS	0891	7540-01-058-0222	3		
DRIP TORCH		W.PACIFIC # 15-001	4		
EAR PLUGS	1027	6515-00-139-0483	50		
EMER. FIREFIGHTER TIME (OF-288)	0866	7540-01-124-7633	100		
FACE & NECK PROTECTOR		CASCADE #50016	7		
FLAGGING,WHITE	0454	9905-01-351-2134	12		
FLAGGING, RED	0456	9905-01-351-2136	12		
FILE, FLAT 10"	0060	5110-00-242-5386	12		

FILE GUIDE, CHAIN SAW CLAMP-ON	0343	5110-01-046-5031		2	
FOAM, CLASS A SYLVEX (5 GAL)				14	
FUSSEE, FIRE STARTER	0105	1370-00-294-1279		72	
FUNNEL	0564	7240-00-527-9868		1	
GASKET, HOSE 3/4"		LOCAL	4		
GASKET, HOSE 1"	0743	5330-00-720-2621		10	
GASKET, HOSE 1.5"	0254	5330-00-239-1872	10		
GLOVES, FOREST WORKER MEDIUM	1187	8415-01-134-8232		13	
GLOVES, FOREST WORKER LARGE	1188	8415-01-134-8233		15	
GLOVES, NOMEX FLIGHT SIZE 10	1225	8415-01-029-0113/S9T		1	
GLOVES, NOMEX FLIGHT SIZE 11	1226	8415-01-029-0116/S9T		2	
GOGGLES, RUBBER BOUTON		CASCADE # 50214		10	
GOGGLES, RETAINING RING (CAP)		CASCADE # 50220		10	
GOGGLES, RETAINING RING (HAT)		CASCADE # 50221		6	
HEADLAMPS, 4 CELL AA	0713	6230-01-387-1399		2	
HELMET, SAFETY, PLASTIC	0109	8415-01-055-2265		8	
HOSE, BOOSTER 1" x 50' (REEL)	1220	4210-00-595-1838		5	
HOSE, SYN. 5/8" GARDEN x 50'	1016	4210-01-167-1061		0	

ITEM	**NFES #**	**NIFC/GSA ORDER #**	**CURRENT INVENTORY**	**REORDER**	**NUS**
HOSE, SYN. 1" x 100'	1238	4210-01-166-8122	3		

HOSE, SYN. 1.5" x 100'		1239	4210-01-165-6597		3
HOSE, CSJRL 1.5" x 50'		0964	4210-01-037-7031		6
HOSE, CSJRL 1.5" x 100'		0967	4210-00-777-1592		1
HOSE, SYN. 2.5" x 25'			W.PACIFIC		2
HOSE, SUCTION 2" NPSH x 8'			W.PACIFIC # 6-10201		3
INCREASER, 3/4" NH x 1" NPSH		2235	4210-01-080-6531		2
INCREASER, 1.5" NH x 2.5" NH			W.PACIFIC # 8A-FM15N25N		2
JEANS, FIRE SIZE 28 x 30		2011	8415-01-211-3274		1
JEANS, FIRE SIZE 32 x 30		2013	8415-01-211-3276		4
JEANS, FIRE SIZE 32 x 34		2020	8415-01-211-7588		5
JEANS, FIRE SIZE 36 x 30		2015	8415-01-211-7584		1
JEANS, FIRE SIZE 36 x 34		2022	8415-01-211-7590		3
JEANS, FIRE SIZE 38 x 34		2023	8415-01-211-9662		2
JUG, INSULATED 5 GALL.	0943		7730-00-893-8550	1	
KIT, BELT WEATHER		1050	6660-01-024-2638		3
KIT, FIRST AID TYPE 1 INDIVIDUAL		0067	6545-00-656-1092		10
KIT, MOP UP (3 PERSON)		0772	4210-01-321-4206		1
LINER, BRUSH COAT SIZE MEDIUM			W.PACIFIC # 12-BC091		2
LINER, BRUSH COAT SIZE LARGE			W.PACIFIC # 12-BC092		4
LINER, BRUSH COAT SIZE X-LARGE			W.PACIFIC # 12-BC093		1

MEALS (MRE)	1842	8970-00-149-1094		12	
MCCLOUD	0296	4210-00-203-3512		7	
NOZZLE, KK PLASTIC 35 GPM 1"0138		4210-00-085-2291	2		
NOZZLE, COMB. BARREL 1"	1081	4210-01-165-6603		2	
NOZZLE, COMB. BARREL 1.5"	1082	4210-01-167-1123		2	
NOZZLE, SIX SHOOTER				2	

ITEM	**NFES #**	**NIFC/GSA ORDER #**	**CURRENT INVENTORY**	**REORDER**	**NUS**
NOZZLE, TWIN TIP FORESTER 1"	0024	4210-00-640-1892		2	
NOZZLE, FOAM GUARDIAN 1.5"		W.PACIFIC # 9-51100012		2	
PACK, FIREFIGHTER'S FIELD (YELL)	1372	8465-01-169-3996		9	
PACK, PERSONNEL GEAR (RED) 1855		8465-01-141-2321	7		
PACKSACK, H2O PROOF W/ STRAPS	0744	8465-00-205-3493		10	
PAIL, COLLAPSIBLE	0141	8465-00-128-6928		2	
PAIL, PLASTIC	0487	7240-00-246-1097		2	
PULASKI	0146	5120-00-293-3467		5	
PUMP, BACKPACK, VEST TYPE				2	
PUMP, BACKPACK, BLADDER TYPE	1149	4320-00-289-892		0	
PUMP, FLOAT		W.PACIFIC # 1-1350	1		
REDUCER, 1" NPSH x 3/4" NH	0733	4210-01-079-9286		5	

REDUCER, 1.5" NH x 1" NPSH	0010	4210-00-975-2969	5
REDUCER, 2.5" NH x 1.5" NH	2230	4210-01-081-0419	1
SHEATH, AXE SINGLE BIT LEATHER	0359	8465-00-293-3369	2
SHEATH, PLASTIC BRUSH HOOK	1852	8465-01-136-4720	2
SHEATH, PLASTIC MCCLOUD	1854	8465-01-136-4718	10
SHELTER, FIRE W/ CASE	0169	4240-01-121-8698	9
SHELTER, PRACTICE FIRE	2407	6930-01-387-8543	2
SHIRTS, FIRE SIZE SMALL	0577	8415-00-233-5818	1
SHIRTS, FIRE SIZE MEDIUM	0578	8415-00-233-5819	4
SHIRTS, FIRE SIZE LARGE	0579	8415-00-259-8718	8
SHIRTS, FIRE SIZE X-LARGE	0580	8415-00-259-8722	2
SHOVEL, FOREST FIRE	0171	5120-00-965-0609	5
SHUT-OFF, BALL VALVE 1"	1201	4210-01-165-6599	2
SHUT-OFF, BALL VALVE 1.5"	1207	4210-01-165-6600	2

ITEM	**NFES #**	**NIFC/GSA ORDER #**	**CURRENT INVENTORY**	**REORDER**	**NUS**
SWATTER, FIRE	1868	W.PACIFIC # 10-104	2		
TANK, PORT-A					

TEES, HOSELINE W/ CAP					
1" NPSH x 1" NPSH x 3/4" NH		1809	4210-01-081-0418		3
TENT, FLY 9' x 10' (BLUE)		1521	8340-01-081-8758		4
TIP, NOZZLE 3 GPM FOG		0635	4210-00-204-3358		2
TIP, NOZZLE 6 GPM FOG		0636	4210-00-204-3386		2
TIP, NOZZLE 3/16" 10 GPM STREAM		0637	4210-00-203-3855		4
TIP, NOZZLE 1/4" 18 GPM STREAM		0737	4210-00-177-6135		2
VALVE, FOOT 2" NPSH			W.PACIFIC # 1-004		2
VALVE, GATED Y 1.5" NH	0231		4210-00-984-3475	3	
WRENCH, HYDRANT			W.PACIFIC # 7-4082	2	
WRENCH, SPANNER (1.5" - 4")			W.PACIFIC # 7-4040	2	
WRENCH, SPANNER (11")		0235	5120-00-596-1427		2
WRENCH, SPANNER (5")		0234	5120-00-596-1426		1

APPENDIX J - LITERATURE CITED

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