WILDLAND FIRE MANAGEMENT PLAN

MINGO NATIONAL WILDLIFE REFUGE

GREAT LAKES-BIG RIVERS REGION

2003

FIRE MANAGEMENT PLAN

MINGO NATIONAL WILDLIFE REFUGE

PUXICO, MISSOURI

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TABLE OF CONTENTS

I

I. INTRODUCTION 1

II. DESCRIPTION OF THE REFUGE 2

A. General Description of Refuge 2
B. Climatology 2
C. Soils 2
D. Vegetation 3
E. Land Use 6
F. Habitat Management Objectives 6
G. Management Constraints 7
H. Historic Fire Information 7
I. Endangered Species 8

III. COMPLIANCE WITH FISH AND WILDLIFE SERVICE POLICY 9

A. Compliance with Service Policy 9
B. NEPA Compliance and Authorities Citation 9
C. Enabling Legislation and Purpose of the Refuge 11
D. Refuge Management Goals and Objectives 11
E. Collaborative Development Process for FMP 12
F. Plans and Objectives Relating to Fire Management 12
G. General Management Considerations 12

IV. FIRE MANAGEMENT GOALS, OBJECTIVES, STRATEGIES, AND LIMITATIONS 15

A. Introduction 15
B. General Fire Management Goals 15
C. Fire Management Objectives 15

V. FIRE MANAGEMENT STRATEGIES AND LIMITS 16

A. Strategies to Meet Fire Management Objectives 16
B. Limits to Strategies 16

VI. FIRE MANAGEMENT UNITS (FMU) 17

A. FMU Suppression Objectives 17
B. Suppression Strategies and Techniques 17
C. Limits 18
D. Normal Fire Behavior 18
E. Prediction of Fire Behavior 19
F. Relationship of Fire Management Unit to Station Objectives 19

VII. FIRE MANAGEMENT AND RESPONSIBILITIES 19

A. Fire Management Team Responsibilities 20

B. Refuge Fire Management Team 22
C. Prescribed Fire Validation 22
D. Fire Cooperators and Interagency Coordination 23

VIII. WILDLAND FIRE PROGRAM 23

A. Fire Prevention Program 23
B. Fire Season 24
C. Fire Behavior 24
D. Preparedness 24
E. Normal Unit Strength 26
F. Severity Funding 27
G. Detection 27
H. Fire Suppression 27
I. Rehabilitation 29
J. Records and Reports 30

IX. PRESCRIBED FIRE PROGRAM 30

A. Introduction 30
B. Use of Prescribed Fire to Achieve Resource Management Goals 30
C. Prescribed Fire Management Units 31
D. Hazardous Fuel Reduction 32
E. Planning 33
F. Limits 34
G. Complexity 35
H. Monitoring and Evaluation 35
I. Prescribed Fire Impacts 36

X. AIR QUALITY AND SMOKE MANAGEMENT GUIDELINES 37

XI. FIRE RESEARCH AND MONITORING 40

XII. PUBLIC SAFETY 40

XIII. PUBLIC INFORMATION AND EDUCATION 40

A. Wildland Fire Suppression 41
B. Prescribed Fire 41

XIV. ARCHEOLOGICAL/CULTURAL/HISTORIC RESOURCES 41

XV. FIRE CRITIQUE AND PLAN REVIEW 42

A. Fire Plan Review 43
B. Wildland Fire Critique and Review 43
C. Prescribed Fire 43

XVI. CONSULTATION AND COORDINATION 43

A. Agency Reviews 43
B. Individuals Consulted 43

APPENDICES **45**

. INTRODUCTION **1**

II. DESCRIPTION OF THE REFUGE **2**

A. General Description of Refuge 2
B. Climatology 2
C. Soils 2
D. Vegetation 3
E. Land Use 6
F. Habitat Management Objectives 6
G. Management Constraints 7
H. Historic Fire Information 7
I. Endangered Species 8

III. COMPLIANCE WITH FISH AND WILDLIFE SERVICE POLICY **9**

A. Compliance with Service Policy 9
B. NEPA Compliance and Authorities Citation 9
C. Enabling Legislation and Purpose of the Refuge 11
D. Refuge Management Goals and Objectives 11
E. Collaborative Development Process for FMP 12
F. Plans and Objectives Relating to Fire Management 12
G. General Management Considerations 12

IV. FIRE MANAGEMENT GOALS, OBJECTIVES, STRATEGIES, AND LIMITATIONS **15**

A. Introduction 15
B. General Fire Management Goals 15
C. Fire Management Objectives 15

V. FIRE MANAGEMENT STRATEGIES AND LIMITS **16**

A. Strategies to Meet Fire Management Objectives 16
B. Limits to Strategies 16

VI. FIRE MANAGEMENT UNITS (FMU) **17**

A. FMU Suppression Objectives 17
B. Suppression Strategies and Techniques 17
C. Limits 18
D. Normal Fire Behavior 18
E. Prediction of Fire Behavior 19
F. Relationship of Fire Management Unit to Station Objectives 19

VII. FIRE MANAGEMENT AND RESPONSIBILITIES **19**

A. Fire Management Team Responsibilities 20
B. Refuge Fire Management Team 22
C. Prescribed Fire Validation 22

D. Fire Cooperators and Interagency Coordination 23
VIII. WILDLAND FIRE PROGRAM 23
A. Fire Prevention Program 23
B. Fire Season 24
C. Fire Behavior 24
D. Preparedness 24
E. Normal Unit Strength 26
F. Severity Funding 27
G. Detection 27
H. Fire Suppression 27
I. Rehabilitation 29
J. Records and Reports 30
IX. PRESCRIBED FIRE PROGRAM 30
A. Introduction 30
B. Use of Prescribed Fire to Achieve Resource Management Goals 30
C. Prescribed Fire Management Units 31
D. Hazardous Fuel Reduction 32
E. Planning 33
F. Limits 34
G. Complexity 35
H. Monitoring and Evaluation 35
I. Prescribed Fire Impacts 36
X. AIR QUALITY AND SMOKE MANAGEMENT GUIDELINES 37
XI. FIRE RESEARCH AND MONITORING 40
XII. PUBLIC SAFETY 40
XIII. PUBLIC INFORMATION AND EDUCATION 40
A. Wildland Fire Suppression 41
B. Prescribed Fire 41
XIV. ARCHEOLOGICAL/CULTURAL/HISTORIC RESOURCES 41
XV. FIRE CRITIQUE AND PLAN REVIEW 42
A. Fire Plan Review 43
B. Wildland Fire Critique and Review 43
C. Prescribed Fire 43
XVI. CONSULTATION AND COORDINATION 43
A. Agency Reviews 43
B. Individuals Consulted 43
APPENDICES 45
APPENDIX A - SPECIES LISTS 46

APPENDIX B - T&E SPECIES 53
APPENDIX C - CURRENT STAFFING 54
APPENDIX D - SAMPLE FIRE PROTECTION AGREEMENT 55
APPENDIX E - FIRE COOPERATORS 59
APPENDIX F - STEP-UP PLAN 60
APPENDIX G - NUS 61
APPENDIX H - FIRE DISPATCH PLAN 63
APPENDIX I - REFUGE FIRE DIRECTORY 68
APPENDIX J - COMMUNICATIONS FREQUENCIES 69
APPENDIX K - WFSA 70
APPENDIX L - DELEGATION OF AUTHORITY 91
APPENDIX M - MONITORING CHECK LIST 93
APPENDIX N - SECTION 7 INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM 96
APPENDIX O - FUTURE PRESCRIBED FIRE GOALS 98
APPENDIX P - HABITAT AND FUEL TYPES 100
APPENDIX Q - FIRE MANAGEMENT UNITS 101
APPENDIX R - GENERAL MAP OF MINGO NWR 102
APPENDIX S - GENERAL LOCATION OF MINGO NWR 103
APPENDIX T - MAP & DESCRIPTION OF FMHA EASEMENTS 104
APPENDIX U - CLIMATOLOGY 106
APPENDIX V - MAP OF WILDERNESS AREA 108

List of Figures

Figure 1 - Future Prescribed Fire Goals 98
Figure 2 - Habitat and Fuel Types 100
Figure 3 - Fire Management Units 101
Figure 4 - General Refuge Map 102
Figure 5 - General Location Map 103
Figure 6 - Map of FMHA Easements 104
Figure 7 - Mingo Class I Wilderness Area 108

List of Tables

Table 1 - Habitat Types and Acreages 6
Table 2 - Optimum Staffing to Conduct a Fire Management Program 20
Table 3 - Annual Refuge Fire Managment Activities 25
Table 4 - Prescribed Fire Units on Mingo NWR 32
Table 5 - Plant List 46
Table 6 - Birds 48
Table 7 - Mammals 49

Table 8 - Salamanders 49
Table 9 - Frogs 50
Table 10 - Toads 50
Table 11 - Turtles 50
Table 12 - Lizards 50
Table 13 - Venomous Snkaes 51
Table 14 - Non-venomous Snakes 51
Table 15 - Fishes 51
Table 16 - Current Employee Qualifications 54
Table 17 - Fire Cooperators 59
Table 18 - Normal Unit Strength Inventory 61
Table 19 - Refuge Fire Directory - 2003 68
Table 20 - Communications Frequencies 69
Table 21 - FMHA Easements - Mingo NWR 105
Table 22 - Climatology 106

I. INTRODUCTION

U.S. Fish and Wildlife Service Policy states that Fire Management Plans will be developed for all FWS areas subject to wildland fires and that each unit will have a Fire Management Plan in place which defines how to manage wildland and prescribed fire. The Fire Management Plan (FMP) for Mingo National Wildlife Refuge (NWR) and all FmHA easements and fee title areas within the 48 county management district has been developed to provide direction in establishing operational procedures to guide all fire management activities. This FMP is written to replace an outdated FMP. The FMP will assist Mingo NWR in achieving resource management objectives as defined in several of the refuge=s interim management plans, and the Comprehensive Conservation Plan (CCP) that will be soon be in progress for the Refuge.

Mingo National Wildlife Refuge

Mingo NWR overlays 21,676 acres in a linear basin formed in an ancient abandoned channel of the Mississippi River. Mingo, meaning dark, stealthy, and treacherous in the Algonquin language, is one of the furthest north refuges with cypress and tupelo swamps in North America.

The Refuge was established in 1945 under authority of the Migratory Bird Treaty Act as a resting and wintering area for migratory waterfowl. Historically, the Mingo National Wildlife Refuge area was a haven for wildlife before logging, drainage, and conversion to agriculture altered the area.. Bankruptcy of the Mingo Drainage District in the 1930's set the stage for Federal acquisition and subsequent restoration of the swamp and its productivity. Peak waterfowl populations of 125,000 mallards and 75,000 Canada geese have been recorded.

The Refuge contains approximately 15,000 acres of bottomland hardwoods, 1,275 acres of cropland and moist soil units, 700 acres of grasslands, and 5,000 acres of marsh and water. There are seven natural areas on the refuge and 120 identified archeological sites. In 1976, 7,730 acres were designated as a Class 1 Wilderness Area (Appendix V). The Mingo Job Corps Civilian Conservation Center, with 230 enrollees, is located on the southeast corner of the Refuge. Refuge administrative purposes comprise approximately 204 acres of the Refuge.

Recreational activities such as waterfowl, squirrel, turkey, and deer hunting, fishing, canoeing, and wildlife observation are very popular on the Refuge. The Refuge is home to sixteen state and two national champion trees. An unique 1.0 mile self-guided Boardwalk nature trail, which loops through a bottomland hardwood swamp, can be enjoyed. There are many historic sites that can be

visited along Mingo=s 20-mile Auto Tour Route, as well as four observation towers, picnic tables and a picnic shelter. It is estimated that 155,000 visitors come to Mingo NWR each year.

II. DESCRIPTION OF THE REFUGE

A. GENERAL DESCRIPTION OF REFUGE

The largest portion of Mingo NWR lies within the ancient Mississippi River Basin and is quite flat and ridges less than ten feet in height are prominent features, particularly during times of high water. The west boundary of the Refuge lies along the foothills of the Ozark Uplift while the east boundary of the Refuge runs along a terrace called Crowley=s Ridge. Elevations along the top of these ridges are as high as 405 'msl compared to below 340' msl elevation of the Basin. Mingo NWR consists of 20 moist soil areas and 5,000 acres of open marsh. There is also 7,730 acres of Class 1 Wilderness Area on the Refuge (Appendix V). The Refuge is located in Stoddard and Wayne counties. The Refuge is almost entirely surrounded by private lands. Duck Creek Conservation Area is located adjacent to the east side of the Refuge. The community of Puxico is approximately one mile south from the Refuge=s Visitor Information Center. Mingo NWR also manages 16 FmHA conservation easements within a 48 county management district. Names, acreage, and locations of these areas are located in Appendix T.

B. CLIMATOLOGY

The climate of the Refuge is a humid continental type with warm summers and cool winters. Mean annual temperature at Poplar Bluff, 25.0 miles to the south-east, is 59 ^{o}F with a mean January temperature of 37.5 ^{o}F and a mean July temperature of 79.5 ^{o}F**.** Mean annual precipitation is 45.6 inches and is rather evenly distributed throughout the year with an average of 3.8 inches per month. Mean length of the growing season at Lake Wappapello, 4.0 miles from the Refuge is 185 days with the average first freeze date occurring October 17 and the average last freeze date occurring April 15. A weather table can be found in Appendix U.

C. SOILS

A complete survey of the soils of the Refuge was made by Burton L. Brown of the Soil Conservation Service in 1972.

1. Bottomland Soils

The most extensive soil type is Waverley Silt Loam. This soil has a grayish brown silt loam surface layer and a gray silt loam subsoil that is mottled throughout. This is a poorly drained acidic soil

formed under wet conditions and a high water table. This soil occupies approximately 50 to 60 percent of the Refuge.

Falaya Silt Loam occupies a small part of the bottom in areas such as Stanley Creek and Lick Creek.. It also borders the upland and the channel of Mingo Creek. Falaya soils have brown silt loam surface layers over grayish brown silt loam underlain at about 40 inches by fray silty clay loam. This soil is somewhat poorly drained, acidic, and subject to flooding or ponding.

Organic soils occupy 800 to 900 hundred acres in Rockhouse and Monopoly marshes and consist of dark colored soils derived from organic matter. They were formed under wet marshy conditions in some of the lowest elevations.

2. Upland Soils

The cherty soils of the steep slopes and stone outcropping along the west side of the Refuge are of the Doniphan series. Doniphan soils have light brown cherty silt loam surface layers and red clay subsoils.

The ridgetops above Doniphan cherty silt loam are narrow and undulating and have about3.0 feet of loess deposits. The soil is Union Silt Loam. The moderately well-drained Union soils have dark grayish brown silt loam surface horizons that are underlain by brown silty clay loam subsoils. They have fragipan layers at depths of 2.0 or 3.0 feet.

On the moderate slopes of the uplands, especially along Highway 51 north of Puxico, there are deep, well-drained soils developed in thick lows. These soils are Loring Memphis Silt Loams and have brown silt loam surface layers and brown silt loam subsoils.

D. VEGETATION

Refuge vegetation may be broadly divided into upland forest and bottomland mixed hardwoods.

1. Upland Forest

Oak-hickory forest type predominates on the cherty upland areas. Three community types have been recognized.

a. Upland Old Fields Community

These areas include scattered woodland clearings, abandoned fields or pastures, and ridge roadsides which are reverting to an oak-hickory forest. Principal trees and shrubs are Sassafras (*Sassafras albidum*), Persimmon (*Diospyros virginiana*), Honey Locust (*Gleditsia triacanthos*), Sumac (*Rhus spp.*), Elm (*Ulmus spp.*), Walnut (*Juglans nigra*), Red Cedar (*Juniperus virginiana*), Blackberry (*Rubus allegheniensis*), Dewberry (*Rubus spp.*), Coralberry (*Symphoricarpos orbiculatus*), and Multiflora Rose(*Rosa spp.*).

b. Xeric Ridge Crests Community

The driest and most exposed forest community exist on ridge crests, bluff tops, and upper slopes on thin, excessively drained soils. Over-story trees include Black Oak (*Quercus velutina*), Post Oak (*Quercus stellata*), White Oak (*Quercus alba*), Black Hickory (*Carya texana*), Mockernut Hickory (*Carya tomentosa*), Elm and White Ash (*Fraxinus americana*). Understory trees and shrubs are Serviceberry (*Amelanchier spp.*), Winged Elm (*Ulmus alata*), Big Tree Plum (*Prunus mexicana*), Sparkleberry (*Vaccinium arboreum*), Hawthorn (*Crataegus spp.*), Southern Blackhaw (*Viburnum spp.*), Sumac (*Rhus spp.*), Blueberry (*Vaccinium spp.*), and St. Andrew=s Cross (*Ascyrum hypericoides*).

c. Mesic Slopes Community

Great species diversity occurs on the middle to lower slopes because of improved temperature-moisture conditions. Important trees and shrubs include White Oak, Mockernut Hickory, Shagbark Hickory (*Carya ovata*), Chinkapin Oak (*Quercus muehlenbergii*), White Ash, Sassafras, Flowering Dogwood (*Cornus florida*), Mulberry (*Morus spp.*), Pawpaw (*Asimina triloba*), Bladdernut (*Staphylea trifolia*), Spicebush (*Lindera spp.*), Devil=s Walking Stick (*Aralia spinosa*), and Wild Hydrangea (*Hydrangea arborescens*).

2. Bottomland Forest

The majority of the Refuge falls in this category. Four community

types are delineated based on dominate species in conjunction with elevation and inundation.

a. Terrace Bottoms Community

Terrace or second bottoms are located at the base of lower slopes, flat banks, and watercourse margins. These well drained and rarely flooded transitional areas support a mixture of upland and flood plain woody species. Major trees are Sugar Maple (*Acer saccharum*), Northern Red Oak (*Quercus rubra*), Shagbark Hickory, Bitternut Hickory (*Carya cordiformis*), Sweetgum (*Liquidambar styraciflua*), American Elm (*Ulmus americana*), Hackberry (*Celtis occidentalis*), Box Elder (*Acer negundo*), Chinkapin Oak, Blackgum (*Nyssa sylvatica*), Black Walnut, Butternut (*Juglans cinerea*), Black Cherry (*Prunus serotina*), Bur Oak (*Quercus macrocarpa*), and Swamp Red Oak (*Quercus falcata*).

b. Oak Hardwood Bottoms Community

The most extensive bottomland forest type is the Oak Hardwood Bottoms. These Pin Oak flats occupy shallowly inundated areas along the banks between drainage ditch levees, and the low floodplains surrounding Rockhouse and Monopoly Marshes. Major trees are Pin Oak (*Quercus palustris*), Willow Oak (*Quercus phellos*), Overcup Oak (*Quercus lyrata*), Green Ash (*Fraxinus pennsylvanica* var. *subintegerrima*), Slippery Elm (*Ulmus rubra*), American Elm, Red Maple (*Acer rubrum*), Sweetgum, Cherrybark Oak (*Quercus pagoda*), Swamp Chestnut Oak (*Quercus michauxii*), Swamp White Oak (*Quercus bicolor*), Box Elder, Sugarberry (*Celtis laevigata*), and Persimmon (*Diospyros virginiana*).

c. Mixed Soft-Hardwood Levees Community

This community type exists along drainage ditch levees, stream margins, roadside embankments, and other watercourse borders. Tree species include Black Willow (*Salix nigra*), Cottonwood (*Populus deltoides*), Silver Maple (*Acer saccharinum*), Sycamore (*Platanus*

occidentalis), and River Birch (*Betula nigra*). Later successional species occurring in this community are similar to the Oak Hardwood Bottoms community.

d. Shallow Swamp Community

This community type occupies inundated areas such as Monopoly Lake, Rockhouse Marsh, Mingo Creek, and Stanley Creek. The predominant species in these wooded swamps are Bald Cypress (*Taxodium distichum*), Blackgum, Swamp Cottonwood (*Populus hetrerophylla*), Red Maple, Pumpkin Ash (*Fraxinus tomentosa*), Black Willow, Water Locust (*Gleditsia aquatica*), Green Ash, and Water Hickory (*Carya aquatica*).

E. LAND USE

The Refuge contains a total of 21,676 acres. Land use can be divided into the following general categories in Table 1.

Table 1 - Habitat Types and Acreages

Habitat Type	Acreage
Forest Land	15,000 acres
Marsh Habitat	4,492 acres
Moist Soil Units	1,000 acres
Grassland	702 acres
Agricultural Fields	278 acres
Administrative Use	204 acres
Total	21,676 acres

F. HABITAT MANAGEMENT OBJECTIVES

Mingo NWR supports significant populations of migratory waterfowl. Land use and public use programs are designed to support or complement the waterfowl maintenance program. The following high priority objectives have been established.

- Provide optimum conditions for mallards during the fall migration and winter pre-breeding period to achieve maximum production from birds returning to the breeding grounds.
- Protect and enhance Refuge habitat to maintain or increase use by endangered species.

- Provide requirements of migrating and wintering Canada geese consistent with distribution objectives established for the Mississippi Valley Population (MVP) and Eastern Prairie Populations in the respective flyway management plans.
- Increase wood duck and hooded merganser production.
- Preserve the remnant bottomland hardwood ecosystem and associated cultural resources representative of the once vast forested wetlands of the upper Mississippi River Delta.

G. MANAGEMENT CONSTRAINTS

On October 19, 1976, a total of 7,730 acres of the Refuge were designated as a Wilderness Area. This designation precludes development in a significant portion of the Refuge, however: it does not affect water management within the Wilderness Area.

There are also seven research natural areas established on the Refuge totaling 625 acres. All the areas except the 140 acre oak-hickory site are located within the Wilderness Area.

One-hundred and twenty historical and archeological sites have been identified as a result of surveys conducted in 1976 and 1978. Since the entire Refuge was not surveyed it=s quite possible that additional sites may exist.

In 1975, two sites on the Refuge were designated as an Archaeological District by the Missouri Department of Natural Resources and listed on the National Register of Historical Places. (All archeological sites can be found using the Archeological survey maps located at Mingo NWR visitor center)

H. HISTORIC FIRE INFORMATION

1. General

The Refuge=s physical features and climatic conditions are not conducive to wildland fires. Dense, green vegetation, high humidity, abundant rainfall, extensive water impoundments and ditches, and restricted public access tend to reduce the chance of wildland fires.

2. Local Attitudes

Local citizens gave little to no input or concern of how wildland fires should be suppressed during the scoping meeting of the Environmental Assessment. Hence, the Refuge will deem the

necessity of immediate or delayed fire suppression based on Congressional mandates and Federal regulations and policy.

3. Large Fire Occurrence

Mingo NWR has never had a large disastrous wildland fire. The largest fire occurred in 1954 and burned 80 acres. Most of this area burned before the fire was detected and suppression activities started. All other fires have been from 1 to12 acres. The majority of the fires have been caused by adjoining landowners allowing fires they started to escape, or by Refuge visitors being careless with cigarettes, barbecue pits, etc. Prior to the establishment of the Refuge a wildland fire occurred that spread throughout the Basin to the western bluffs of the Refuge.

4. Economic Losses

Wildland fires on the Refuge have not caused any reportable economic losses in the past. The largest loss has been an old wooden building acquired with the May Place tract of land which burned in 1959. No economic value has been assigned to the leaves, grass, or brush that has burned in the past. No timber has been lost, nor have any economic activities been affected, such as farming, haying, etc. The Boardwalk trail received slight damage from fire once resulting in repair cost of about $100.00.

5. Natural Role of Fire

There is no known natural role of fire in the bottomland hardwood ecosystem. Potentially, wildland fires in hardwood systems could have severe ecological impacts if they occur during the active growing season and become hot enough to kill the thin bark of the hardwood trees. To date, this has not occurred on Mingo NWR. The traditional methods of controlling wildland fires with leaf rakes, flappers, and backpack water sprayers do not have any effects on the ecology of the area. The use of a dozer or a fire plow, both are normally used on larger fires in Missouri, would cause some destruction of vegetation and erosion, however, this type of equipment has not been needed on the Refuge in the past. Its use would be severely limited by the drainage ditch system and the steep topography on the borders of the refuge.

I. ENDANGERED SPECIES

There are two listed endangered, threatened, or rare species that occur on Mingo NWR. These include the alligator snapping turtle and the bald eagle. There are 2 known bald eagle nesting territories on the Refuge. One nest is located in the middle of Monopoly Lake. It is rather unlikely

to be affected by a wildland fire considering the amount of water surrounding it. The second territory is located south of Gumstump Pool, in between Ditch 3 and Ditch 4. It is possible that this territory could receive damage in the instance of a wildland fire, although it is unlikely, for it rests over temporary waters the majority of the year. This site is a priority for protection if a wildland fire situation would arise. During the winter months, at least 50 migratory bald eagles are present on the Refuge, and these numbers are steadily rising. These wintering populations begin to arrive in late November, with peak numbers in January.
The alligator snapping turtle is mainly an aquatic reptile. This species is a year round resident at the refuge. It is likely that there would be no direct, adverse impacts on the alligator snapping turtle since water access is readily available year-round for escape.

III. COMPLIANCE WITH FISH AND WILDLIFE SERVICE POLICY

A. COMPLIANCE WITH SERVICE POLICY

Fish and Wildlife Service fire management policy is based on the Departmental Manual (620 DM 1) and the 2001 Federal Wildland Fire Policy. **Firefighter and public safety is the first priority**. All Fire Management Plans and activities must reflect this commitment. With the possible exception of instances where the life of another is threatened, no Service employee, contractor, or cooperator will be purposely exposed to life-threatening conditions or situations (See 241 FW 7).

This plan provides fire management guidelines for the Mingo NWR and all FmHa and fee title areas in the management district (see Appendix T for listings).

B. NEPA COMPLIANCE AND AUTHORITIES CITATION

An Environmental Assessment has been completed for this plan. An Intra-service section 7 has also been completed and is located in Appendix N.

The statutes cited herein authorize and provide the means for prevention, preparedness, control, and suppression of wildland fire on lands under the jurisdiction of the Department of the Interior, or lands adjacent thereto.

1. Reciprocal Fire Protection Act of May 27, 1955.

(69 Stat. 66; 42 U.S.C. 1856 a) Authorizes reciprocal fire protection agreements with any fire organization for mutual aid

with or without reimbursement and allows for emergency assistance in the vicinity of agency facilities in extinguishing fires when no agreement exists.

2. **National Wildlife Refuge System Administration Act of 1966 as amended.**

   (80 Stat. 927; 16 U.S.C. 668dd through 668ee)

3. **Federal Fire Prevention and Control Act of October 29, 1974.**

   (88 Stat. 1535; 15 U.S.C. 2201)

4. **Wildland Fire Suppression Assistance Act of 1989.**

   P.L. 100-428, as amended by P.L. 101-11, April 7, 1989.

5. **Protection Act of September 20, 1922.**

   (42 Stat. 857; 16 U.S.C. 594) Authorizes the Secretary of the Interior to protect from fire, lands under the jurisdiction of the Department directly or in cooperation with other Federal Agencies.

6. **Economy Act of June 30, 1932.**

   (47 Stat. 417; 31 U.S.C. 315) Authorizes contracts for services with other Federal Agencies.

7. **Disaster Relief Act of May 22, 1974.**

   (88 Stat. 143; 42 U.S.C. 5121) Authorizes Federal agencies to assist state and local governments, during emergency or major disaster, by direction of the President.

8. **McSweeney-McNary Act of 1928.**

   (45 Stat. 221; 16 U.S.C. 487)

9. **Taylor Grazing Act of June 28, 1934 as amended.**

   (48 Stat. 1269; 43 U.S.C. 315), governs grazing on the public lands.

10. **O. and C. Act of August 28, 1937.**

    (50 Stat. 875; 43 U.S.C. 1181e)

11. **National Park Service Acts as amended.**

    (67 Stat. 495; 16 U.S.C. 1b)

12. **Federal Property and Administrative Service Act of 1949.**

    (40 U.S.C. 471; et seq.) Sets forth requirements for the management and disposal of government property.

13. **Alaska Native Claims Settlement Act of December 18, 1971.**

    (85 Stat. 688; 43 U.S.C. 1601)

14. **Federal Land Policy and Management Act of 1976.**

(90 Stat. 2743)

15. Federal Grant and Cooperative Agreement Act of 1977.

(Public Law 950224, as amended by Public Law 97-258, September 13, 1982 (96 Stat. 1003; 31 U.S.C. 6301-6308)

16. Alaska National Interest Lands Conservation Act of December 2 1980.

(94 Stat. 2371) Designated certain lands in Alaska as units of the National Park, National Wildlife Refuges, Wild and Scenic Rivers, National Wilderness Preservation and National Forest Systems, resulting in general expansion of all systems.

17. Supplemental Appropriation Act of September 10, 1982.

(96 Stat. 837)

18. Indian Self-Determination and Education Assistance Act.

(Public Law 93-638) as amended.

19. National Indian Forest Resources Management Act.

(Public Law 101-630 November 28, 1990)

20. Tribal Self-Governance Act of 1994.

(Public Law 103-413)

C. ENABLING LEGISLATION AND PURPOSE OF THE REFUGE

Mingo National Wildlife Refuge was established in 1945 under the authority of the Migratory Bird Treaty Act and the Migratory Bird Hunting Stamp Act. One additional purchase of 27 acres was made in 1971 with Land and Water Conservation Funds. The total acreage is 21,676 acres.

The purpose of the Refuge at the time of establishment was to preserve an already successful migrating and, to some extent wintering, duck area. At the time of purchase, there were millions of acres of bottomland hardwoods in Southeast Missouri. Since that time, most bottomland hardwoods have been cleared for farming. Mingo is the only large tract remaining. Because of this drastic change in land use, it becomes obvious that preservation must be given high priority when considering Refuge objectives. At the present time, the objectives for waterfowl plus the additional objectives for preservation can be met.

D. REFUGE MANAGEMENT GOALS AND OBJECTIVES

- Augment opportunities on the Refuge for nesting, resting, and foraging of non game and Trust bird species, in particular, the songbird and

neotropical species listed in Region 3's Resource Conservation Priorities, by gradually reverting less desirable vegetation into other, more natural habitats.

- Conduct haying, mowing, prescribed burns, and all other habitat management practices, so that nesting and reproduction are interfered with as little as possible.
- Control and reduce the presence of exotic, invasive, and nuisance species of plants on the Refuge.
- Use fire as an important weapon in the arsenal for fighting weedy species. It will be used in compliance with local and state laws, in conjunction with habitat management efforts, and in such a manner as to avert any collateral damage.

E. COLLABORATIVE DEVELOPMENT PROCESS FOR FMP

The FMP has received input from Missouri Department of Conservation, local governments, and other interested parties. Continuing opportunities exist for future collaboration in management planning and research on both refuges.

F. PLANS AND OBJECTIVES RELATING TO FIRE MANAGEMENT

Grassland Management Plan

A...provide habitat for grassland birds; maintain and enhance bald eagle habitat and other raptor feeding habitat; provide nesting habitat for ground nesting birds; improve overall habitat diversity on the Refuge; protect water quality and soils from erosion; and provide unique public use and interpretive opportunities to create an appreciation and knowledge of grasslands and their uses by wildlife.

Action taken for vigor and maintenance usually requires manipulation and has, in the past, centered around mowing, haying, and prescribed burning.

G. GENERAL MANAGEMENT CONSIDERATIONS

1. Area-wide Considerations

a. Interagency Relationships - While no formal agreement exists between the Refuge and the State of Missouri, frequent contacts occur to discuss population status and effects of outside influences on the species found on the Refuge. There are also contacts with non-governmental organizations that are involved in monitoring populations and providing a source of research results to improve management. Local cooperative efforts have not been

intensive.

b. Regional Strategies - No regional strategies related to fire management exist at Mingo.

c. Other Collaborative Processes - Some opportunities will result from local review. This plan was placed out for public review and input for a thirty day period to insure local concerns were addressed and any misconceptions regarding fire management were cleared.

2. 10 Year Comprehensive Strategy Core Principles

a. Collaboration - For this FMP, collaboration at the local level includes the Corps of Engineers, MDOC, county and town governments. Adjacent landowners (representative stakeholders) will also be involved.

Collaboration beyond the local level may occur as the Refuge provides migration resting habitat. Likely partners are other FWS units and state organizations.

b. Priority Setting - Hazardous fuels reduction projects are planned during the life of this plan, priority setting for project funding will occur on a local, regional and national basis within the FWS organization. Local project priorities may be developed collaboratively with cooperators, adjacent landowners and other stakeholders as appropriate.

c. Accountability - Accountability for achieving objectives developed in this plan will be accomplished by reporting results of projects or activities to the National Fire Plan Operations and Reporting System (NFPORS) as it is implemented. For objectives related to suppression, the annual report of fire activity, available from the Zone Fire Management Officer at Mark Twain National Wildlife Refuge in Quincy, IL will document results of suppression actions taken on the Refuges.

3. Contribution of Wildland Fire Goals to Regional/National Plans

a. National Fire Plan - Due to the small size of the Refuge and limited fire history since acquisition, wildland fire operations will not contribute significantly to any of the National Fire Plan goals.

b. Restore Fire-Adapted Communities - Prescribed fire application will help restore fire to the remnant prairies on the Refuge. The acreage involved is relatively small and will have no significant effect on National Fire Plan Goals.

4. 10 Year Comprehensive Strategy

a. Priorities to Protect Communities and High Risk Watersheds - Puxico, MO is the closest community that could be affected by wildland fire escaping the Refuge. There are several small groups of rural homes near the boundaries as well.

The watershed of the St. Francis River is not considered a high risk watershed. The Refuge is relatively flat and with a history of few fires, limited in size, it unlikely that fire will adversely impact the watershed below the Refuge. Within the Refuge there is some potential for localized siltation should a wildland fire burn on some of the slopes of more than 10% grade. Due to the water-based management priorities on the Refuge, retardant use will be limited.

b. Collaboration among Governments and Representative Stakeholders - Collaboration will occur between the MDOC, county and local governments and adjacent landowners (representative stakeholders).

c. Performance Measures and Results Monitoring - The primary performance measure applicable to this Refuge involves effective protection of life, property and existing habitat conditions. A second measure is the restoration of fire to its traditional role in fire adapted or dependent communities.

5. Cohesive Strategy Elements (Draft from USFS accepted by Interior agencies)

a. Institutional Objectives and Priorities - There are numerous refuge units in the Great Lakes-Big Rivers Region of FWS that support large fire-adapted communities. These areas will receive priority attention. Mingo=s needs will be addressed as regional priorities are established.

b. Program Management Budgets and Authorities - With no fire history, Mingo is part of a larger prescribed fire district and will eventually support some level of dedicated fire management staffing. Near term support will be continue to be provided by the PFS at Crab Orchard and the district FMO at Mark Twain NWR.

c. Social Awareness and Support - The refuge is estimated to host approximately 155,000 visitors annually. Public support is fairly strong, but few visitors come in contact with fire management operations while on the Refuge. Due to the small size of the Refuges and their scattered nature, the areas are mostly known only to local residents. Due to their designation as endangered species refuges no attempt has been made to generate extensive public support for Refuge operations.

IV. FIRE MANAGEMENT GOALS, OBJECTIVES, STRATEGIES, AND LIMITATIONS

A. INTRODUCTION

Fire has played a historical role in shaping the development and maintenance of warm season grasses. Under present day circumstances and over the course of time, planned and unplanned fire will continue to play a role in the management of resources on Mingo National Wildlife Refuge. The Fire Management Plan for Mingo NWR provides a detailed course of action to implement fire management policies for the Refuge for the purpose of achieving management objectives.

B. GENERAL FIRE MANAGEMENT GOALS

- Firefighter and public safety is the priority of the program. All Fire Management activities will reflect this commitment.
- Protect life, property, and other resources from unplanned fire.
- Use prescribed fire where appropriate to accomplish resource management objectives.
- Restore fire into the ecological process.
- Develop and implement a process to ensure the collection, analysis, and application of fire management information needed to make management decisions.

C. FIRE MANAGEMENT OBJECTIVES

- Protect from fire all important scientific, cultural, historic, prehistoric,

visitor facilities, administrative sites, and Refuge housing.

- Restore and perpetuate habitat important to migratory and native wildlife species by maintaining a diversity of plant communities in various successional stages.
- Use prescribed fire to the fullest extent possible to restore natural ecological processes, fire regimes, and vegetative communities on the Refuge, including native warm season grasses.
- Prevent human-caused wildland fires.
- Educate the public regarding the role of prescribed fire within the Refuge.
- Maintain and enhance moist soil units by retarding the invasion of woody species and noxious weeds.
- Use prescribed fire when it is the most effective and efficient means for achieving management objectives.
- Manage the risks associated with hazard fuels. Use prescribed fire near the urban wildland interface, sensitive resources and sensitive boundary areas to reduce risk from wildland fire damage.

V. FIRE MANAGEMENT STRATEGIES AND LIMITS

A. STRATEGIES TO MEET FIRE MANAGEMENT OBJECTIVES

- The Refuge will utilize the appropriate management response to suppress all wildland fire including lightning ignitions occurring within the boundaries of the Refuge.
- Suppress all wildland fires in a safe and cost effective manner consistent with resources and values at risk.
- Suppression strategies and tactics will be unique to each incident dependent on safety considerations, weather conditions, cost of suppression, fuel conditions, availability of resources, and location of the fire in relation to structures, cultural resource sites, and Class I Wilderness Area.
- Minimum impact strategies and tactics will be used whenever possible.
- Prescribed fire will be utilized to modify vegetative communities for improved wildlife habitat, ecosystem function, and hazard fuel reduction.

B. LIMITS TO STRATEGIES

- The use of retardant or foam will not be allowed in wetlands due to toxicity to aquatic species.
- Prescribed fire will be used to reduce hazardous fuel accumulations provided resource objectives are not negatively impacted.

- Utilization of heavy equipment during wildland fires will be allowed only with the approval of the Refuge Manager or their designee.
- Wildland fire use for resource benefit will not be utilized.
- The minimum tool necessary will be used when suppressing wildland fires in the Wilderness Area.

VI. FIRE MANAGEMENT UNITS (FMU)

All of Mingo NWR will be considered as one FMU for wildland fire suppression. All prescribed fires will be located in one of four prescribed fire units (Appendix Q). The Prescribed Fire Management Units will be discussed in Section IX- Prescribed Fire Program.

A. FMU SUPPRESSION OBJECTIVES

- Provide for the safety of firefighters, Refuge visitors, cooperators, and personnel.
- The Refuge will utilize the appropriate management response to suppress all wildland fire including lightning ignitions occurring within the boundaries of the Refuge.
- Minimize the damage to Refuge resources from suppression efforts, especially conscious of applying the minimum tool necessary in the Wilderness Area.
- Prevent fires from burning off of the Refuge onto adjacent lands.
- Prevent damage to cultural and historic resources.

B. SUPPRESSION STRATEGIES AND TECHNIQUES

- Utilize existing roads and trails, bodies of water, areas of sparse or non-continuous fuels as primary control lines, anchor points, escape routes, and safety zones.
- When appropriate, conduct backfiring operations from existing roads and natural barriers to halt the spread of fire.
- Use burnouts to stabilize and strengthen the primary control lines.
- If the use of heavy equipment is warranted, upon approval of the Refuge Manager, construction of control lines will border existing roads and ditches whenever possible.
- Retardants may be used on upland areas.
- Constructed firelines will be rehabilitated after the fire.
- The Incident Commander will choose the appropriate suppression strategy and technique. As a guide: On low intensity fires (generally flame lengths less than 4 feet), the primary suppression strategy will be direct attack with hand crews and engines. If conditions occur that sustain higher intensity fires (those with flames lengths greater than 4 feet), then indirect strategies which utilize back fires or burning out

from natural and human-made fire barriers may be utilized. Those barriers should be selected to safely suppress the fire, minimize resource degradation and damage, and be cost effective.

C. LIMITS

Immediate action will be taken to control all wildland fires. The methods utilized, especially in the Wilderness Area, should be the minimum tool. These may include, although not limited to, lookout towers, tool caches, firebreaks, motorized land, water, or air equipment, and chemical retardants. Care must be taken to ensure that control methods do not harm the Refuge especially the Wilderness Area more than the wildland fire itself.

See Section V-B for a listing of limits to suppression activity.

D. NORMAL FIRE BEHAVIOR

Fire behavior is dependent on many factors. Some of the most important influences are relative humidity, air temperature, fuel type, fuel moisture, wind speed, slope, aspect, time of day, and season. On-site predictions of estimated fire behavior can be made with the above inputs through the use of nomograms and models developed for this purpose. The various prediction systems provide outputs of rate of spread, fireline intensity, heat per unit area, and flame length.

The following general statements can be made for fires in certain fuel types:

Fuel Model 1- describes areas dominated by short grass, such as grama grass. A spread rate of 78 chains/hour with flame lengths of 4 feet under moderate conditions is possible. This fuel model occurs on low river terraces, including warm season grasses and levees.

Fuel Model 3- describes areas dominated by grass or grasslike vegetation averaging 3 feet in height. This would include cured stands of cattail and stands of native warm season grasses. A spread rate of 104 chains/hour with flame lengths of 12 feet is possible under moderate conditions. This fuel model represents the wetland, lowland shrub, and seeded grass habitat types.

Fuel Model 8 Closed Canopy Forests - describes areas of heavy fuel concentration. Only under severe weather conditions do these fuels pose fire problems. Closed canopy stands of short needle conifers or

hardwoods that have leafed out support fire in the compact litter layer. The layer consists of mostly needles, leaves, and some twigs since little undergrowth is present in the stand. Representative conifer types are white pine, lodgepole pine, spruce, true firs, and larches.

Fuel Model 9- describes areas dominated by hardwood litter from deciduous trees in the bottomland forest and upland forest habitat types. A spread rate of 7-8 chains per hour with flame lengths of 2-3 feet is possible under moderate conditions.

Fuel Model 10- describes areas of heavy down material. The fires burn in the surface and ground fuels with greater fire intensity than in the other timber litter models. Dead-down fuels include greater quantities of 3 inch or larger limbwood resulting from overmaturity or natural events that create a large load of dead material on the forest floor. Crowning out, spotting, and torching of individual trees are more frequent in this fuel situation. Examples include insect or disease-ridden stands, windthrown stands, overmature situations with deadfall, and aged light thinning or partial-cut slash.

E. PREDICTION OF FIRE BEHAVIOR

At the present time, Mingo NWR does not have a weather station, therefore the necessary data has not been collected to accurately determine a fire weather history. The National Forest Service (NFS) of Popular Bluff fire danger rating criteria will be used to determine potential fire behavior and trends necessary to properly manage the fire suppression program. Indices are calculated for grass and timber fuels by the NFS and are available.

F. RELATIONSHIP OF FIRE MANAGEMENT UNIT TO STATION OBJECTIVES

The Suppression Unit encompasses the entire Refuge. Therefore, the previous discussion of Station Objectives (Section III- D and E) fully addresses the unit objectives for the Suppression Unit.

VII. FIRE MANAGEMENT AND RESPONSIBILITIES

The suppression of wildfire is given priority over all activities except the safeguarding of human life (620 DM 1.4A). It is expected that all fire trained Refuge employees will be available to assist with emergency suppression as needed on the Refuge. Fire duty assignments will include only those duties for which each employee is qualified according to guidelines specified in the National Interagency Fire Qualification Subsystem Guide (PMS 310-1). Individuals must meet training, experience, and physical fitness requirements.

Prescribed burns may use individuals that meet FWS qualifications and fitness standards identified in the FWS Fire Management Handbook. Depending on fire complexity, several non-line support functions may be necessary. These positions will be activated as needed.

Table 2 - Optimum Staffing to Conduct a Fire Management Program

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

A. FIRE MANAGEMENT TEAM RESPONSIBILITIES

Refuge Manager (RM)

The Refuge Manager is responsible for the full range of management duties within the Refuge, including fire management activities that implement an effective fire management program. The appropriate action will be taken by the manager for fires on Refuge lands. Related fire management activities include delegation of authority, approval of agency advisors, implementing the Wildfire Situation Analysis (WFSA) and approval of prescribed fire operations. (621 FW 1.5F)

Assistant Refuge Manager:

The Assistant Refuge Manager supervises career, seasonal, and temporary fire staff. Serve as incident commander during wildland fire incidents. Assist with interagency fire dispatches as qualified. Maintain lead responsibility for managing the prescribed fire program including: serve as prescribed fire burn boss, as available and qualified; propose prescribed fire projects; write prescribed fire plans. During the absence of the Refuge Manager, delegate the responsibility for managing Refuge programs. Assist with interagency assignments and supervise the maintenance staff.

Refuge Biologist:

The Refuge Biologist will coordinate fire monitoring program to determine if prescribed burns accomplish objectives. Provide technical/biological support to managers in selecting appropriate resource objectives and the best management options to use in accomplishing selected objectives, including prescribed fire. Review prescribed burn

plans to ensure sound biological principles are being followed, resource management objectives are valid, and sensitive resources are not negatively impacted. Serve as qualified on prescribed burns. Assist with interagency assignments as qualified.

Fire Management Officer (FMO)

The Zone FMO, is a resource shared by the stations within his/her zone. The FMO advises the Refuge Manager(s) or staff as requested on matters relative to fire planning, fire pre-suppression, suppression and prescribed burning. Assists in intra-agency and inter-agency fire management needs. The FMO supplies technical assistance relative to fire management activities and also advises the assigned stations on priorities, strategies and tactics to reduce adverse fire impacts. The FMO can assist with oversight and coordination of the Refuge=s fir management program, including wildfires, prescribed burning, and fire related dispatch and mobilization. The FMO can assist with matters pertaining to preparation and implementation of the Fire Management Plan. He/she can represent the assigned stations and coordinate fire related activities with: other refuges, regional fire coordinator, and local, state, and other federal fire organizations as directed by the RM. Reviews refuge annual prescribed burn plans. Maintains training and qualification records for Refuge personnel; coordinates Refuge fire training; maintains fire records and systems; assists in developing and implementing fuel management and prescribed fire projects; coordinates mobilization of Refuge resources for off-Refuge assignments. (621 FW 1.5.G)

Prescribed Fire Specialist (PFS):

This position is identified in Firebase, but is presently vacant due to a lack of funds and will be addressed as funding becomes available. In the interim, the PFS stationed at Crab Orchard NWR will assist and oversee the Mingo NWR prescribed fire program. The PFS directs field operations for implementing and carrying out the Fire Management Plan. This position is responsible for the day to day implementation of the fire suppression program, to ensure fire readiness of unit personnel, supplies, equipment, and apparatus. Serves as prescribed burn boss on burns, and as Initial Attack Incident Commander during wildfires. The PFS determines funding for NUS and prescribed fire activities using the FIREBASE system for fire funding. Prepares the refuge annual prescribed burn program. Is responsible for scheduling and implementation of management-ignited prescribed fire needs.

Regional Fire Management Coordinator (RFMC):

Provides coordination, training planning, evaluation and technical guidance, as requested, to the Refuge. Reviews and approves refuge annual prescribed burn plan and budget requests. The RFMC will be informed of all wildfire suppression activity occurring on the Refuge. As conditions warrant, approves refuge step-up plan implementation, and may request fire personnel from the Refuge to meet suppression needs elsewhere. He similarly may be called upon to gather additional resources to implement the fire management program. (621 FW 1.5E)

Fire Technician(s):
These positions are responsible for maintenance of fire equipment and maintaining an inventory of the fire supplies. The technicians relay this information to the PFS to determine needs for NUS or for the fire cache. The fire technician also assists the PFS and Refuge staff with planning and implementation of the fire program. Also, this person serves as a prescribed fire crew member and a national wildfire resource as qualified.

Administrative Officer (AO):
Responsible for posting of firefighter time and meeting procurement needs at the local level during an ongoing incident. Serves as communications link for ongoing wildfires and prescribed fires. Responsible for the administrative support needed to assist the FMO with budget, time and procurement. Serves as a support dispatcher regionally and nationally as qualified.

Remainder of Refuge Staff:
All staff members assist with fire planning, preparation, operations, and monitoring as qualified or support rolls as determined by Refuge Manager. Staff members also assist as national wildfire resources as qualified and available.

B. REFUGE FIRE MANAGEMENT TEAM

The Refuge Fire Management Team consists of the positions listed above, assigned under the supervision of the Refuge Manager. Since Refuge staff members change periodically, as do individual fire qualifications, no attempt is made to list individuals by name and individual qualification in this section. However, this information can be found in Appendix C. This appendix will be updated on an annual basis.

C. PRESCRIBED FIRE VALIDATION

The FMO/PFS, working with the management staff advises the RM on issues pertaining to prescribed fire validation. This allows the RM to

confirm that burns will be within prescription and make appropriate decisions on the daily application of prescribed fire as appropriate.

D. FIRE COOPERATORS AND INTERAGENCY COORDINATION

No formal cooperative agreements are in place with the state of Missouri or other Federal agencies for fighting wildland fires. An Interagency Fire Coordination Meeting is held annually with the U.S. Forest Service, U.S. Army Corps of Engineers, and Missouri Department of Conservation. The Mingo Job Corps staff and a large number of students are qualified and available for immediate assistance on any Refuge fire. Escaped fires would constitute an emergency situation and require the assistance of professional fire fighters. Standard building evacuation procedures would be followed as outlined in the Station Safety Plan.

Mingo NWR is almost entirely surrounded by private lands and local fire departments have primary fire management responsibilities for lands within their jurisdiction under state law. There are currently five local agreements for fire suppression assistance. They are with Puxico Fire Department, Wappapello Fire Department, Butler County Fire Department, Lowndes Volunteer Fire Department, and Stoddard County Fire Department. Under these agreements, local fire departments are available upon request to respond to wildland fires on the Refuge. The Butler and Stoddard County departments serve primarily for backup to the other three departments in a Mutual Aid role. Upon arrival, FWS personnel assume command of incidents on the Refuge. Fire Department resources are then either released or used in a support capacity.

VIII. WILDLAND FIRE PROGRAM

A. FIRE PREVENTION PROGRAM

Although fire may have historically played a role in the development of habitat on Mingo NWR, human ignited fires and natural ignitions burning without a prescription are likely to result in unwanted damage to cultural and/or natural resources. In order to prevent wildland fire, an educational program will be utilized to reduce the threat of human caused fires. Ongoing monitoring will be conducted by Refuge staff, visitors, and cooperators to detect fire ignitions. Actions taken to implement this include:

1. Staff Requirements.

All staff members will be familiar with this plan. New employees and volunteers will be given an orientation session which includes discussion of fire prevention and detection.

2. Fire Prevention.

Fire prevention will be discussed at safety meetings, prior to the fire season, and during periods of high fire danger. Periodic training of staff in regards to fire prevention will be conducted.

3. High Fire Danger

During periods of high fire danger, warnings will be posted at visitor information stations.

4. Public Contacts.

Public contacts will be made via press releases and verbal contacts during periods of high fire danger.

5. Fire Investigations.

A thorough investigation will be conducted of all fires suspected to have been intentionally set. Upon completion of the investigation, appropriate action will be taken

Fire Prevention Analysis

Analysis has not been completed due to the low number of ignitions. If ignitions significantly increase or begin to occur in new areas, prevention strategies will be reviewed and modified, if necessary. As new visitor facilities are developed or use levels significantly increase, the Fire Management Plan will be reviewed and modified, if necessary.

B. FIRE SEASON

The fire season runs from March through November. Fires outside of this window are possible, but are usually associated with abnormal precipitation trends.

C. FIRE BEHAVIOR

Wildland fire can be dangerous and unpredictable during any season of the year; however, the months of March, April, October, and November typically have the potential for the **most severe fire behavior** and the most likely period of occurrence. During these months, cool season grasses and other plants have cured out, relative humidity is usually low, temperatures are moderate, wind speeds are typically high, and ignition sources (hunters and other visitors) are common.

D. PREPAREDNESS

1. Training and Qualifications

Fish and Wildlife Service policy sets training, qualification, and

fitness requirements for all wildland firefighters and prescribed fire positions. All personnel involved in fire management functions will be provided with the training required to meet FWS qualification standards for the position they are expected to perform. Interagency training opportunities will be utilized whenever possible. Due to the frequent adoption and evolution of policy, the training process is not described in this section. Current training procedures will be available from the Zone FMO.

2. Annual Refuge Fire Management Activities

Table 3 - Annual Refuge Fire Managment Activities

ACTIVITY	MONTH											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Update Interagency Fire Agreements	**X**											
Winterize Fire Equipment												**X**
Inventory Fire Engine and Cache		**X**										
Complete Training Analysis	**X**											
Annual Refresher Training		**X**										
Annual Fitness Testing		**X**										
Pre-Season Engine Preparation		**X**										
Prescribed Fire Plan Preparation	**X**											
Review and Update FMP	**X**											
Prepare Pre-Season Risk Analysis		**X**										

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

3. Emergency Preparedness / Preparedness Levels - Impact of Regional and National Preparedness Levels

Local dispatch centers shall be made aware of the situation and consulted to determine the availability of contingency resources in the event of an escape. Preparedness levels may be obtained from the Missouri Interagency Coordination Center.

Prescribed fire application can be continued or be initiated if the

following conditions are met:

a. Preparedness Level IV

Local Volunteer Fire Department=s (VFD=s) Notification
Contingency forces will generally be VFD=s. Therefore, prior to initiating a prescribed fire, VFD=s will be notified to ensure adequate contingency resources are available.

Regional / National Notification
Regional or State level agency representative must concur with local agency recommendations for managed fires. Evaluation of significant risk is made by Regional or State agency representative in presentation of prescribed fire implementation proposal to geographic Multi-Agency Coordinating (MAC) group prior to any prescribed fire approval (Eastern Area Interagency Incident Mobilization Guide 1999).

b. Preparedness Level V

Approval from the Service Fire Management Coordinator at the National Interagency Fire Center (NIFC) in concert with the Geographical Area Coordination Group is required.

Regional / National Notification
Regional or State level agency representative must concur with local agency recommendations for managed fires. Evaluation of significant risk is made by Regional or State agency representative in presentation of prescribed fire implementation proposal to geographic Multi-Agency Coordinating (MAC) group prior to any prescribed fire approval (Eastern Area Interagency Incident Mobilization Guide 1999).

Prescribed fire activities will not be conducted when the National Preparedness is at Levels IV or V, without approval of the Eastern Area Coordination Group.

E. NORMAL UNIT STRENGTH

All equipment will be stored at the Refuge maintenance shop and may be kept on the pumper trailer in the maintenance shop during the winter months.

In the instance of a wildland fire or a prescribed burn too large to be handled without assistance from cooperative agencies, excess tools and equipment will be provided by the cooperators.

Lists of tools and other equipment can be found in Appendix G.

F. SEVERITY FUNDING

Severity funding may be essential to provide adequate fire protection for the Refuge during periods of drought, as defined by an appropriate drought indicator. Severity funds may be used to hire additional firefighters, extend firefighter seasons, or to provide additional resources. The FWS Fire Management Handbook provides guidelines for use of severity funding.

G. DETECTION

The Refuge relies on neighbors, visitors, cooperators, and staff to detect and report fires. In addition, increased patrols by Refuge personnel will occur during periods of very high and extreme fire danger.

H. FIRE SUPPRESSION

1. General

Service policy requires the Refuge to utilize the Incident Command System (ICS) system and firefighters meeting National Wildland fire Coordination Group (NWCG) qualifications for fires occurring on Refuge property. All suppression efforts will be directed towards safeguarding life while protecting the Refuge=s resources and property from harm. Mutual aide resources responding from cooperating agencies will not be required to meet NWCG standards, but must meet the standards of their respective Agency. Mutual aide resources will report to the Incident Commander (in person or by radio) and receive their duty assignment. Mutual aid forces will be first priority for release from the fire. 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 Refuge lands will be reported to Refuge Headquarters and the appropriate County

Dispatch Office. **The person receiving the report will be responsible for implementing the Fire Dispatch Plan (Appendix H) and assume duties of Fire Dispatcher until relieved or released.**

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

The **Fire Dispatcher** will be responsible for coordinating the filling and delivery of any resource orders made by the IC for all operational and logistical needs, including engines, 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 Missouri Interagency Coordination Center.** The Zone FMO will generally be able to assist with ordering resources from outside the area.

Requests for assistance by cooperators on fires not threatening the Refuge must be made to the Refuge Manager or designee. Only qualified and properly equipped resources meeting National Wildfire Coordinating Group standards will be dispatched.

3. Communications

Appendix J contains a listing of Radio Communication Frequencies commonly used on Mingo NWR..

4. Initial Attack

All fires occurring on the Refuge and staffed with Service employees will be supervised by a qualified IC. The IC will be responsible for all management aspects of the fire. 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) determining 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.

5. Escaped Fires/Extended Attack

Additional qualified resources can be requested directly from the Mark Twain U.S. National Forest Service (MO), Missouri Department of Natural Resources, Mingo Job Corps, and the local community of Puxico. The Missouri Interagency Coordination Center (agreement pending) will be contacted to request resources beyond the Aclosest forces@.

Whenever it appears a fire will escape initial attack efforts, leave Service lands, or when the fire exceeds the capabilities of command or operations, the IC will take appropriate, pro-active actions to ensure additional resources are ordered. The IC, through dispatch or other means, will notify the Zone FMO of the situation. The Zone FMO will assist the Refuge Manager in completing a Wildland Fire Situation Analysis (WFSA) Appendix K and Delegation of Authority (Appendix L).

6. Mop-up and Rehabilitation

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

7. Limits to Suppression Activities

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. The minimum tool necessary will be used in the designated Wilderness Area.

I. REHABILITATION

Rehabilitation of suppression actions will take place prior to firefighters being released from the fire. Actions to be taken will include:

- All trash will be removed.
- Firelines will be refilled and waterbars added as needed.
- Hazardous trees and snags cut and all stumps cut flush.
- Repair damage to improvements caused by suppression efforts, and complete rehabilitation and restoration plan if necessary.

Current FWS fire rehabilitation and restoration policy and guidelines are found in the FWS Manual, Part 095 Chapter 3, Wildland Fire Management Emergency Preparedness and Response, Section 3.9 Fire Suppression Activity Damage. Supplemental funding guidance is found in the Fire Management Handbook Section 1.6 Subactivity 9262.

Fire rehabilitation and restoration policy for all Federal agencies is currently under significant revision. Revised policy when approved can be found in the FWS Fire Management Handbook, Chapter 5: Fire Rehabilitation and Restoration. The revised policy will include; Fire Suppression Activity Damage, Burned Area Emergency Rehabilitation (BAER), Fire Damage Restoration, and Fuels Management Project Rehabilitation. The Zone FMO will be consulted for assistance on fire rehabilitation and restoration on Refuge wildland fires.

J. RECORDS AND REPORTS

The incident commander (IC) on a wildland fire or the prescribed fire burn boss on a prescribed burn will be responsible for the completion of a DI-1202 Fire Report as well as Crew Time Reports for all personnel assigned to an incident and return these reports to the Assistant Refuge Manager. The IC or burn boss 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 Assistant Refuge Manager or Refuge Manager will ensure all data is entered into the FMIS computer database within 10 days after the fire is declared out. The IC or burn boss 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

A. INTRODUCTION

Fire, whether caused by lightning or native Americans, was a major natural process in the Mingo Basin Area prior to European settlement and the resulting intensive fire suppression. The Refuge once used prescribed fire as a management tool. The average prescribed burn size was 40 acres. The majority of burns conducted were associated with warm season grass seeding restoration/maintenance and woody species encroachment. Burning occurred almost exclusively in the spring. Summer and fall burns were not utilized due to staffing shortages and lack of access to current fire effects research and monitoring information.

B. USE OF PRESCRIBED FIRE TO ACHIEVE RESOURCE MANAGEMENT GOALS

The use of prescribed fire is an appropriate management action. In resource management, prescribed fire is used to renovate, restore, create, or maintain diverse native plant communities and perpetuate indigenous wildlife and habitat.

The goals of resource management prescribed fire are:

- reduction/control of invasive vegetation, primarily bull thistle and fescue grass.
- control of woody vegetation invasion of grasslands, primarily willow, indigo bush, persimmon, and cottonwood.
- restoration of warm season grasses.

The objectives of resource management prescribed fire :

- Treat approximately 0-200 acres per year in order to accomplish resource management goals on land management units. Maintaining the desired burn frequency and utilizing the appropriate burn season will be a priority. Areas that will likely be treated with prescribed fire can be found on the map in Appendix Q.

Repeated fire reduces the litter and humus, accelerates the slow nutrient cycle, increases native herbaceous plants, returns sun exposure to native plant=s apical meristem, reduces woody plants and reduces excessive fuels in the woodlands.

Burn periods and fire effects at Mingo NWR (Adapted From a Burning Case Study by Karen Smith) describe the following:

- Spring burns: Stresses smooth brome, quack grass, and fescue. The critical point is to burn when exotic grasses are actively growing and native cool season grasses are not fully active. Woody plants will sucker profusely, native cool seasons are set back somewhat, but the set back depends on precipitation following the burn. Native warm season grasses seem to increase.
- Summer burns from mid-July to late August (historical fire period): Reduces woody plants more effectively than any other period. Repeated burns decrease exotic cool seasons.
- Fall burns: Simulates the Spring period, but has been used infrequently. Woody and exotic plants may not do as well when compared to the Spring period because in many winters soil surface is exposed to drying, winter elements, which is a disadvantage to woody and exotic plants.

C. PRESCRIBED FIRE MANAGEMENT UNITS

The Refuge will be divided into 5 prescribed fire management units. The Units were created using habitat types, under the basic assumption that each habitat presents its own unique fire behavior and prescription values.

A general discussion of anticipated fire behavior based on fuel models can be found in Section VIII. A map of the habitat types of Mingo can be found in Appendix P.

Table 4 - Prescribed Fire Units on Mingo NWR

Management Unit	Acreage
Forest Land	15,000 acres
Marsh Habitat	4,492 acres
Moist Soil Units	1,000 acres
Grassland	702 acres
Agricultural Fields	278 acres
Total	**21,472 acres**

D. HAZARDOUS FUEL REDUCTION

The Refuge hazardous fuel reduction program may use prescribed fire within or near structural/wildland interface areas, wildland fire sensitive resources, and specific Refuge boundary areas to reduce the risk from wildland fire damage. Refuge boundary zone burn units are selected based on values at risk on adjacent land, probability for wildland fire escape from FWS land, and fuel. Fuels in hazard fuel sites typically contain many years of accumulated grass, shrub and tree litter, and high densities of live shrubs. The large volume of litter and shrub component causes Refuge control problems during suppression actions, because of potential high rate of spread and flame lengths that prevent direct attack of a headfire. High litter loadings allow wildland fires to carry even during the growing season. To the greatest extent possible, hazard fuel burns will only be used when they can compliment resource management objectives. Other methods are also used to reduce fuel loads, such as mechanical mowing haying or discing.

Goals of Hazardous Fuel Reduction Prescribed Fire Program include:

- Maintain dead fuel loadings within the normal range of the fuel model in hazardous fuel zones
- Maintain woody shrub vegetative component to #25 to 50% canopy coverage density
- Prevent hazardous fuel accumulations from endangering life, property, and wildlife resources

Objectives of Hazardous Fuel Reduction Prescribed Fire Program are:

- Reduce dead fuel loadings (litter) of 3 to 5 tons per acre by

approximately 75% or better
- Reduce canopy coverage density of shrub vegetation component by 50%
- Burn units once every 4 to 7 years depending on fuel accumulations and resource management considerations.

The timing of burns varies according to specific objectives desired. Burning is usually conducted in late March through mid-June and mid-July through November.

E. PLANNING

The Refuge Manager is responsible for supervising the development of resource management objectives for individual units on the Refuge. The Refuge Biologist will provide assistance in selection of the appropriate management action needed to meet objectives. If needed, the Zone FMO and/or Prescribed Fire Specialist (PFS) will be consulted for assistance in accomplishing desired objectives. Prescribed burn plans are prepared that document objectives and the plan of action for achieving them. Elements of each burn plan will meet all training, personnel, equipment, and other requirements as specified in the FWS Fire Management Handbook (621 FW 3, Section 2.2). Prescribed fires will be planned to minimize the risk of escape and/or to mitigate necessary risks and provide an adequate contingency plan for suppressing the fire should an escape occur. Burn plans will be written by a qualified burn boss. Low and moderate complexity burn plans must be reviewed by a Prescribed Burn Boss Type II (RXB2) or higher. High complexity burns must be reviewed by a Prescribed Burn Boss Type 1 (RXB1). Burn plans will be submitted for review to the Refuge Manager, Zone FMO, and Regional Fire Coordinator at least 60 days prior to the planned burn day. The Refuge Manager will have final signature approval following the review process previously listed.

The FMO, PFS, Refuge Managers, fire management crew, and other staff will be responsible for prescribed fire preparations including equipment maintenance and firebreak preparation. Prescribed burn units may require preparation including; mowed lines, disced lines and black lines. Public relations must be considered. Preparation for burns will be handled on an individual basis and will be identified in the prescribed burn plan for that unit. The Refuge Manager will prioritize the units to be burned on the Refuge if conflicts exist.

Prescribed burns may be conducted at any time of the year, depending on

objectives and prescription. The typical prescribed burn season is March through November. Timing of burns for individual units is based on specific objectives. Burning in wetlands to reduce emergent vegetation may also occur during the late fall or winter. The process of burning to establish blacklines which will be used as control lines for future burn units may also be conducted in fall and winter.

Permits to burn are not required by Missouri at this time. The Refuge will report wildland fire and prescribed fire activity to the Missouri Interagency Coordination Center (MOCC) for the Statewide and National Fire Situation Report. Mingo NWR is within the Eastern Area Fire Coordination Zone. When the Eastern Area is in Fire Danger Preparedness Level V and/or the National Preparedness Level is IV or V, specific project approval must be obtained from the Regional fire staff to conduct prescribed burning operations.

Multiple units may be burned at the same time within the Refuge. The maximum number of simultaneous burns will depend on the availability of personnel, equipment, and the cumulative impacts of smoke on sensitive targets. The Zone FMO, PFS or other qualified Prescribed Fire Manager will be available to coordinate the management of simultaneous burns. It is not required that the Prescribed Fire Manager be on-site during the burns, but he/she must be in contact with each burn project. Sufficient suppression forces must be available for each burn to provide adequate response in the event of an escape.

F. LIMITS

Mingo NWR is located in the Eastern Geographic Fire Management Area as organized by the National Interagency Fire Center. One or more prescribed fires cannot be ignited when the Eastern Area is in a Fire Danger Preparedness Level V and/or the National Preparedness Level is V, without the approval of the Eastern Area Coordination Group (EACG). At planning Level V, the FWS Service Fire Management Coordinator must also approve the burn.

Contingency forces will generally be Volunteer Fire Departments (VFD). Therefore, prior to initiating a prescribed fire, VFD=s will be notified to ensure adequate contingency resources are available.

County sheriff offices institute local burn advisories for private lands during periods of high fire danger. The FWS is not required to comply during county burn advisories; however, the Refuge will maintain close

coordination with the counties when burning during county burn advisories. High complexity burns will not be ignited during county burn advisories.

Drought can have an effect on fire severity and control. Individual prescribed burn plans are required by FWS policy to assess local drought indicators. Drought indicators (PDI - KBDI, precipitation departures from normal) will be used to determine the degree of drought. These indicators can be accessed on the web at http://www.boi.noaa.gov/fwxweb/fwoutlook.htm

There will be no control burns initiated in the Wilderness Area on the Refuge. Only suppression efforts utilizing minimum tool necessary will occur. Prescribed fire planning in adjacent Refuge areas will include a smoke management section to meet the requirements designated for Class 1 airsheds.

G. COMPLEXITY

Prescribed fire complexity on the Refuge will be determined by the FWS Complexity Analysis. Most prescribed fires currently being conducted are of low complexity; however, moderate complexity burns will be more common due to multiple objectives, sensitive species, smoke management issues, and multiple fuel models.

H. MONITORING AND EVALUATION

1. Introduction

Past monitoring and evaluation of prescribed fires has been limited. Pre-burn evaluation was limited to general photographs and/or qualitative evaluation of fuel conditions and green up conditions. Burn day evaluations documented weather conditions on site. Post burn evaluation was limited to subjective qualitative estimates of species response and effectiveness in achieving objectives.

2. Methods

First Order Fire Effects Monitoring Program

a. **Environmental conditions** will be recorded at the site, periodically, prior to ignition and hourly during the burn. Conditions to be evaluated include air temperature, relative humidity, and wind speed and direction.

b. **Fuel moisture(s)** will be measured or estimated using

tables, charts, or other prediction systems (BEHAVE).

c. **Fire behavior** such as flame length and rates of spread will be recorded.

d. **Post fire effects** will be measured or estimated. These effects include scorch height, percent of area burned, percent of fuel consumed. Percent of fuel consumed is based on fuel (time-lag) classification, fire severity, amount of duff removed, and a map of the burn mosaic.

I. PRESCRIBED FIRE IMPACTS

1. Environmental Impacts

Environmental impacts of the prescribed fire program have been discussed in previous sections of this Fire Management Plan. Air quality issues will be discussed in Section XI.

2. Social and Economic Impacts

The Refuge is surrounded primarily by agriculture based communities and landowners. Fire is used by farmers to prepare crop fields, clear ditches, and clear seasonal wetlands. Smoke and fire on the local landscape are a common occurrence. The public has generally accepted the use of prescribed fire in the neighboring communities.

The majority of recreational use occurring on the Refuge is centered around hunting, fishing, and wildlife observation. Visitors from all over the region come to participate in wildlife dependent recreational opportunities on the Refuge. Annual visitation is estimated at 155,000 per year. Negative impacts to the local economy could result if habitat conditions decline resulting in decreases in wildlife populations. The number of visitors traveling to the area could decrease; thus, reducing income for the local economy.

Escaped prescribed burns pose a threat to adjacent life and property, but proper planning and prescriptions, qualified personnel, and contingency planning will mitigate this threat. Temporary air quality impacts from smoke may occur, but are mitigated by the fuel type (light fuels) where fires are usually limited to one burning period with little residual burning, and consultation with State air quality personnel.

X. AIR QUALITY AND SMOKE MANAGEMENT GUIDELINES

The goal of a responsible Smoke Management Program is to achieve Refuge land management objectives while minimizing undesirable impacts. Smoke and fire management priorities are the same. Firefighter and public safety is the first priority. Personal property and natural resource protection is the second priority. Firefighter safety standards come from the Occupational Safety and Health Act with OSHA having primary implementation responsibility. OSHA typically adopts standards developed by experts in the area of interest. In the case of wildland fire, organizations like the National Wildland fire Coordinating Group and National Fire Protection Association guidelines are also included. In the Service, the Office of Safety and Health is responsible for integrating OSHA policies, procedures, and guidance into Service management operations. Exposure to carbon monoxide and individual particulate matter compounds in wildland fire smoke are of primary firefighter safety interest. Limiting firefighter exposure to smoke is the best way to improve a firefighter's working environment. This is best done by operations planning and crew rotation.

Public health and welfare standards come from the Clean Air Act. The Environmental Protection Agency (EPA) is responsible for establishing policy and guidance which are used by the individual states to develop specific State Implementation Plans (SIPs) and Smoke Management Programs (SMPs). It is the SIPs and SMPs that establish the legal standards for Service operations. Of the criteria pollutants in smoke, particulate matter is of most concern to public health. The EPA has established National Ambient Air Quality Standards (NAAQS) for Particulate Matter. They are set for both 10 and 2.5 micron size categories.

Emissions and NAAQS exceedances from prescribed and wildland fires used to achieve Refuge objectives are addressed by the Interim Air Quality Policy on Wildland and Prescribed Fire. The states use these policies and other information to develop SIPs/SMPs which become the public health standard that Service smoke management plans must address.

The EPA has also established visibility and regional haze standards to protect public welfare. The Interim Air Quality Policy on Wildland and Prescribed Fire does apply to visibility and regional haze, but the Natural Events Policy does not. Both natural and anthropogenic emission sources contribute to visibility impairment and regional haze. The states use The Interim Air Quality Policy on Wildland and Prescribed Fire and other information to develop SIPs/SMPs which become the public welfare standard Service smoke management plans must address.

Along with conforming with public health and welfare standards, smoke management responsibilities also includes protecting public safety and reducing nuisance impacts from the smoke.

Smoke management strategies vary widely in their applicability and effectiveness by vegetation type, burning objective, region of the country, and whether fuels are natural or activity-generated. When fire is used to reduce fuel loadings, eliminate an undesirable species, dispose of biomass waste, facilitate timber harvest, etc., these strategies can be very effective in both conforming with State standards and meeting Refuge management objectives.

When fire is needed for ecosystem maintenance or restoration, especially those ecosystems that are fire adapted or maintained, these strategies are less applicable because they all alter the ecosystem's fire regime (intensity, frequency, seasonally, or spatial distribution). Altering an ecosystem's fire regime is manifested by changes in community structure and function and species diversity and distribution to some degree and is well documented.

Combustion of fuels during prescribed fire operations may temporarily impact air quality, but the impacts are mitigated by small burn unit size and the distance from population centers. Refuge staff will work with neighboring agencies and in consultation with State air quality personnel to address smoke issues that require additional mitigation.

Individual prescribed burn plans address smoke management specific to each burn. Smoke management elements required in each burn plan include: identification of smoke sensitive targets and hazards, distance to smoke sensitive targets and hazards, action necessary to prevent adverse impacts to targets and hazards, transport wind speed and direction, and dispersal conditions.

Smoke sensitive areas in the area include Refuge Class 1 Wilderness Area, Refuge, county, and state roads. Private lands adjacent to the Refuge and Refuge are primarily agricultural with single family residences and farmsteads. Agricultural burning in and around the Refuge is widespread, frequent, and commonly accepted by the public.

Individual prescribed burn plans will specifically address smoke management concerns and actions required to ensure public safety and prevent negative impacts from smoke. The public will be informed of prescribed fire activity on the Refuge through several methods including: in person or telephone notification of nearby neighbors, Refuge press releases, information bulletins posted at

information kiosks, smoke signs and traffic control devices. Local and county entities will be contacted prior to burning by phone or in person as part of the required elements of each prescribed burn plan.

Burn plans will also include contingency plans which will be implemented in the event of unexpected negative smoke dispersal conditions. In general, prescribed burns will be small in size (average 5 to 75 acres), have light fuel loads (.25 to 3 tons of fuel per acre), will be burned under low fuel moisture conditions, and will be burned under specific wind direction and atmospheric stability conditions.

SMOKE MANAGEMENT CONTINGENCY PLAN

If changes in weather conditions occur that cause imminent smoke problems, the following plan will be initiated:

1. **Signage.**

   Smoke signs will be placed on all potentially impacted roads following DOT requirements. A refuge employee will be assigned to monitor the road on each end of the area of concern and will be equipped with a radio, cell phone and vehicle with emergency lights for high visibility. If possible, staff should wear high visibility vests when working on roads. If conditions warrant, traffic control will be initiated using appropriate "stop" and or "caution" signs, and the county sheriff or other law enforcement personnel will be called to assist with local traffic control, including temporary closure of area roads if deemed necessary.

2. **Emission Management.**

   All attempts will be made to reduce smoke emissions from the burn as quickly as possible. This may include immediate shut down of the burn and suppression of any area of the unit still on fire. Mopup will also be initiated in order to eliminate as much smoke production as possible.

3. **Additional Resources.**

   If additional resources are needed to extinguish the burn and eliminate further smoke production, they will be called in through the refuge dispatch system and may include fire departments, personnel from other refuges or other state and Federal agencies in the area.

4. **Local Impact Mitigation.**

   If it appears that smoke from the burn will impact local

communities or other smoke sensitive locations, all efforts will be made to identify the potential problem areas and inform the public so that local actions to reduce impacts such as closing up buildings and moving smoke sensitive individuals away from the impacted area can occur.

XI. FIRE RESEARCH AND MONITORING

Monitoring will comply with accepted scientific methods. Specific methodology is described previously in this plan. Fire behavior data will be collected on all prescribed fires occurring on Mingo NWR as outlined above. The data recorded, along with information gathered through research studies in similar plant communities, 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.

XII. PUBLIC SAFETY

Firefighter and public safety always take precedence over property and resource protection during any fire management activity.

Under moderate to severe fire danger index ratings, flaming fronts are capable of moving at fast speeds in all fuel models. In order to eliminate safety hazards to the public, all public access into the burn units will be closed the day of the burn. Fire crews will be briefed, that should an individual who is not a member of the fire crew be observed in the prescribed burn unit, they are to immediately escort them out of the area. The fire crew will keep the fire scene clear of people except for Service firefighters and cooperating fire crews.

During wildland fires, the IC is responsible for managing hazards from smoke. Smoke mitigation and management will be included in the prescribed burn plan and is the responsibility of the burn boss. Smoke from a Refuge fire could impair visibility on roads and become a hazard. Actions to manage smoke can include: use of road guards and pilot car, signing, altering ignition techniques and sequence, halting ignition, suppressing the fire, and use of local and Refuge law enforcement as traffic control. The Refuge will follow guidelines set by the Region 3 for safety and smoke management.

Wildland fires 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.

XIII. 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. WILDLAND FIRE SUPPRESSION

During wildland fire suppression, the IC is responsible for dispersal of information to the press and the public. The IC may delegate this responsibility as appropriate.

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:

- Presentations in local schools
- Attendance at local fire department meetings
- Including a prescribed fire message in Refuge interpretive publications and materials
- Follow prescriptions in burn plans to prevent escape

XIV. ARCHEOLOGICAL/CULTURAL/HISTORIC RESOURCES

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 wildland fire holding actions.

Appropriate measures will be taken to protect sites during wildland fire suppression efforts. Incident commanders will be briefed on site locations. Prescribed fire plans will outline protection measures to be taken to preserve sites. Prescribed burn planning will include site survey and clearance if ground disturbance is planned from such activities as plow lines and hand lines.

The use of earth moving equipment poses a threat to cultural resources found below the ground surface. The use of earth moving equipment for suppression activities within the Refuge must be approved by the Refuge Manager on a fire by fire basis, and the possible presence of cultural resources will be considered in the approval process. Whenever possible, efforts will be made to contact the Regional Archaeologist to discuss the consequences of the use of earth moving equipment prior to the deployment of the equipment on a wildland fire.

Preparation for prescribed fires such as constructing fire lines are subject to Section 106 of the National Historic Preservation Act. The procedures in the Notice dated December 8, 1999, AHistoric Preservation Responsibilities,@ apply to the planning and preparation for conducting prescribed fires.

Efforts to control wildland fires (including prescribed fires that get out of control) are also subject to Section 106 of the National Historic Preservation Act. We will meet our obligations under this act in the following ways:

When the land covered by a wildland fire has been inventoried to identify cultural resources, and the cultural resources have been evaluated for significance according to the criteria for the National Register of Historic Places, the Fire Management Officer will direct ground disturbing fire suppression efforts around (will avoid impacting) historic properties. Nevertheless, evidence of a previously undetected cultural resource may be encountered. The Refuge Manager shall immediately notify the Regional Historic Preservation Officer (RHPO). The RHPO will take immediate steps to have the cultural resource evaluated and protected, as appropriate, to the extent required by law and policy. This may require arranging for a qualified professional to visit and evaluate the site's importance and recommend a course of action. An evaluation and decision on the disposition of the cultural resource should be made within 48 hours of the discovery unless the project's schedule allows greater flexibility.

When the land covered by a wildland fire has *not* been inventoried for cultural resources and wildland fire suppression activities do result in ground disturbing activities, we will take the following action. Soon after fire control, the Refuge Manager will contact the RHPO to arrange for an archeologist to investigate the disturbed areas to determine if sites were affected.

Refuge operations and maintenance funds will pay the cost of these activities unless the action is an emergency archeological and historic property survey in unstable areas prone to further degradation (i.e., erosion) following a wildland fire or in association with an emergency fire rehabilitation treatment. Emergency archeological and historic property surveys in unstable areas prone to further degradation (i.e., erosion) following a wildland fire or in association with an emergency fire rehabilitation treatment, and archeological, historic structure, cultural landscape, and traditional cultural property resource stabilization and rehabilitation can be funded with emergency rehabilitation funding (Subactivity 9262).

XV. FIRE CRITIQUE AND PLAN REVIEW

A. FIRE 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 and updated as necessary.

B. WILDLAND FIRE CRITIQUE AND REVIEW

Wildland fires will be critiqued by the IC. The Regional Fire Management Coordinator will conduct formal critiques in the event of:

- Significant injury, accident, or fatality
- Significant property or resource damage
- Significant safety concerns are raised

C. PRESCRIBED FIRE

Prescribed fires will be critiqued by the Burn Boss and documented in the DI-1202. The Regional Fire Management Coordinator will conduct formal critiques in the event of:

- Significant injury, accident, or fatality.
- An escaped prescribed fire occurs
- Significant safety concerns are raised.
- A significant smoke management problem occurs

XVI. CONSULTATION AND COORDINATION

All fire management program activities will be implemented in cooperation with the State of Missouri Department of Environmental Quality, and with member agencies of the Missouri Incident Command System. Other agencies will be consulted as needed.

A. AGENCY REVIEWS

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

US Fish & Wildlife Service
Regional Office- Region 3
Regional Fire Management Coordinator

B. INDIVIDUALS CONSULTED

The following were consulted in the development of this plan:

FMP- Mingo NWR
FMP- Big Stone NWR
FMP- Desoto NWR

FMP- Swan Lake NWR
FMP-Squaw Creek NWR
Master Plan- Mingo NWR
Refuge Manager, Kathleen A. Maycroft, Mingo NWR, MO
Refuge Biologist, Charles Shaiffer, Mingo NWR, MO
Assistant Manager, Bernie Petersen, Fort Niobrara NWR, NE
Assistant Manager, Rick Speer, Mingo NWR, MO
Prior Zone FMO, Thomas Zellmer, Agassiz NWR, WI
Zone FMO, Cliff Berger, Mark Twain NWR, IL

APPENDICES

APPENDIX A - SPECIES LISTS
Mingo National Wildlife Refuge

Table 5 - Plant List

Common Name	Scientific Name	Common Name	Scientific Name
American Elm	*Ulmus americana*	Maidenhair Fern	*Adiantum pedatum*
American Holly	*Ilex opaca*	Marsh Fleabane	*Pluchea camphorata*
Arrow Root	*Thalia dealbata*	Milkweed Family	*Asclepias perennis*
Baldcypress	*Taxodium distichum*	Mockernut Hickory	*Carya tomentosa*
Beak Rush	*Rhynchospora macrostachya*	Mulberry	*Morus spp.*
Beech	*Fagus grandifolia*	Multiflora Rose	*Rosa spp.*
Beechdrops	*Epifagus virginiana*	Narrow-leaved Spleenwort	*Athyrium pycnocarpon*
Big Bluestem	*Andropogon gerardii*	Northern Red Oak	*Quercus rubra*
Big Tree Plum	*Prunus mexicana*	Overcup Oak	*Quercus lyrata*
Bitternut Hickory	*Carya cordiformis*	Parsley Family	*Cynosciadium digitatum*
Black Cherry	*Prunus serotina*	Pawpaw	*Asimina triloba*
Black Chokeberry	*Pyrus melanocarpa*	Pennywort	*Obolaria virginica*
Black Hickory	*Carya texana*	Persimmon	*Diospyros virginiana*
Black Oak	*Quercus velutina*	Pin Oak	*Quercus palustris*
Black Willow	*Salix nigra*	Planertree	*Planera aquatica*
Blackberry	*Rubus allegheniensis*	Post Oak	*Quercus stellata*
Blackgum	*Nyssa sylvatica*	Pumpkin Ash	*Fraxinus tomentosa*
Bladdernut	*Staphylea trifolia*	Purple-stemmed Cliffbrake	*Pellaea atropurpurea*
Blue Curls	*Trichostema setaceum*	Rattlesnake Fern	*Botrychium virginianum*
Blueberry	*Vaccinium spp.*	Red Cedar	*Juniperus virginiana*
Box Elder	*Acer negundo*	Red Maple	*Acer rubrum*
Broad Beach Fern	*Thelypteris hexaponoptera*	River Birch	*Betula nigra*
Bulblet Fern	*Cystopteris bulbifera*	Sassafras	*Sassafras albidum*
Bur Oak	*Quercus macrocarpa*	Sedge Family	*Carex louisianica*
Butternut	*Juglans cinerea*	Serviceberry	*Amelanchier spp.*
Buttonbush	*Cephalanthus occidentalis*	Shagbark Hickory	*Carya ovata*

Common Name	Scientific Name	Common Name	Scientific Name
Buttonweed	*Diodia virginiana*	Silver Maple	*Acer saccharinum*
Cane	*Arundinaria gigantea*	Slippery Elm	*Ulmus rubra*
Cherrybark Oak	*Quercus pagoda*	Smartweed Family	*Polygonella arnericana*
Chinkapin Oak	*Quercus muehlenbergii*	Snowbell	*Styrax americana*
Christmas Fern	*Polystichum acrostichoides*	Southern Blackhaw	*Viburnum spp.*
Climbing Hempweed	*Mikania scandens*	Sparkleberry	*Vaccinium arboreum*
Composite Family	*Spilanthes americana*	Spicebush	*Lindera spp.*
Cooper Iris	*Iris fulva*	Spider Lily	*Hymenocallis occidentalis*
Coralberry	*Symphoricarpos orbiculatus*	St. Andrew=s Cross	*Ascyrum hypericoides*
Corkwood	*Leitneria floridana*	Sugar Maple	*Acer saccharum*
Cotton Gum	*Nyssa aquatica*	Sugarberry	*Celtis laevigata*
Cottonwood	*Populus deltoides*	Sumac	*Rhus spp*
Cut-leaved Grape Fern	*Botrychium dissectum*	Sunflower Family	*Helianthus microcephalus*
Devil=s Walking Stick	*Aralia spinosa*	Swamp Chestnut Oak	*Quercus michauxii*
Dewberry	*Rubus spp.*	Swamp Cottonwood	*Populus hetrerophylla*
Dogbane	*Trachelospermum dirrorme*	Swamp Red Oak	*Quercus falcata*
Drummond Red Maple	*Acer rubrum drummondii*	Swamp White Oak	*Quercus bicolor*
Duckweed Family	*Wolffiella floridana*	Sweetgum	*Liquidambar styraciflua*
Ebony Spleenwort	*Asplenium platyneuron*	Sycamore	*Platanus occidentalis*
Eryngo	*Eryngium prostratum*	Three-awn grass	*Aristida lanosa*
Evening Primrose Family	*Ludwigia glandulosa*	Tulip-tree	*Liriodendron tulipifera*
Flowering Dogwood	*Cornus florida*	Virginia Willow	*Itea virginica*
Fragile Fern	*Cystopteris fragilis*	Walking Fern	*Camptosorus rhizophyllus*
Gentian Family	*Bartonia paniculata*	Walnut	*Juglans nigra*
Grape	*Vitis palmata*	Water Locust	*Gleditsia aquatica*
Grass Family	*Trisetum pensylvanicum*	Water Hickory	*Carya aquatica*
Green Ash	*Fraxinus pennsylvanica var. subintegerrima*	Water Oak	*Quercus nigra*

Common Name	Scientific Name	Common Name	Scientific Name
Hackberry	*Celtis occidentalis*	Water Willow	*Justicia ovata*
Hawthorn	*Crataegus spp.*	Waterleaf Family	*Hydrolea uniflora*
Honey Locust	*Gleditsia triacanthos*	Waterlily Family	*Cabomba carolinana*
Indiangrass	*Sorghastrum nutans*	White Ash	*Fraxinus americana*
Lance-leaved Violet	*Viola lanceolata*	White Oak	*Quercus alba*
Little Bluestem	*Schizachyrium scoparium*	Wild Hydrangea	*Hydrangea arborescens*
Little Gray Polypody	*Polypodium polypodioides*	Willow oak	*Quercus phellos*
Loosestrife Family	*Lysimachia radicans*	Winged Elm	*Ulmus alata*
Madder Family	*Oldenlandia uniflora*	Wisteria	*Wisteria macrostachya*

Table 6 - Birds

Common Name	Scientific Name	Common Name	Scientific Name
American Bittern	*Botaurus lentiginosus*	Parula Warbler	*Parula americana*
Barred Owl	*Strix varia*	Pectoral Sandpiper	*Calidris melanotos*
Blue-winged Teal	*Anas discors*	Pied-billed Grebe	*Podilymbus podiceps*
Canada Goose	*Branta canadensis*	Pintail	*Anas acuta*
Cattle Egret	*Bubulcus ibis*	Prothontary Warbler	*Protonotaria citrea*
Cedar Waxwing	*Bombycilla cedrorum*	Red-shouldered Hawk	*Buteo lineatus*
Common Snipe	*Gallinago gallinago*	Ring-necked Duck	*Aythya collaris*
Gadwall	*Anas strepera*	Robin	*Turdus migratorius*
Great Blue Heron	*Ardea herodias*	Snow Goose	*Chen caerulescens*
Great Horned Owl	*Bubo virginianus*	Sora	*Porzana carolina*
Greater Yellowlegs	*Tringa melanoleuca*	Spotted Sandpiper	*Actitis macularia*
Green-backed Heron	*Butorides striatus*	Stilt Sandpiper	*Micropalama himantopus*
Green-winged Teal	*Anas crecca*	Tree Swallow	*Tachycineta bicolor*
Hooded Merganser	*Lophodytes cucullatus*	Tundra Swan	*Olor columbianus*
King Rail	*Rallus elegans*	White-throated Sparrow	*Zonotrichia albicollis*
Least Sandpiper	*Calidris minutilla*	Wood Duck	*Aix sponsa*
Lesser Yellowlegs	*Tringa flavipes*	Yellow Breasted Chat	*Icteria virens*
Little Blue Heron	*Egretta caerulea*	Yellow-crowned Night-heron	*Nyctanassa violaceus*
Mallard	*Anas platyrhynchos*	Yellow-throated Warbler	*Dendroica dominica*

Common Name	Scientific Name	Common Name	Scientific Name
Mississippi Kite	*Ictinia mississipiensis*		

Table 7 - Mammals

Common Name	Scientific Name	Common Name	Scientific Name
Beaver	*Castor canadensis*	Muskrat	*Ondatra zibethicus*
Bobcat	*Lynx rufus*	Norway Rat	*Rattus norvegicus*
Cotton Mouse	*Peramyscus gossypinus*	Opossum	*Didelphis marsupialis*
Coyote	*Canis latrans*	Pine Vole	*Pitymys pinetorum*
Deer Mouse	*Peromyscus rnaniculatus*	Prairie Vole	*Pedomys ochrogaster*
Eastern Chipmunk	*Tamias striatus*	Raccoon	*Procyon lotor*
Eastern Cottontail	*Sylvilagus floridanus*	Red Bat	*Lasiurus borealis*
Eastern Fox Squirrel	*Sciurus niger*	Red Fox	*Vulpes fulva*
Eastern Gray Squirrel	*Sciurus carolinensisa*	Rice Rat	*Oryzomys palustris*
Eastern Mole	*Scalopus aquaticus*	River Otter	*Lutra canadensis*
Eastern Woodrat	*Neotoma floridana*	Shorttail Shrew	*Blarina brevicauda*
Golden Mouse	*Peromyscus nuttalli*	Southern Bog Lemminq	*Synaptomys cooperi*
Gray Fox	*Urocyon cinereoargenteus*	Southern Flying Squirrel	*Glaucomys volans*
Hispid Cotton Rat	*Sigmodon hispidus*	Striped Skunk	*Mephitis mephitis*
House Mouse	*Mus musculus*	Swamp Rabbit	*Sylvilagus aquaticus*
Least Shrew	*Cryptotis parva*	Western Harvest Mouse	*Reithrodontomys megalotis*
Little Brown Myotis	*Myotis lucefugus*	White-footed Mouse	*Peromyscus leucopus*
Longtail Weasel	*Mustela frenata*	Whitetail Deer	*Odocoileus virginianus*
Mink	*Mustela vison*	Woodchuck	*Marmota monax*

Table 8 - Salamanders

Common Name	Scientific Name	Common Name	Scientific Name
Central Newt	*Notophalmus viridescens louisianensis*	Slimy Salamander	*Plethodon glutinosus glutinosus*
Eastern Tiger Salamander	*Arnbystoma tigrinum tigrinum*	Small-mouthed Salamander	*Ambystoma texanum*
Lesser Siren	*Siren intermedia nettingi*	Southern Red-backed Salamander	*Plethodon serratus*
Long-tailed Salamander	*Eurycea longicauda*	Spotted Salamander	*Ambystoma maculatum*

Common Name	Scientific Name	Common Name	Scientific Name
	longicauda		
Marbled Salamander	*Arnbystoma opacum*	Three-toed Arnphiuma	*Amphiuma trideactylum*

Table 9 - Frogs

Common Name	Scientific Name	Common Name	Scientific Name
Blanchard's Cricket Frog	*Acris crepitan blanchardi*	Northern Spring Peeper	*Hyla crucifer crucifer*
Bronze Frog	*Rana clamitas clamitas*	Pickerel Frog	*Rana palustris*
Bullfrog	*Rana catesbeiana*	Southern Leopard Frog	*Rana pipiens sphenocephala*
Eastern Green Treefrog	*Hyla chrysoscelis*	Upland Chorus Frog	*Pseudacris triseriata feriarum*
Green Treefrog	*Hyla cinerea cinerea*		

Table 10 - Toads

Common Name	Scientific Name	Common Name	Scientific Name
American Toad	*Bufo americanus americanus*	Eastern Spadefoot	*Scaphiopus holbrooki*
Eastern Narrow-mouthed Toad	*Gastrophyryne carolinensls*	Fowler's Toad	*Bufo fowleri*

Table 11 - Turtles

Common Name	Scientific Name	Common Name	Scientific Name
Alligator Snapping Turtle	*Macroclemys temmincki*	River Cooter	*Pseudernys concinna concinna*
Chicken Turtle	*Deirochelys reticularia*	Snapping Turtle	*Chelydra serpentina serpentina*
False Map Turtle	*Graptermys pseudo geographica kohni*	Southern Painted Turtle	*Chrysemys picta dorsalis*
Map Turtle	*Graptemys geographica*	Spiny Softshell	*Trionyx spinifer*
Mississippi Mud Turtle	*Kinosternon subrubrum*	Stinkpot	*Sternothaerus odoratus*
Red eared Turtle	*Pseudemys scripta elegans*	Three-toed Box Turtle	*Terrapene carolina triunguis*

Table 12 - Lizards

Common Name	Scientific Name	Common Name	Scientific Name
Broad-headed Skink	*Eumeces laticepts*	Ground Skink	*Scincella lateralis*

Common Name	Scientific Name	Common Name	Scientific Name
Coal Skink	*Eumecea anthracinus*	Northern Fence Lizard	*Sceloporus undulatus hyacinthinus*
Five-lined Sk1nk	*Eumeces fasciatus*	Six-lined Race Runner	*Cnemidophorus sexlineatus*

Table 13 - Venomous Snkaes

Common Name	Scientific Name	Commmon Name	Scientific Name
Southern Cooperhead	*Agkistrodon contortrix contortrix*	Western Cottonmouth	*Agkistrodon piscivorus leucostoma*
Timber Rattlesnake	*Crotalus horridus horridus*		

Table 14 - Non-venomous Snakes

Common Name	Scientific Name	Common Name	Scientific Name
Broad-banded Water Snake	*Nerodia fasciata confluens*	Red Milk Snake	*Lampropeltis doliata syspila*
Brown Snake	*Storeria dekayi*	Ringneck snake (prairie)	*Diadophis punctatus*
Diamond-backed Water Snake	*Nerodia tazispilota rhombifera*	Rough Green Snake	*Opheodrys aestivus*
Eastern Garter Snake	*Thamnophis sirtalis sirtalis*	Southern Black Racer	*Coluber constrictor priapus*
Eastern Hognose Snake	*Heterodon platyrhinos*	Speckled Kingsnake	*Lampropeltis getulus holbrooki*
Graham' s Water Snake	*Nerodia graharni*	Western Mud Snake	*Francia abacura reinwardti*
Green Water Snake	*Nerodia cyclopion cyclopion*	Western Ribbon Snake	*Thamnophis proximus*
Prairie Kinqsnake	*Lampropeltis calligaster calligaster*	Western Worm Snake	*Carphophis arnoenus vermis*
Rat Snake	*Elaphe obsoleta*	Yellow-bellied Water Snake	*Nerodia erythrogaster flavisgaster*
Red-bellied Snake	*Storeria occipitomaculata*		

Table 15 - Fishes

Common Name	Scientific Name	Common Name	Scientific Name
Alligator gar	*Lepisosteus spatula*	Green sunfish	*Lepomis cyaneilus*
Banded pygmy sunfish	*Elassoma zonatum*	Johnny darter	*Etheostoma nigrum*
Bantom sunfish	*Lepomis syurnatricus*	Largemouth bass	*Micropterus salmoides*

Common Name	Scientific Name	Common Name	Scientific Name
Black bullhead	*Ictalurus melas*	Largemouth buffalofish	*Ictiobus cyrinellus*
Black crappie	*Pomoxis nigromaculatus*	Mosquitofish	*Gambusia affinis*
Black-spotted topminnow	*Fundulus olivaceus*	Orange spotted sunfish	*Lopomis humilis*
Black-stripe topminnow	*Fundulus notatus*	Ozark minnow	*Dionda nubila*
Bluegill sunfish	*Lepomis macrochirus*	Pirate perch	*Aphredoderus sayanus*
Bowfin	*Amla calva*	Pugnose minnow	*Notropis emilae*
Brook silverside	*Labidesthes sicculus*	Shortnose gar	*Lepisosteus platostomus*
Brown bullhead	*Ictalurus nebulosus*	Smallmouth buffalofish	*Ictiobus bubalus*
Carp	*Cyprinus carpio*	Spotted gar	*Lepisosteus oculatus*
Chain pickerel	*Esox niger*	Spotted sucker	*Minytrema melanops*
Channel catfish	*Ictalurus punctatus*	Starhead topminnow	*Fundulus notti*
Drum (perch) (sheephead)	*Aplodinotus grunniens*	Striped bass	*Micropterus punctulatus*
Flier sunfish	*Centrarchus macropterus*	Tadpole madtom	*Noturus gyrinus*
Gizzard shad	*Dorosoma cepedianum*	Warmouth sunfish	*Lepomis gulosus*
Golden shiner	*Notemigonus crysoleucas*	White crappie	*Pomoxls annularis*
Grass pickerel	*Esox americanus vermiculatus*	Yellow bullhead	*Ictalurus natalis*

APPENDIX B - T&E SPECIES
Rare, Threatened, and Endangered Species/Habitat

Federally Listed Species Reported in Missouri -- 25 listings

Animals -- 17

Status	Listing
E	Bat, gray (*Myotis grisescens*)
E	Bat, Indiana (*Myotis sodalis*)
E	Bat, Ozark big-eared (*Corynorhinus townsendii ingens*)
T	Cavefish, Ozark (*Amblyopsis rosae*)
T	Darter, Niangua (*Etheostoma nianguae*)
T	Eagle, bald (lower 48 States) (*Haliaeetus leucocephalus*)
E	Higgins eye (*Lampsilis higginsii*)
T	Madtom, Neosho (*Noturus placidus*)
E	Mapleleaf, winged (*Quadrula fragosa*)
E	Mucket, pink (*Lampsilis abrupta*)
E	Pearlymussel, Curtis (*Epioblasma florentina curtisii*)
T	Plover, piping (except Great Lakes watershed) (*Charadrius melodus*)
E	Pocketbook, fat (*Potamilus capax*)
E	Puma, eastern (*Puma concolor couguar*)
E	Shiner, Topeka (*Notropis topeka*)
E	Sturgeon, pallid (*Scaphirhynchus albus*)
E	Tern, least (interior pop.) (*Sterna antillarum*)

Plants -- 8

Status	Listing
T	Milkweed, Mead's (*Asclepias meadii*)
T	Aster, decurrent false (*Boltonia decurrens*)
T	*Geocarpon minimum* (No common name)
T	Sneezeweed, Virginia (*Helenium virginicum*)
E	Bladderpod, Missouri (*Lesquerella filiformis*)
E	Pondberry (*Lindera melissifolia*)
T	Orchid, western prairie fringed (*Platanthera praeclara*)
E	Clover, running buffalo (*Trifolium stoloniferum*)

* E - Endangered T - Threatened

APPENDIX C - CURRENT STAFFING
August, 2003

As of August, 2003

Table 16 - Current Employee Qualifications

Name	Position	Qualifications
Kathleen A. Maycroft	Refuge Manager	FFT2
Rick Speer	Assistant Manager	FFT2, RXB3
Judy Plunkett	Park Ranger	FFT2
Doug Siler	Equipment Operator	FFT2
Rudy Williams	Equipment Operator	FFT2
Dan Wood	Biological Science Aid	FFT2

FFT2- Firefighter Type 2
RXB3- Prescribed Fire Burn Boss

APPENDIX D - SAMPLE FIRE PROTECTION AGREEMENT

Cooperative Fire Protection Agreement
U.S. Department of the Interior
Fish and Wildlife Service
Mingo National Wildlife Refuge
and the
_____ Fire Department

The Agreement was made and entered into on _____, 2002 pursuant to the Reciprocal Fire Protection Act of 1955 (69 Stat. 66; 42 U.S.C. 1856) as amended by the Wildfire Suppression Assistance Act of 1989 (102 Stat. 1615). It is between the United States Department of the Interior, Fish and Wildlife Service, Mingo National Wildlife Refuge, hereinafter referred to as Athe Refuge@, and the _____ Fire Department, hereinafter referred to as the "Fire Department.@ This Agreement outlines the cooperative efforts between the Refuge and the Fire Department for fire protection and specifically authorizes the expenditure of funds for any fire protection activity resulting from its execution.

The Fire Department Shall:

1. Provide wildfire suppression equipment as available, including fire engines, a tractor and disk, shovels and fire rakes, as well as fire service personnel.

2. Respond to all wildfires in the Refuge boundaries that are within the Fire Department's designated fire protection area.

3. Respond to all wildfires within the Refuge boundaries and outside of the Fire Department=s designated fire protection area, at the discretion of the fire chief. This response wil1 include mutual aid calls.

4. Agree to stay with all wildfires until out, or until released from duty by the designated incident commander, or until called to another fire, or other structure fires in the Fire Department's designated protection area.

5. Submit billings for wildfire suppression on Refuge lands within 48 hours of each fire. Billings will be submitted to:

   Mingo National Wildlife Refuge
   24279 State Highway 51
   Puxico, MO 63960

The Refuge Shall:

1. Reimburse the Fire Department at a flat rate of.$ 500.00 for services rendered as listed in the above section "The Fire Department Shall" of this Cooperative Agreement for the first two (2) hours of a wildfire call to the Refuge. In the case of a wildfire call extending beyond two hours, the Refuge shall reimburse the Fire Department at a flat rate of $100.00 for each half-hour the Refuge Incident Commander determines that Fire Department continues to be needed. These services will include all manpower and equipment as needed and available.

2. Assist the Fire Department with wildlife training.

3, Assume the role of "Incident Commander on any fire within the boundaries of the Refuge once the Refuge personnel are on the scene.

4. Respond with manpower and equipment, when available, .at the request of the fire chief, on wildfires outside the Refuge boundaries.

Special Provisions:

1 Each party agrees that it, will be responsible for its own acts and the result of thereof and shall not be responsible for the acts of the other party and the results thereof. Each party therefore agrees, to the extent authorized by applicable law, to assume all risks and liability to itself, its agents or employees, for any injury to persons or property resulting from any operations of its agents or employees under this agreement, and for any loss, cost, damage or expense resulting at any time from any and all causes due to any acts, or negligence, or the failure to exercise proper precautions of or by itself or its own agents to the Agreement. The liability of the Federal Government will be governed by the Federal Tort Claims Act (28 U.S.C. section 2761 et seq.) while the liability of the Fire Department will be governed by applicable federal and state laws.

2. Repairs necessary to keep operational any equipment covered by this agreement will be made by and at the expense of party owning the equipment.

3. The Refuge's fiscal obligation hereunder are contingent upon the availability of funds as appropriated by Congress from which payment for the purposes of this agreement can be made.

4. Fish and Wildlife Service personnel will not participate in the suppression of structure fires, but may assist in preventing a structure fire from spreading in wildland and becoming a wildland fire.

The Agreement (_____) is effective on the date first written above, is subject as applicable to the attached General Provisions for financial Assistance and certifications, and is to continue in force until tem1inated by either party giving at least thirty (30) days written notice to the other party. Unless earlier terminated, this Agreement shall expire five years from the effective date.

IN TESTIMONY WHEREOF, on the date hereof, the parties have hereunto set their hands:

_____ Fire Department

_____ _____
Signature of Chief or other authorized official Date

_____
Printed/Typed Name of Fire Department Signatory

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

_____ _____
Signature of Contracting Officer Date

APPENDIX E - FIRE COOPERATORS

Table 17 - Fire Cooperators

AGENCY	NAME/TITLE	PHONE NUMBER
Puxico Fire Department	Steve Scott, Chief	573-222-3535
Wappapello Fire Department.	Claude Gore, Chief	573-222-8342
Lowndes Volunteer Fire Department	Herman Swafford, Chief	573-495-2330
Butler County Fire Department (Poplar Bluff)	Bob Fredwell,Chief	573-785-3952
Stoddard County Fire Department (Bloomfield)	John Standridge, Chief	573-568-4535
Mingo Job Corps	Don Riggle, Director	573-222-2649
Duck Creek State Wildlife Management Area	Dave Wissehr, Manager	573-222-3337 or 3247 or 3248
Forest Fire Poplar Bluff		573-785-1475
Forest Fire Piedmont		day 573-223-4525 night 573-223-7013
Corps of Engineers Lake Wappapello	Gary Stilts, Project Manager	573-222-8562
Gaylord Memorial Lab	Leigh Fredrickson, Director	573-222-3531
Ambulance Service Wappapello Poplar Bluff Stoddard County Wayne County		 573-222-8250 573-686-1234 573-624-8951 573-224-5550
Missouri DOC at Cape Girardeau		573-290-5730
Zone FMO	Cliff Berger	217-224-8580
Missouri Interagency Coordination Center	Temporary Lynn Carpenter	573-341-5584
Missouri Interagency Fire Center	Lynn Carpenter	573-341-7484

APPENDIX F - STEP-UP PLAN

STEP-UP PLAN

The Step-up Plan will guide fire preparedness operations and use of emergency preparedness funding. Preparedness activities will be based on the outputs from the Fire Danger Maps, a product of the Wildland Fire Assessment System, and from fire danger rating information gathered from the U.S. Forest Service of Mark Twain National Forest in Poplar Bluff. The Wildland Fire Assessment System (WFAS) is found on the Internet at www.fs.fed.us/land/wfas. The assessments are based on the National Fire Danger Rating System (NFDRS). Fire danger is broadly divided into five staffing classes, according to the intensity of danger factors, as indicated by the Adjective Rating or Level. The staffing classes relate to the expected severity of fire conditions. Preparedness actions are based on the latest Adjective Rating and the Next Day Forecast. When fire danger is high or very high someone will be placed on call, and when fire danger reaches extreme additional funding will be accessed for the addition of staff and supplies.

PREPAREDNESS ACTION	**Fire Danger Rating** (WFAS)				
	Low	**Moderate**	**High**	**Very High**	**Extreme**
Maintain Radio Contact	X	X	X	X	X
Maintain Response Time of: (minutes)	90	90	60	60	45
Fire-ready engine at Refuge Headquarters		X	X	X	X
Carry PPE while on duty				X	X
Tour of duty changed at Manager=s discretion			X	X	X
Detection patrol conditional				X	X

If fire danger is High or greater and Refuge hunting season is open, move up to next level because of increased risk of human caused ignitions.

APPENDIX G - NUS
Normal Unit Strength Inventory of Fire Supplies

Table 18 - Normal Unit Strength Inventory

Item	Qty
Chainsaw	4
Flapper	1 per qualified individual
Shovel	1 per qualified individual
Pulaski	1 per qualified FFT2 individual
Backpack Pump	1 per 2 qualified FFT2 individuals
Chainsaw Toolkit	1 per chainsaw
Flashlight	1 per qualified FFT2 individual
Chock Blocks	2
Tow Chain	2
Hydraulic Jack	1
Lug Wrench	1
Fence Pliers	1
Rope 25'	1
Duct Tape	1
Water Cooler	1
Bolt Cutters	1
Toilet Paper	as needed
Cooler(Ice chest)	1
Hose Clamp	1
Gaskets set	1
Hose Reel Crank	1
Fire Extinguisher	1
Flagging roll	1
Gas Safety Can	1
General Tool Kit	1
Gas Filter	1

Item	**Qty**
Spark Plugs	1 set
Portable Radios	8
Mobile Radios	5
Batteries	as needed
Hose Booster	1
Adjustable Nozzle 1 2 inch	1
Hard Hat	1 per qualified individual
Head Lamp	1 per qualified individual
Gloves	1pair per qualified individual
First Aid Kit	4
Fire Shirt	1 per qualified individual
Fireline Handbook	1 per qualified individual
Goggles	1 per qualified individual

APPENDIX H - FIRE DISPATCH PLAN
MINGO NWR

Upon report of smoke or fire:

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

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

Initial information from reporting party:

A. Name:_____

B. Callback number:_____

C. Location of smoke or fire (be specific):_____
_____

D. Access to fire:_____
_____

E. Color of smoke:_____

F. Size of fire:_____

G. Type of vegetation:_____

H. Fire behavior:_____

I. Improvements threatened:_____

J. Anyone at the fire scene:_____

K. See anyone in area or vehicles leaving area:_____
_____

III. Check map for ownership/protection status.

IV. If fire is on Refuge or within 0.5 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 until someone is contacted.

B. During regular working hours:

Notify Refuge Manager.

Utilize administrative Technician if available or use other Refuge staff as dispatcher.

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

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

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

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

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

D. Contact County Dispatch.

E. 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 wildland fire.

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

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

- 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

B. Inform cooperator that you will check what is available and call back ASAP (must be within 1 hour).
   - Notify Refuge Manager and get approval for dispatch.

C. Dispatch resources requested and approved by Refuge Manager. Additional resources can be obtained from other Refuges if needed and available.
   - Notify cooperator of what was dispatched and an estimated time of arrival.
   - Coordinate the filling of additional resource orders from the Cooperator.
   - Remain on duty until relieved.

FIRE LOG

TIME	TX	RX	TRANSMISSION

FILLING RESOURCE ORDERS

1. Determine from the Incident Commander (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. Contact Missouri Interagency Coordination Center (573-364-4621) to order out of area resources.

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

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

    b. Notify IC of ETA

    c. Track out of area resources to make sure they arrive. If they do not meet their ETA contact Missouri Interagency Coordination Center.

4. When out of area resources have been released or demobilized; all demobilization will be coordinated through Missouri Interagency Coordination Center.

APPENDIX I - REFUGE FIRE DIRECTORY
MINGO NWR

Table 19 - Refuge Fire Directory - 2003

NAME	WORK PHONE	HOME PHONE
Kathleen A. Maycroft (RefugeManager)	573-222-3589	573-785-3553
Richard Speer	573-222-3589	573-222-3823
Charles Shaiffer (Biologist)	573-222-3589	573-222-6460
Judy Plunkett (Park Ranger)	573-222-3589	573-222-8814
Phyllis Ford (Adminstrative Technician)	573-222-3589	573-222-2409
Doug Siler (Equipment Operator)	573-222-3589	573-222-3963
Rudy Williams (Equipment Operator)	573-222-3589	573-222-3106
Dan Wood (Biological Science Aide)	573-222-3589	573-222-2661

APPENDIX J - COMMUNICATIONS FREQUENCIES
MINGO NWR

Table 20 - Communications Frequencies

CHANNEL #	CHANNEL NAME	RECEIVE	TRANSMIT	CODE
1	Refuge Car/Car Repeater A	164.62500	163.15000	
2 103.5	Repeater D	164.62500	163.15000	1A
3 156.7	Gipsy	151.19000	159.34500	5A
4	Mutual Aid	155.47500	155.47500	
5	Civil Defense	155.14500	155.14500	
6 118.8	Stoddard County	155.19000	159.03000	2B

APPENDIX K - WFSA
WILDLAND FIRE SITUATION ANALYSIS

Incident Name:
Jurisdiction:
Date and Time Completed:

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

Section I, WFSA Information Page

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

I.	**Wildland Fire Situation Analysis**
To be completed by the Agency Administrator(s)	
A. Jurisdiction(s)	**B. Geographic Area**
C. Unit(s)	**D. WFSA #**

E. Fire Name	**F. Incident #**

G. Accounting Code:

H. Date/Time Prepared _____@_____

I. Attachments

- Complexity Matrix/Analysis * _____
- Risk Assessment/Analysis * _____
  - Probability of Success * _____
  - Consequences of Failure * _____
- Maps * _____
- Decision Tree ** _____
- Fire Behavior Projections * _____
- Calculations of Resource Requirements * _____
- Other (specify) _____

* Required

** Required by FWS

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

Section II. Objectives and Constraints

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

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

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

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

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

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

II.	Objectives and Constraints
To be Completed by the Agency Administrator(s)	

A. Objectives (Must be specific and measurable)

1. Safety

- Public

- Firefighter

2. Economic

3. Environmental

4. Social

5. Other

B. Constraints

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

Section III. Alternatives

A. Wildland Fire Management Strategy: Briefly describe the general wildland fire strategies for each alternative. Alternatives must meet resource management plan objectives.

B. Narrative: Briefly describe each alternative with geographic names, locations, etc., that would be used when implementing a wildland fire strategy. For example: "Contain within the Starvation Meadows' watershed by the first burning period."

C. Resources Needed: Resources described must be reasonable to accomplish the tasks described in Section III.B. It is critical to also look at the reality of the availability of these needed resources.

D. Final Fire Size: Estimated final fire size for each alternative at time of containment.

E. Estimated Contain/Control Date: Estimates of each alternative shall be made based on predicted weather, fire behavior, resource availability, and the effects of suppression efforts.

F. Cost: Estimate all incident costs for each alternative. Consider mop-up, rehabilitation, and other costs as necessary.

G. Risk Assessment - Probability of Success/Consequences of Failure: Describe probability as a percentage and list associated consequences for success and failure. Develop this information from models, practical experience, or other acceptable means. Consequences described will include fire size, days to contain, days to control, costs, and other information such as areas closed and effect on critical habitat. Include fire behavior and long-term fire weather forecasts to derive this information.

H. Complexity: Assign the complexity rating calculated in "Fire Complexity Analysis" for each alternative, e.g., Type II, Type I.

I. A map for each alternative should be prepared. The map will be based on the "Probability of Success/Consequences of Failure" and include other relative information.

III. Alternatives (To be completed by FMO / IC)			
[redacted]	**A**	**B**	**C**
A. Wildland Fire Strategy			
B. Narrative			
C. Resources needed **Handcrews** **Engines** **Dozers** **Airtankers** **Helicopters**			
D. Final Size			
E. Est. Contain/ Control Date			
F. Costs			
G. Risk Assessment **- Probability of success** **- Consequence**			

of failure	_____	_____	
H. Complexity			
I.	**Attach maps for each alternative**		

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

Section IV. Evaluation of Alternatives

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

Sum of Economic Values: Calculate for each element the net effect of the rating system used for each alternative. This could include the balance of:

pluses (+) and minuses (-), numerical rating (-3 and +3), or natural and cultural resource values in dollar amounts. (Again, resource benefits may be used as part of the analysis process when the wildland fire is within a prescription consistent with approved Fire Management Plans and in support of the unit's Resource Management Plan.)

IV. Evaluation of Alternatives			
To be Completed by the Agency Administrator(s) and Fire Manager / Incident Commander			
A. Evaluation Process	**A**	**B**	**C**
Safety			
Firefighter			
Aviation			
Public			

Sum of Safety Values			
Economic **Forage** **Improvements** **Recreation** **Timber** **Water** **Wilderness** **Wildlife** **Other (specify)**			
Sum of Economic Values			
Environmental **Air** **Visual** **Fuels** **T & E Species** **Other (specify)**			
Sum of Environmental Values			

Social **Employment** **Public Concern** **Cultural** **Other (Specify)**			
Sum of Social Values			
Other			

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

Section V. Analysis Summary

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

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

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

Section IV. Decision

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

V. Analysis Summary			
To be Completed by the Agency Administrator(s) and Fire Manager / Incident Commander			
Alternatives	**A**	**B**	**C**
A. Compliance with Objectives **Safety** **Economic** **Environmental** **Social** **Other**			
B. Pertinent Data **Final Fire Size** **Refugeity** **Suppression Cost** **Resource Values** **Probability of Success** **Consequences of Failure**			

C. External / Internal Influences

National & Geographic Preparedness Level

_____

Incident Priority

_____

Resource Availability

_____

Weather Forecast (long-range)

_____

Fire Behavior Projections

_____

VI.	Decision

The Selected Alternative is:

_____

Rationale:

_____ _____

Agency Administrator's Signature **Date/Time**

This Section is completed by the Agency Administrator(s) or designee.

Section VII. Daily Review

The date, time, and signature of reviewing officials are reported in each column for each day of the incident. The status of Preparedness Level, Incident Priority, Resource Availability, Weather Forecast, and WFSA validity is completed for each day reviewed. Ratings for the Preparedness Level, Incident Priority, Resource Availability, Fire Behavior, and Weather Forecast are addressed in Section V, C. Assign a "yes" under "WFSA Valid" to continue use of this WFSA. A "no" indicates this WFSA is no longer valid and another WFSA must be prepared or the original revised.

Section VIII. Final Review

This Section is completed by the Agency Administrator(s). A signature, date, and time are provided once all conditions of the WFSA are met.

VIII. Daily Review									
To be completed by the Agency Administrator(s) or Designee									
Selected to be reviewed daily to determine if still valid until containment or control									
			PREPAREDNESS LEVEL	INCIDENT PRIORITY	RESOURCE AVAILABILITY	WEATHER FORECAST	FIRE BEHAVIOR PROJECTIONS	WFSA VALID
Date	**Time**	**By**						

If WFSA is no longer valid, a new WFSA will be completed!
VIII. Objectives **Final Review**
The elements of the selected alternative were met on: _____ **Date** **Time** **By:_____** **(Agency Administrator(s))**

A GUIDE FOR ASSESSING FIRE COMPLEXITY

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

Use of the Guide:

1. Analyze each element and check the response "yes" or "no."

2. If positive responses exceed, or are equal to, negative responses within any primary factor (A through G), the primary factor should be considered as a positive response.

3. If any three of the primary factors (A through G) are positive responses, this indicates the fire situation is, or is predicted to be, Type I.

4. Factor H should be considered after all the above steps. If more than two of these items are answered "yes," and three or more of the other primary factors are positive responses, a Type I team should be considered. If the composites of H are negative, and there are fewer than three positive responses in the primary factors (A-G), a Type II team should be considered. If the answers to all questions in H are negative, it may be advisable to allow the existing overhead to continue action on the fire.

GLOSSARY OF TERMS

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

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

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

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

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

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

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

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

FIRE COMPLEXITY ANALYSIS

		Yes	No
A.	FIRE BEHAVIOR: Observed or Predicted		
	1. Burning Index (from on-site measurement of weather conditions). Predicted to be above the 90% level using the major fuel model in which the fire is burning.	___	___
	2. Potential exists for "blowup" conditions (fuel moisture, winds, etc.)	___	___
	3. Crowning, profuse or long-range spotting.	___	___
	4. Weather forecast indicating no significant relief or worsening conditions.	___	___
	Total	___	___
B.	RESOURCES COMMITTED		
	1. 200 or more personnel assigned.	___	___
	2. Three or more divisions.	___	___
	3. Wide variety of special support personnel.	___	___
	4. Substantial air operation which is not properly staffed.	___	___
	5. Majority of initial attack resources committed.	___	___
	Total	___	___
C.	RESOURCES THREATENED		
	1. Urban interface.	___	___
	2. Developments and facilities.	___	___
	3. Restricted, threatened or endangered species habitat.	___	___
	4. Cultural sites.	___	___
	5. Unique natural resources, special designation zones or wilderness.	___	___
	6. Other special resources.	___	___
	Total	___	___
D.	SAFETY		
	1. Unusually hazardous fire line conditions.	___	___
	2. Serious accidents or facilities.	___	___
	3. Threat to safety of visitors from fire and related operations.	___	___
	4. Restricted and/or closures in effect or being considered.	___	___
	5. No night operations in place for safety reasons.	___	___

Total ___ ___

E. OWNERSHIP

1. Fire burning or threatening more than one jurisdiction. ___ ___
2. Potential for claims (damages). ___ ___
3. Conflicting management objectives. ___ ___
4. Disputes over fire management responsibility. ___ ___
5. Potential for unified command. ___ ___

Total ___ ___

F. EXTERNAL INFLUENCES

1. Controversial wildland fire management policy. ___ ___
2. Pre-existing controversies/relationships. ___ ___
3. Sensitive media relationships. ___ ___
4. Smoke management problems. ___ ___
5. Sensitive political interests. ___ ___
6. Other external influences. ___ ___

Total ___ ___

G. CHANGE IN STRATEGY

1. Change in strategy to control from confine or contain. ___ ___
2. Large amount of unburned fuel within planned perimeter. ___ ___
3. WFSA invalid or requires updating. ___ ___

Total ___ ___

H. EXISTING OVERHEAD

1. Worked two operational periods without achieving initial objectives. ___ ___
2. Existing management organization ineffective. ___ ___
3. IMT overextended mentally and/or physically. ___ ___
4. Incident action plans, briefings, etc., missing or poorly prepared. ___ ___

Total ___ ___

Signature_____

Date_____ **Time**_____

APPENDIX L - DELEGATION OF AUTHORITY

DELEGATION OF AUTHORITY

Mingo NWR
Puxico, Missouri

As of _____, _____, I have delegated authority to manage the _____
(Time, Date) (Fire Incident Name)
_____, Mingo NWR, to Incident Commander _____
(Fire Number) (Name)
and his/her Incident Management Team.

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

I am assigning _____ as the Line Officer Representative to act as liaison and provide any help you need. (S)he is authorized to speak for me in the event a decision is needed.

My specific considerations for management of this fire are:

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

(Signed) (Date)
Refuge Manager

APPENDIX M - MONITORING CHECK LIST

RECOMMENDED FIRE MONITORING STANDARDS

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

Planning and Preparation

Environmental Conditions Prior to the Burn

____ Photo Points Established
____ Fuel
- ____ Model(s)
- ____ Loading (By Size Class)
- ____ % Cover (Type/Model)
- ____ Continuity
- ____ Crown ratio
- ____ Depth of Fuel Bed
- ____ Other

____ Air Temperature (Maximum - Minimum to develop trends)
____ Relative Humidity (Maximum - Minimum to develop trends)
____ Wind Speed and Direction (Eye-level/20 Foot)
____ Fuel Moisture
- ____ Dead Fuel Moisture (Use of Fuel Sticks and/or Drying Ovens highly recommended)
- ____ Live Fuel Moisture (Fuel Models 2,4,5,7,10)

____ Soil Moisture (Dry, Moist, Wet)
____ Drought Indicator (Track One or More)

Execution

Environmental Conditions During the Burn

____	Date/Time	
____	Air Temperature	(Every 30 minutes)
____	Relative Humidity	(Every 30 minutes)
____	Wind Speed and Direction	(Eye Level) (Every 30 minutes)
____	Cloud Cover	
____	Fuel Moisture (Indicate How Determined: Calculated, Actual)	

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

Fire Behavior

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

Smoke/Air Quality

____	Mixing/Dispersal	(Good, Fair, Poor)
____	Trajectory of Column	(Surface/Upper Level)
____	Duration	(Active Burning/Smoldering)
____	Problems	

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

Post Burn

First Order Fire Effects

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

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

APPENDIX N - SECTION 7 INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Intra-Service Section 7 Biological Evaluation Form

Originating Person: Kathleen A. Maycroft
Telephone Number: (573)222-3589
Date: January 22, 2002

I. Region 3

II. Service Activity (Program) and Geographic Area or Station Name: Mingo National Wildlife Refuge, Puxico, Missouri.

III. List Species (including proposed and candidate species) or critical habitat (including proposed) found within action area: Bald Eagle (*Haliaeetus leucocephalus*), Alligator Snapping Turtle (*Macroclemys temmincki*).

IV. Describe location including County, State and TSR (township, section & range): Stoddard and Wayne Counties in Missouri, Township 27 North, Range 7 East, parts of Sections 25 and 36, Township 27 North, Range 8 East, parts of Sections 3, 4, 8, 9, 17, 18, 19, 23, 24, 26, 27, 28, 33, all of Sections 1,2, 10, 11, 12, 13, 14, 15, 16, 20, 21, 22, 29, 30, 31, 32, Township 28 North, Range 8 East, parts of Sections 34, 35, 36, Township 27 North, Range 9 East, Section 6 and parts of sections 7, 18 and 19.

V. Description of proposed action: Mingo NWR is developing a Fire Management Plan which will delineate guidelines to use whenever a wildfire is detected or a prescribed burn is conducted on the Refuge. The Fire Management Plan addresses three general habitat types and what activities will be allowed in each. A draft Fire Management Plan is attached.

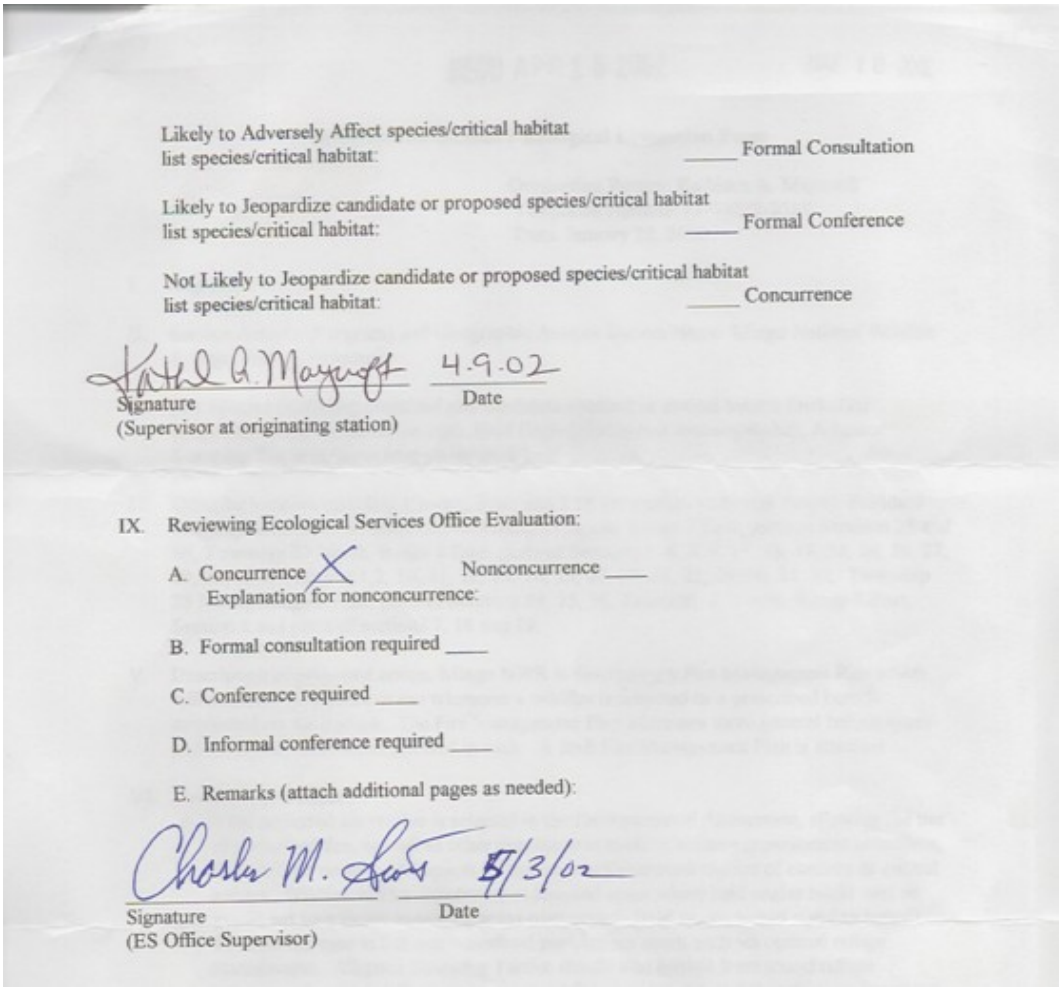
VI. Description of effects:

A. If the preferred alternative is selected in the Environmental Assessment, allowing the use of prescribed fire, as well as other management tools to achieve management objectives, there will be no adverse impacts to endangered/threatened/species of concern or critical habitat. Wildfire will be suppressed in forested areas where bald eagles might nest or would not be a factor in nesting areas over water. Bald eagles would stand to benefit from the increase in fish and waterfowl populations resulting from optimal refuge management. Alligator Snapping Turtles should also benefit from sound refuge management, which will result in increased fish populations, and therefore, an increased food base for the turtles. This management will also reduce siltation on the refuge which is also important to the long term health of alligator snapping turtle populations.

B. Determination (check all that apply) Response requested

No Effect on species/critical habitat
list species/critical habitat: __X__ Concurrence (optional)

Not Likely to Adversely Affect species/critical habitat
list species/critical habitat: _____ Concurrence



Likely to Adversely Affect species/critical habitat
list species/critical habitat: _____ Formal Consultation

Likely to Jeopardize candidate or proposed species/critical habitat
list species/critical habitat: _____ Formal Conference

Not Likely to Jeopardize candidate or proposed species/critical habitat
list species/critical habitat: _____ Concurrence

Kathl A. Mayhugh 4.9.02
Signature Date
(Supervisor at originating station)

IX. Reviewing Ecological Services Office Evaluation:

A. Concurrence X Nonconcurrence ____
Explanation for nonconcurrence:

B. Formal consultation required ____

C. Conference required ____

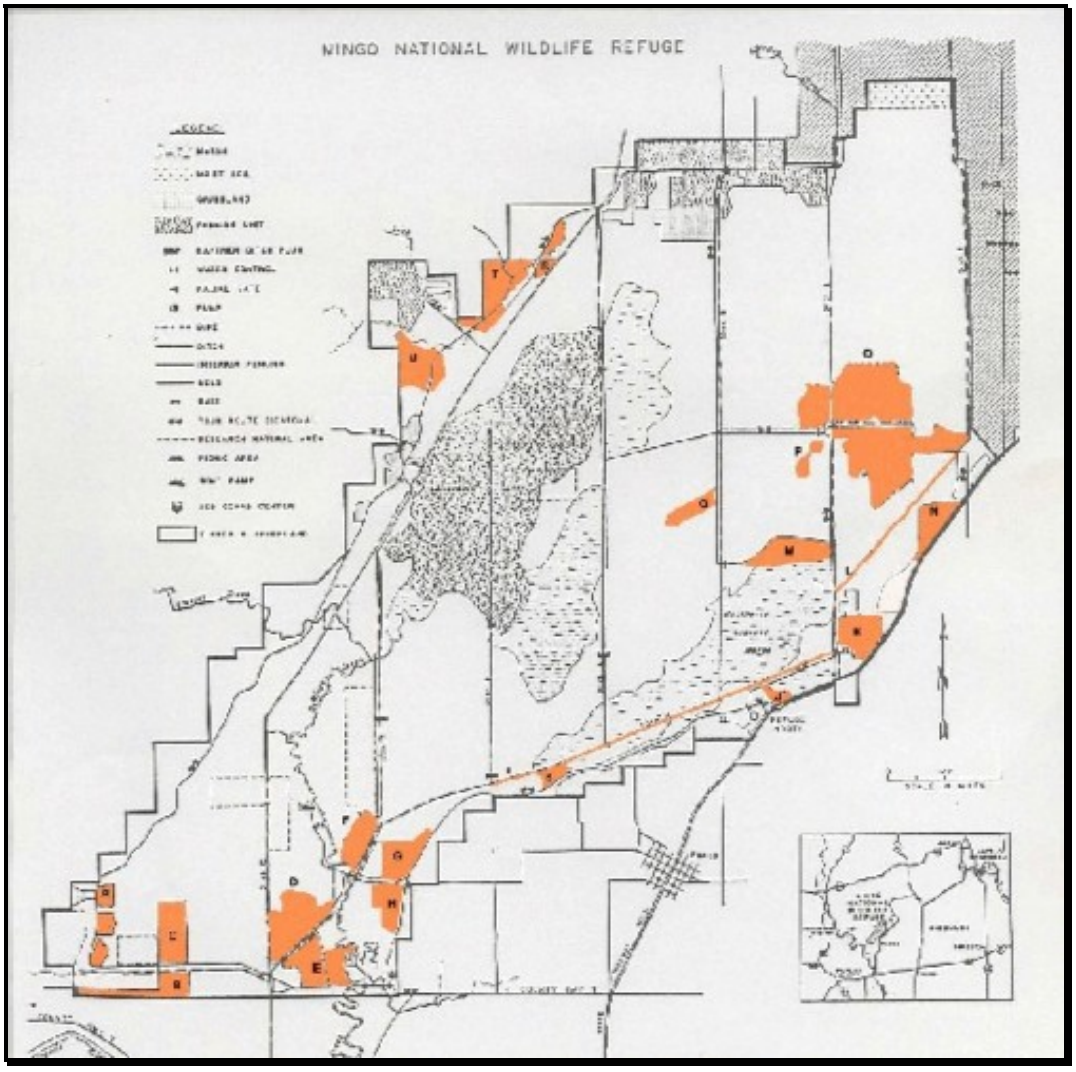
D. Informal conference required ____

E. Remarks (attach additional pages as needed):

Charles M. Scott 5/3/02
Signature Date
(ES Office Supervisor)

APPENDIX O - FUTURE PRESCRIBED FIRE GOALS

Figure 1 - Future Prescribed Fire Goals

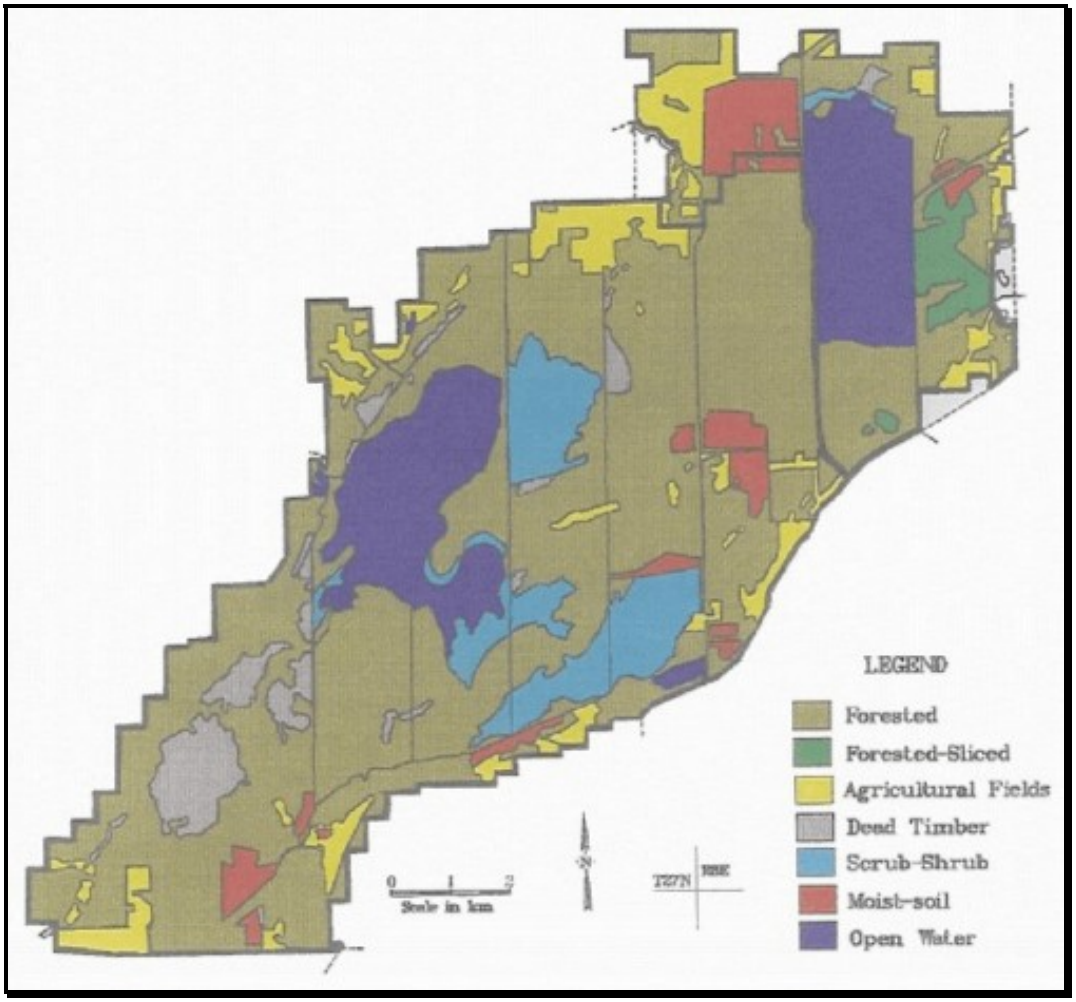


Corresponding Letter	Unit Name	Acreage
A	Grazing Unit 17	45
B	Grazing Unit 18	82
C	Grazing Unit 19	45
D	8's & 9'sUnits and levees	157

Corresponding Letter	Unit Name	Acreage
E	Binford Unit	81
F	Moist Soil Unit 7 and levees	21
G	Grazing Unit 22	47
H	Grazing Unit 21	25
I	Ditch 11 Spoil Bank	32
J	B & M Field	8
K	MS 5 & 6 Units and levees	62
L	Ditch 1 Spoil Bank	10
M	Pool 6	65
N	Grazing Unit 11	45
O	Company Farm Units and levees	362
P	Farm Unit 27 (Sassafras)	19
Q	Hay Unit 28 (Sandblow)	9
R	Hay Unit 14 (Walker Field)	26
S	Pierman Lane Unit	12
T	Fox Pond	78
U	Wilfong Pasture	60

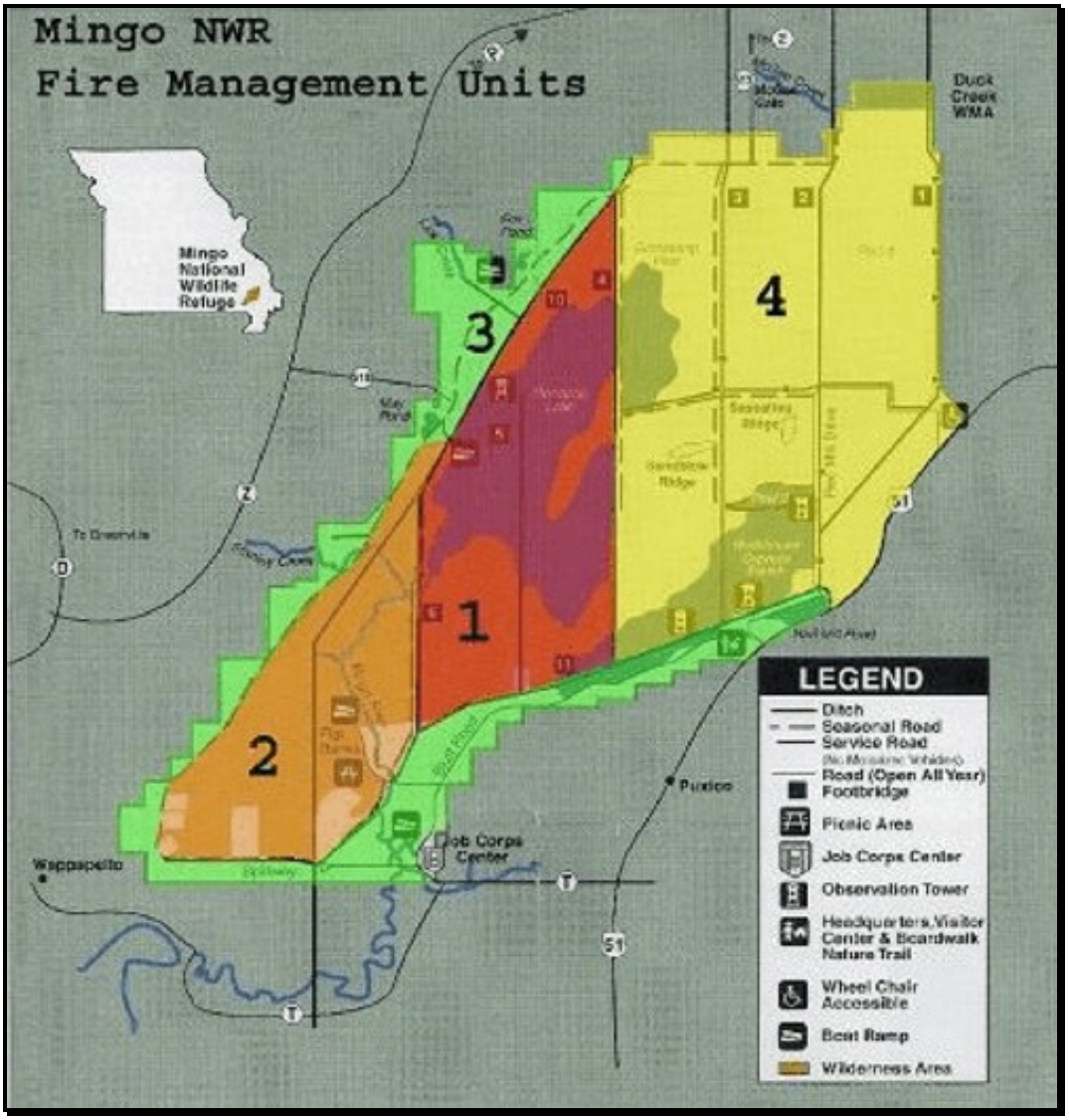
APPENDIX P - HABITAT AND FUEL TYPES

Figure 2 - Habitat and Fuel Types



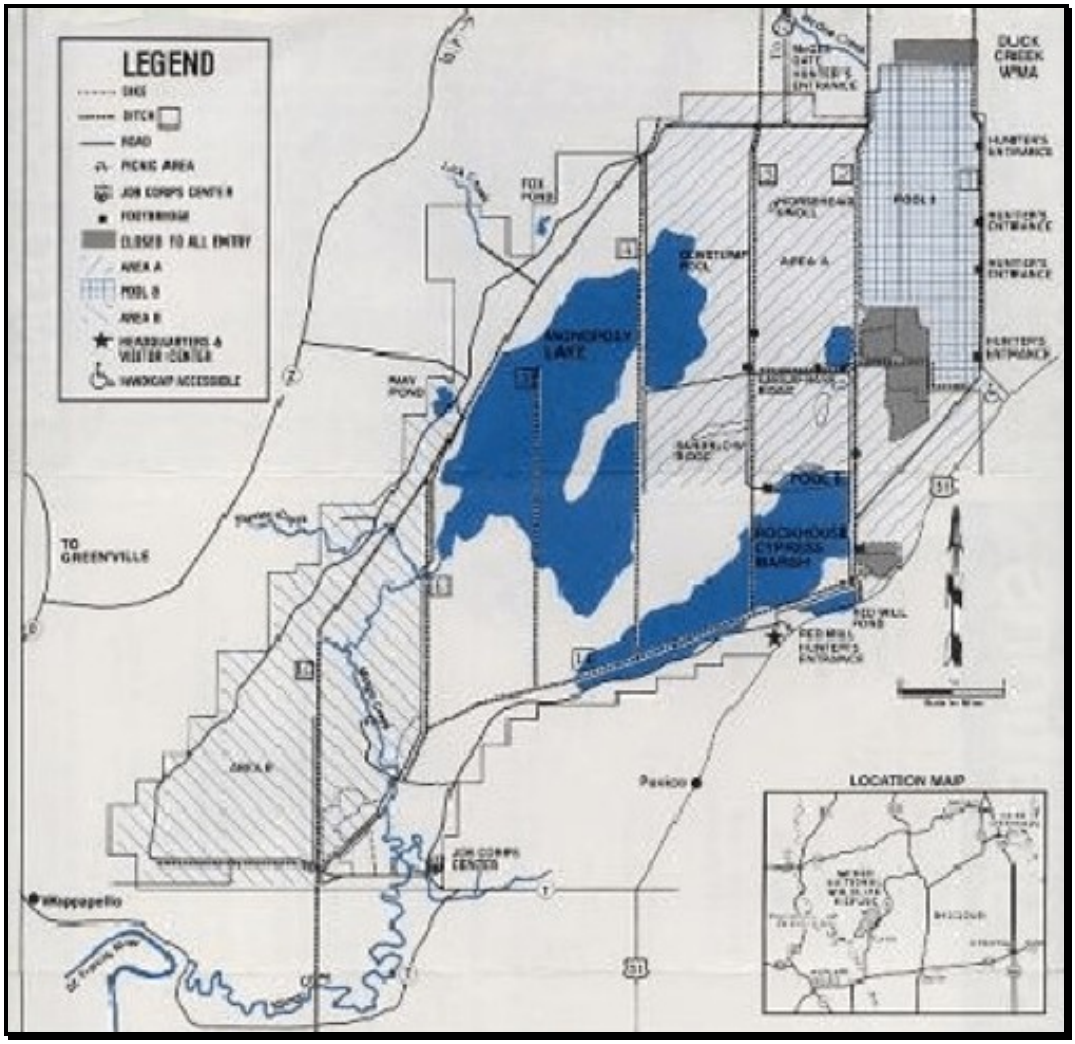
APPENDIX Q - FIRE MANAGEMENT UNITS

Figure 3 - Fire Management Units



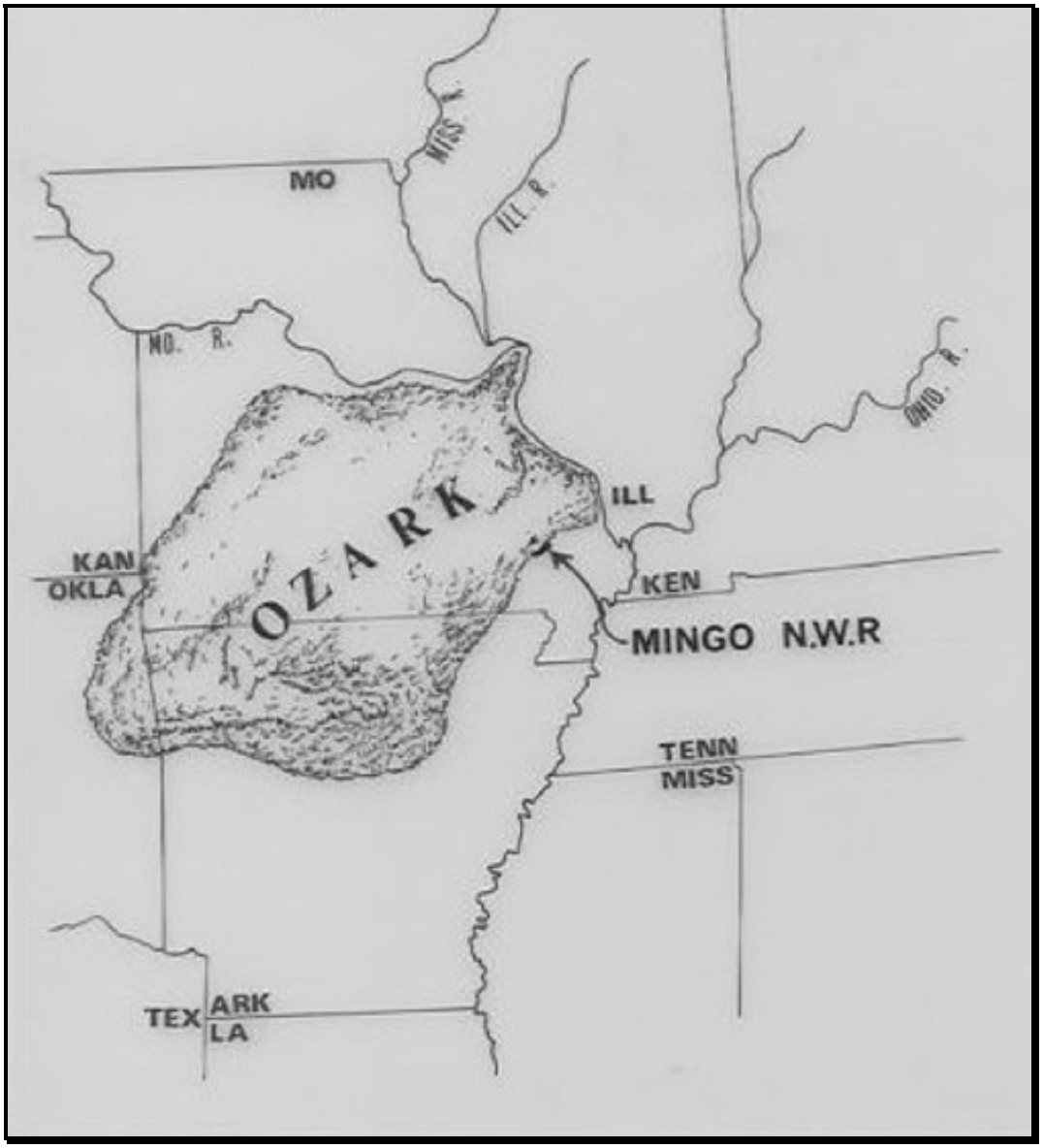
APPENDIX R - GENERAL MAP OF MINGO NWR

Figure 4 - General Refuge Map



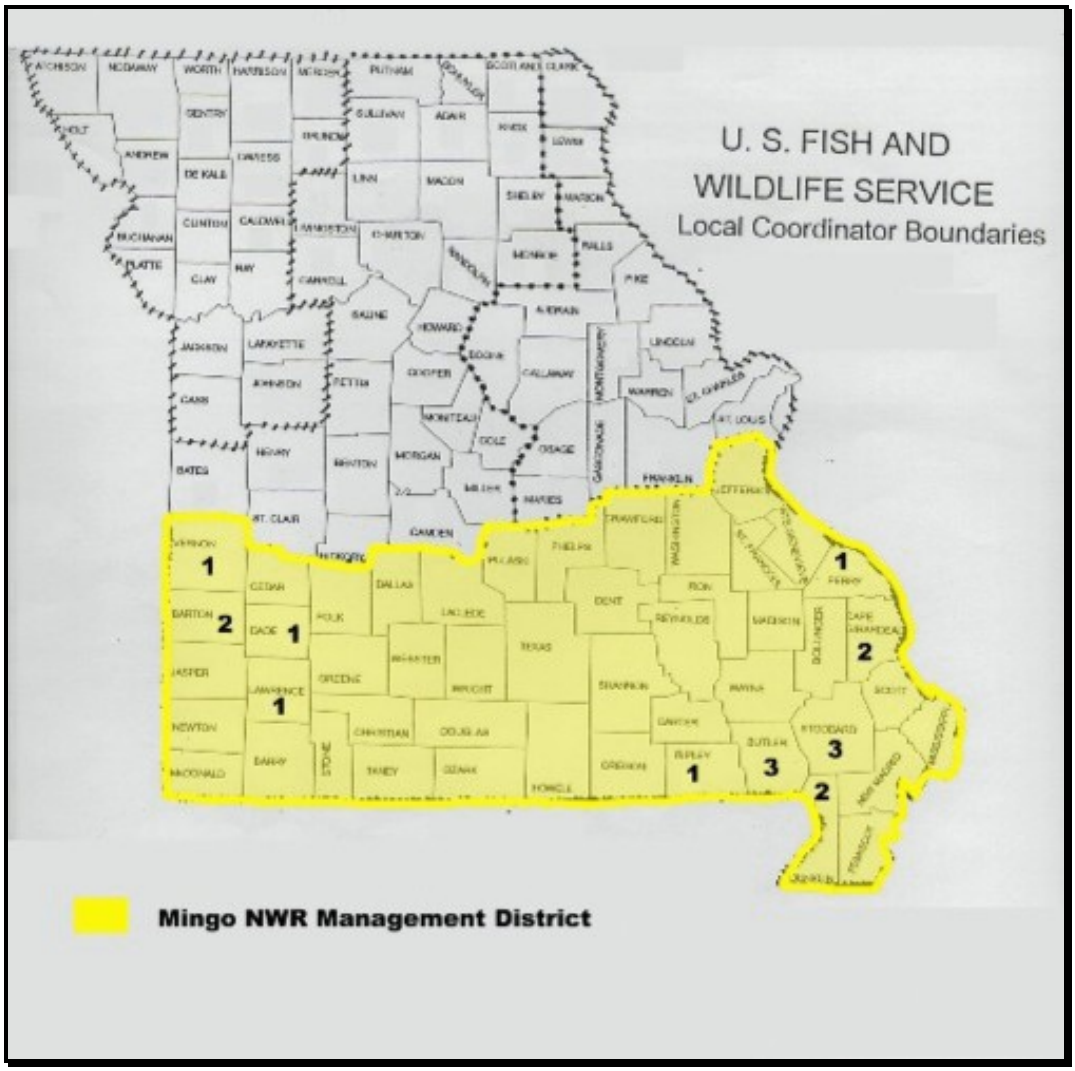
APPENDIX S - GENERAL LOCATION OF MINGO NWR

Figure 5 - General Location Map



APPENDIX T - MAP & DESCRIPTION OF FMHA EASEMENTS

Figure 6 - Map of FMHA Easements



Easement Review
December 18, 2002

The conservation easement contact at MNWR is Rick Speers, Asst. Refuge Manager.

MNWR's Farm Bill property management zone consists of 48 counties in the southern third of the state. MNWR's zone is the most diverse one with four biomes: the Tallgrass Prairie Biome lies in the northeastern corner of the zone, the Mid-latitude Deciduous Forest Biome lies in the western half of the zone, the Southern Pine Forest Biome is

located on the eastern half of the zone, and finally, the Southern Floodplain Forest lies in the Bootheel (Exhibit 2, Biodiversity Task Force 1992).

MNWR is responsible for 16 conservation easements totaling 409.30 acres. The average easement size is 28.7 acres (range 3-84.1 acres). There is one fee title property in the MNWR zone. All of the conservation easements in MNWR's zone are posted and receive annual inspections. The conservation easement management staff developed habitat management plans for all easements. Almost all MNWR's easements are located in wetland deficiency areas defined by MDC (Exhibit 3). The easements in this zone are clumped in two of the biomes, the Tallgrass Prairie Biome, and the Southern Pine Forest biome. The easements in the Tallgrass Prairie Biome are 5 hours from MNWR, therefore, they are treated as walk-aways. The easements in the Southern Floodplain Forest are close the the refuge and are the same habitat type as the refuge, therefore these easements are more closely monitored. The easement management staff have planted trees on several of the easements with an acorn planter designed by MNWR staff. As the major farm crops in this biome are rice and cotton, the need to fence for cattle is not as frequent here as in the other zones. However, the cost of fencing is still prohibitive.

Table 21 - FMHA Easements - Mingo NWR

Original Landowner	Tract	County	Easement Acres
A. Lenz	BR10c	Barton	41.91
J. Reaves	BR12c	Barton	32.63
D. Eaton	BL09c	Butler	13.7
A. McCombs	BL10c	Butler	17.34
H. Petty	BL11c	Butler	36.0
D. Seabaugh	CP10c	Cape Girardeau	16.0
Probst Hog Farm	CP11c	Cape Girardeau	29.58
C. Decker	DA11c	Dade	30.64
D. Eaton (2 easements split on 2 tracts)	DU10c	Dunklin	49.0
R. Mattlage	LW10c	Lawrence	3.0
M. Herman	PR02n	Perry	5.75
H. Asher	RI10c	Ripley	32.0
S. Kleffer	SD10c	Stoddard	12.66
R. Crowell	SD11c	Stoddard	18.7
S. Lynch	SD12c	Stoddard	29.5
D. Ast	VE10c	Vernon	84.09

APPENDIX U - CLIMATOLOGY

Table 22 - Climatology

Month	Temperature						Precipitation				
	Ave. Daily Max. (EF)	Ave. Daily Min. (EF)	Ave. (EF)	2 years in 10 will have-		Ave. # of growth degree days	Ave. (inches)	2 years in 10 will have (inches)		Ave # days with at least 0.10 inches	Ave. snow inches
				Max temp higher than (EF)	Min temp lower than (EF)			less than	more than		
January	42.6	24.6	33.6	69	-4	17	3.73	1.70	5.46	6	3.8
February	48.3	28.6	38.5	73	4	22	3.45	1.91	4.80	6	2.8
March	59.7	38.5	49.1	83	13	144	5.33	2.62	7.67	8	2.3
April	72.1	49.3	60.7	88	28	321	4.58	2.44	6.45	8	.0
May	81.0	57.5	69.3	94	37	598	5.26	2.76	7.43	8	.0
June	88.5	65.2	76.9	99	49	807	3.77	1.99	5.33	6	.0
July	91.5	68.9	80.2	101	54	936	3.82	2.04	5.38	6	.0
August	89.1	66.7	77.9	100	53	865	3.58	1.82	5.10	5	.0
September	82.3	60.8	71.6	95	40	648	3.73	1.73	5.45	6	.0
October	73.4	48.7	61.1	90	29	355	2.50	.80	3.88	5	.0
November	58.6	39.1	48.9	79	16	83	4.37	1.75	6.58	6	.6
December	47.2	30.1	38.7	70	4	13	4.12	1.81	6.09	7	1.4
Yearly	69.5	48.2	58.9	102	-4	4,809	48.24	39.04	56.98	77	10.9

APPENDIX V - MAP OF WILDERNESS AREA

Figure 7 - Mingo Class I Wilderness Area