WILDLAND FIRE MANAGEMENT PLAN

PILOT KNOB/OZARK CAVEFISH NATIONAL WILDLIFE REFUGES

GREAT LAKES-BIG RIVERS REGION

2003

FIRE MANAGEMENT PLAN

MINGO SATELLITE REFUGES

IRON and LAWRENCE COUNTIES MISSOURI

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I. INTRODUCTION

U.S. Fish and Wildlife Service (FWS) 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. This plan proposes fire management actions for two refuges that are managed as satellites of Mingo National Wildlife Refuge (NWR). Both are located in southern Missouri (Figure 1). As this plan is not generating new Federal actions that would affect the environment, it is deemed a categorical exclusion and requires no additional environmental documentation under the National Environmental Policy Act (NEPA).

Figure 1 – Location Map

A. PILOT KNOB NATIONAL WILDLIFE REFUGE

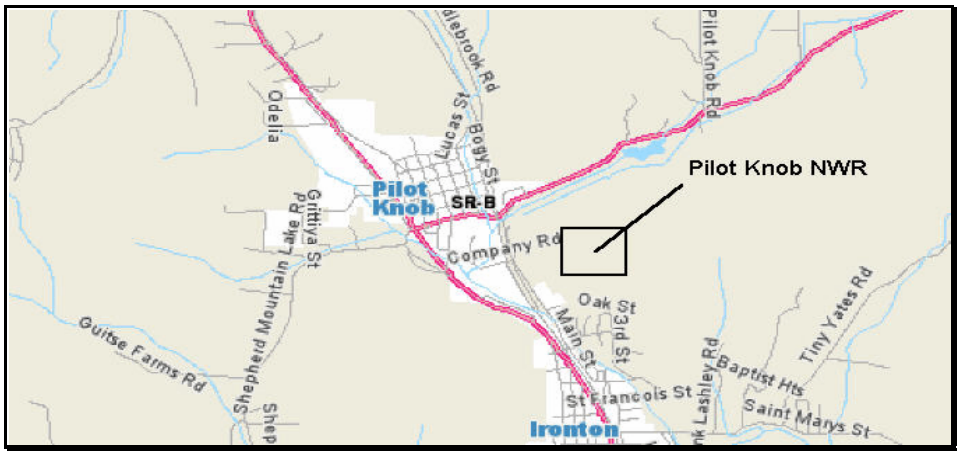
Pilot Knob mine is located in southeast Missouri (Figure 2) near the small town of Pilot Knob, (Figure 3) Township 34 North, Range 4 East , in the southern 2 of section 29, in Iron County. The mine is a major hibernaculum, estimated to contain half of Missouri=s known Indiana bat (*Myotis sodalis*) population. Pilot Knob NWR consists of approximately 90 acres, on a steep conical hill ascending over 560 feet above the Arcadia Valley floor.

The Refuge was established in 1987, shortly after an accident involving two teenagers exploring the mine. The owners, Pilot Knob Ore Company, donated 90 acres including the mine to the U.S. Fish and Wildlife Service.

Figure 2 - Pilot Knob Area Map

The area immediately surrounding the entrance was restricted by a chain link fence installed by the Missouri Department of Conservation (MDOC) in 1989. The site is managed as a satellite refuge of the Mingo National Wildlife Refuge, located approximately 60 miles to the southeast.

Figure 3 - Pilot Knob Refuge Map



Abandoned mines precipitate many visitors. Due to the exceedingly unstable and hazardous nature of the mine and outer rock face, the area has been closed to the general public since the acquisition of the property. Public entry to the mine has decreased, however, visible signs of trespass

can still be seen.

B. OZARK CAVEFISH NATIONAL WILDLIFE REFUGE

Ozark Cavefish is located in southwest Missouri (Figure 4) in Lawrence county, in the northwest ¼ of section 29, Township 29 North, Range 25 West (Figure 5). The area is described as Turnback Cave Springs at its exit from Turnback Cave. It is one of 21 cave sites known as a home to the endangered Ozark Cavefish (*Amblyopsis rosae*). The Refuge consists of approximately 40 acres, and lies in the Springfield Plateau subdivision of the Missouri Ozark=s Province. Nearly 3000 feet of interconnecting passages run throughout the large cave.

Figure 4 - Ozark Cavefish Area Map

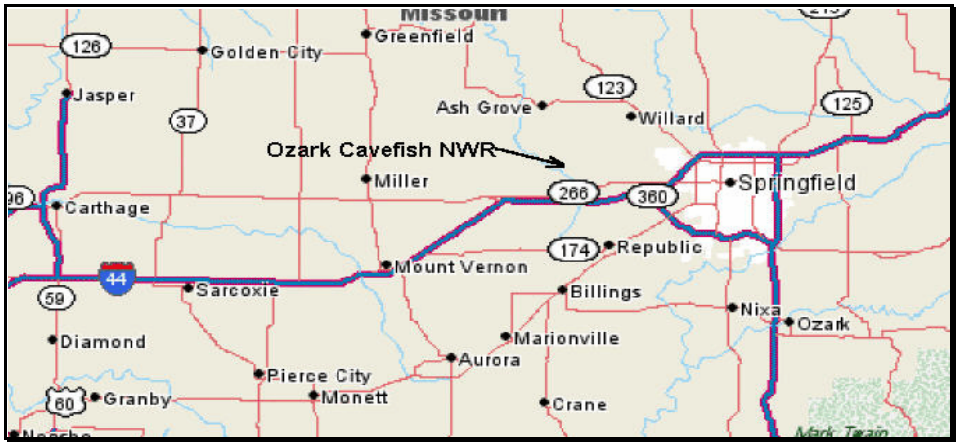
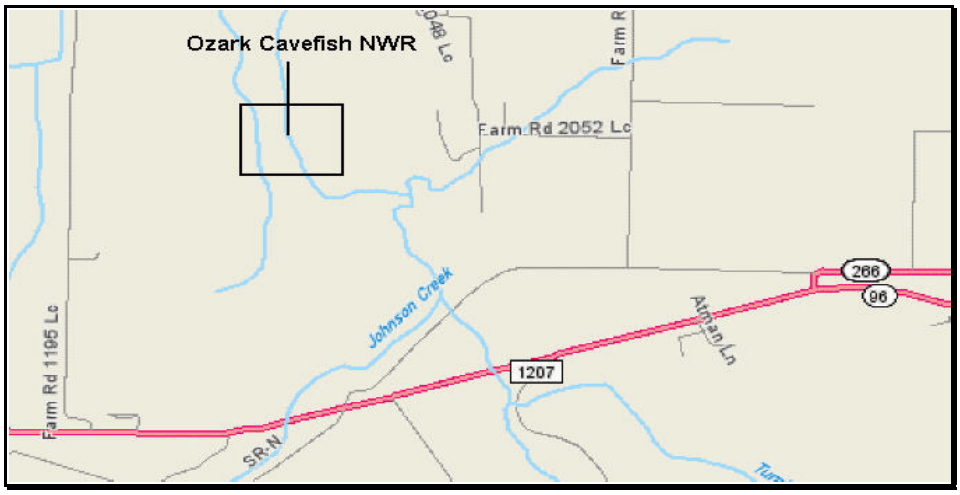


Figure 5 - Ozark Cavefish Refuge Map



The Refuge was established in 1991 through a purchase from a private landowner. The area immediately south of the Refuge is owned by the

Missouri Department of Conservation. Paris Springs is located to the east. It is here that entrance to the Refuge can be obtained, via an easement. The site is managed as a satellite refuge of the Mingo National Wildlife Refuge, located approximately 230 miles to the east.

II. DESCRIPTION OF THE REFUGE

A. GENERAL DESCRIPTION

1. Pilot Knob

Pilot Knob diverges from the general igneous hills in many aspects. It is undoubtedly cone-shaped, and nearly dissociated from the adjoining porphyry hills. It is connected on the east with the higher hills by a low neck of igneous rock which emerges only about 200 feet above the surrounding Cambrian rocks. The mountain is located in T. 34 N., R. 4 E. in the southern 2 of Section 29, about five miles south of Iron Mountain. It has a basal diameter of three-quarters of a mile and rises about 600 feet above the surrounding valley, attaining an elevation of approximately 1,500 feet above sea level. To the north, across a narrow valley is Buzzard Mountain, on the northwest is Cedar Hill, on the southwest is Shepherd Mountain, and on the east and southeast are other mountains all of which are composed of compact, reddish brown porphyry (igneous rock) which does not differ essentially from that constituting the lower portion of Pilot Knob. The Refuge, located in Iron County, consists of the upper 90 acres of Pilot Knob Mountain, and the lower portion of the mountain is divided into land owned by the State of Missouri and private landowners. The community of Ironton lies approximately 3/4 mile south of the mountain.

2. Ozark Cavefish

Ozark Cavefish NWR is one of the five out of 21 potential sites that is protected for the endangered Ozark Cavefish. Adjacent to the South of the Refuge is Missouri Department of Conservation=s 208 acre Paris Springs Access, on Turnback Creek. Halltown is approximately 4 miles to the East. Although MDOC owns the entrance to Turnback Creek Cave, the exit at Turnback Creek is on the Refuge. This exit area is essential in protecting the cavefish site and assists in meeting Recovery Plan Goals. The Refuge is located in the northwest 1/4 of section 29, Township 29 North, Range 25 West. The Refuge, located in Lawrence County, consists of the 40 acres and an access easement. Surrounding lands are owned by the

State of Missouri and private landowners. The community of Mt. Vernon lies approximately 9 miles to the southwest of the Refuge.

B. CLIMATOLOGY

1. Pilot Knob

The climate of the Refuge is a humid continental type with warm summers and cool winters. Mean annual temperature of Iron County is 56 ^{o}F with a mean January temperature of 32 ^{o}F and a mean July temperature of 73 ^{o}F. Mean annual precipitation is 44.3 inches and is rather evenly distributed throughout the year with an average of 3.7 inches per month. Mean length of the growing season in Iron County is 185 days with the average first freeze date occurring October 11 and the average last freeze date occurring April 27.

2. Ozark Cavefish

The climate of Lawrence County is a humid continental type with warm summers and cool winters. Mean annual temperature of Lawrence County is 55.9 ^{o}F with a mean January temperature of 32.6 ^{o}F and a mean July temperature of 77.7 ^{o}F. Rainfall is fairly heavy with mean annual precipitation of 39.74 inches and is rather evenly distributed throughout the year with an average of 3.3 inches per month. Mean length of the growing season in Lawrence County is 189 days with the average first freeze date occurring October 14 and the average last freeze date occurring April 28.

C. SOILS

1. Pilot Knob

The majority of the mountain is comprised of Killarney very cobbly silt loam, 14 to 50 percent slopes, and rubbly. This is a well drained soil with a dark grayish brown very cobbly silt loam about 3 inches thick. The subsurface soil is a very brown cobbly silt loam about 4 inches thick. The upper 29 inches of the subsoil is yellowish brown very cobbly silt loam, and very gravelly silty clay loam. The surface runoff is high and erosion is a major hazard. The Killarney soil type covers approximately 50-60 % of the mountain=s base.

The second soil type is Irondale very cobbly silt loam, 15 to 40 percent slopes, and rubbly. Stones and Boulders generally cover 15 to 50 percent of the surface. The surface layer is extremely dark grayish brown very cobbly silt loam about 3 inches thick.

The subsurface layer is a brown very cobbly silt loam about 5 inches thick. The subsoil is very cobbly silt loam about 32 inches thick. It is yellowish brown in the upper part and reddish brown in the lower part. Rhyolite bedrock is at a depth of about 35 inches. Permeability is moderate, but surface runoff is rapid. The organic content is low, and the surface layer is friable but cannot be easily tilled because it commonly has 50 percent or more rock fragments.

2. Ozark Cavefish

Wilderness cherty silt loam, the primary soil type found on the Refuge, has 2 to 9 percent slopes. It is deep, gently or moderately sloping, and moderately well drained. Some areas have small and large sinkholes. Coarse fragments of chert are on the surface. Generally, the surface layer is dark grayish brown cherty silt loam about 2 inches thick. The subsurface layer is brown cherty silt loam about 8 inches thick. The subsoil above the fragipan is about 11 inches thick, with the upper part being a yellowish brown, friable cherty silt loam, and the lower part a brown, firm cherty silty clay loam. The fragipan is about 35 inches thick. The upper part is pale brown, firm, cherty silt loam, and the lower part is mottled, multicolored, firm very cherty silty clay loam. The subsoil below the fragipan is dark red, very firm cherty clay to a depth of 72 inches. Some areas are stony. This soil is moderately permeable and surface runoff is medium.

D. VEGETATION

1. Pilot Knob

Refuge vegetation may be considered as upland forest. Oak-hickory forest types predominate on the cobbly silt loam areas, and are interspersed with shortleaf pine in places. These shallow soils support various forbs and native grasses, such as sumac (*Rhus spp.*), coralberry (*Symphoricarpos orbiculatus*), little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), and indiangrass (*Sorghastrum nutans*).

2. Ozark Cavefish

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

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, Elm (*Ulmus spp.*), Walnut (*Juglans nigra*), Red Cedar (*Juniperus virginiana*), Blackberry (*Rubus allegheniensis*), Dewberry (*Rubus spp.*), Coralberry, 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 (*Q. stellata*), White Oak (*Q. 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, 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*).

Bottomland Forest

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 (*Q. macrocarpa*), and Swamp Red Oak (*Q. falcata*).

b. Mixed Soft-Hardwood Levees Community - This community type exists along 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.

E. LAND USE

1. Pilot Knob

The Refuge comprises a total of approximately 90 acres. Land use can be classified into two types: 1) Oak Hickory Forest 2) Cave Habitat. The forested land consumes the 90 acres and the cave habitat is nearly 30 acres at varying heights within the abandoned mine.

2. Ozark Cavefish

The Refuge comprises a total of approximately 40 acres. Land use can be classified into four types: 1) Upland Forest 2) Bottomland Forest 3) Grassland 4) Spring, Creek, or Stream. There are approximately 16.5 acres of bottomland and upland forest, and approximately 23.5 acres of open grassland.

F. HABITAT MANAGEMENT OBJECTIVES

1. Pilot Knob

Pilot Knob supports an estimate of nearly one-third of the world=s Indiana bat population. Due to the significance of this site as a hibernaculum and the protected status of the endangered bats, Pilot Knob is not managed for, nor open to the public. It is managed strictly to protect and enhance Refuge habitat to maintain or

increase use by endangered species. Scientific investigations, research, and monitoring is allowed by permit only.

2. Ozark Cavefish

Ozark Cavefish supports two endangered species, the gray bat (*Myotis grisescens*) and the Ozark cavefish, as well as the bristle cave crayfish (*Cambarus setosus*). Due to the significance of this site as critical habitat for these three species and the biological importance of the resources, Ozark Cavefish NWR is not managed for, nor open to the public. It is managed strictly to protect and enhance Refuge habitat to maintain or increase use by endangered species. Scientific investigations, research, and monitoring is allowed by permit only. Specific Objectives include, but are not limited to:

a. Ensure protection of the federally endangered gray bat maternity colony inhabiting the cave and utilizing the Refuge,

b. Ensure protection of the federally endangered Ozark Cavefish population inhabiting the cave stream,

c. Protect the uncommon bristle cave crayfish population inhabiting the cave stream,

d. Prohibit recreational visitation to the site,

e. Prevent potentially adverse impacts on the site and its ecosystem from surface management practices**.**

G. MANAGEMENT CONSTRAINTS

Both Refuges must be managed in accordance with the Endangered Species Act of 1973 and its amendments.

H. HISTORIC FIRE INFORMATION

1. Pilot Knob

In general, the Refuge=s physical features and climatic conditions are not conducive to wildland fires. The low organic content of the soil in combination with the high percentage of rock eliminates the most significant threat of wildland fire. High humidity, abundant rainfall, and restricted public access tend to reduce the chance of wildland fires.

Historically, fire played a natural role in the mountain=s ecosystem. Whether lightning or Native American=s were the cause of the ignitions, periodically the forests were burned. At present, wildland fires potentially could have severe ecological impacts if they occur during the active growing season. To date, this has not occurred on Pilot Knob 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 serious erosion problems, however, this type of equipment has not been needed on the Refuge in the past. Its use would be severely limited by the steep topography of the Refuge.

2. Ozark Cavefish

In general, the Refuge=s physical features and climatic conditions are not conducive to wildland fires. High humidity, abundant rainfall, and restricted public access tend to reduce the chance of wildland fires.

Historically, fire played a natural role in the area=s ecosystem. Whether lightning or Native American=s were the cause of the ignitions, periodically the forests were burned. At present, wildland fires potentially could have severe ecological impacts if they occur during the active growing season. To date, this has not occurred on Ozark Cavefish 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 some erosion problems, however, this type of equipment has not been needed on the Refuge in the past. Its use would be limited in some areas of the refuge by steep topography.

I. ENDANGERED SPECIES

1. Pilot Knob

There are two listed endangered, threatened, or rare species that occur or are likely to occur on Pilot Knob National Wildlife Refuge.

The Indiana Bat hibernates within the abandoned mine shaft

located at the peak of Pilot Knob Mountain. Wildland fire could generate serious ecological impacts on the bat population residing in the cave. Air is continually circulating through the passageways of the mine. The entrance(s) that draws air into the cavity has not been identified. It is conceivable, in the instance of a wildland fire, occurring during the bats= hibernation period, for smoke to be drawn through the rooms that are housing the bats. Suffocation of one third of the world=s population of the Indiana Bat could likely occur. If the bats were awakened by the increase in temperature or decrease in oxygen and abandoned the cave, death would likely follow due to 1) the lack of another suitable hibernaculum 2) the premature usage of the bats= energy reserves, leaving them without proper amounts for the duration of hibernation 3) the lack of food sources during the winter months. Wildland fire occurring during the months when the cave is not in use by the bats could have indirect effects on the population. The Indiana Bat=s diet, like most bats, primarily consists of flying insects. Little is known about the distances traveled by the bats to their food sources. Proximity to drinking and feeding sites are a severely limiting factor, and it has been found that most species prefer to be within a half-mile of these sites. The destruction of habitat upon Pilot Knob Mountain, due to fire, could upset the dietary needs of the Indiana Bat upon its return to the cave. The entire Refuge is a priority for protection in the instance of a wildfire. There are differing estimates of Pilot Knob=s Indiana bat population, but the number is likely within the range of 50,000 to 100,000. The bats generally arrive in September and leave in April.

The Gray Bat hibernates in the mine, and is listed as an endangered species. Wildland fire could potentially impact the gray bat in much the same way as it would the Indiana bat. Fall migration begins in early September and generally completes by early November, however the mine=s construction and airflow may have combined to produce what is known as the Achimney effect@. Warm air becomes trapped in areas higher than the passageway for its escape. The same is true of cold air, thus the Gray bat might make a migration within the Pilot Knob Mine. Population estimates of this species could not be determined due to the hazardous nature and narrow passages. Studies have concluded that the Gray bat prefers to be located within 1.2 miles from food and water sites. It can be concluded, if wildland fire were to destroy the forest within a radius of 1.2 miles, devastating results

could develop. Due to the possible Achimney effect@ and possible year-round residence of the Gray bat, a wildland fire occurring in the summer months when the Indiana bats are gone could still have adverse impacts on the Gray bat. Suffocation within the cave is a possibility, and the increase in temperature of the in-flowing air could raise the temperature of the cave leaving it unsuitable for the bats to inhabit. Bats are very sensitive species and some, like the Indiana bat have specific temperature requirements. Variation from these temperatures can cause a population to abandon the site.

2. Ozark Cavefish

There are three listed endangered, threatened, or rare species that occur on Ozark Cavefish NWR.

The Ozark Cavefish resides in Turnback Creek Cave Springs. This fish is a small, blind, highly specialized cave-adapted troglobitic fish, that is restricted to limestone caves in the Springfield Plateau of the Ozark Highlands. The presence of cavefish is a sign of high quality water. The species is highly sensitive to changes in its environment. Wildland fire could generate serious ecological impacts on the cavefish population residing in the creek. It is likely that there would be no direct impacts, however, the loss of erosion controlling vegetation near or along the stream corridor could increase surface soil deposits into the stream. This could cause water levels of the stream to rise, or it could decrease the rate of flow, both of which would alter the availability of food sources. While Ozark cavefish rely heavily on plankton as a food source, it has been found that the fish live commensally with the gray bat. Bat guano has also shown to be a significant source of food for this species. If the bats were to be disturbed, an important food source could be disrupted.

The Gray Bat utilizes Turnback Cave in the summer for reproductive and rearing purposes and is listed as an endangered species. Wildland fire could potentially impact the gray bat. Studies have concluded that the Gray bat prefers to be located within 1.2 miles from food and water sites. It can be concluded, if wildland fire were to destroy the vegetation within a radius of 1.2 miles, devastating results could develop. Suffocation within the cave, due to smoke, is a possibility and the increase in temperature of the in-flowing air could raise the temperature of the cave leaving it unsuitable for the bats to inhabit the rooms. Bats are

very sensitive species and some, like the Indiana bat have specific temperature requirements. Variation from these temperatures can cause a population to abandon the site. As mentioned previously, Ozark cavefish rely on guano as a food source, therefore if the gray bats abandoned the cave or perished from smoke inhalation, the cavefish could suffer.

The bristle cave crayfish is another species that relies on the integrity of Turnback Cave Creek. This species reportedly occurs in only 18 locations within the White, Arkansas, and Osage River Drainage Basins of the Springfield Plateau of the Missouri Ozarks. Little is known about the ecology of these crayfish, however, populations have drastically declined in the past century. Much of the decline is due to the closure of small perennial springs and ground water pollution from nearby urban areas. Wildland fire could significantly cause indirect impacts to the delicate ecosystem of the bristle cave crayfish. The accelerated erosion that follows a wildland fire caused by the destruction of ground covering vegetation could increase the amount of deposited silt into the stream potentially contaminating or disrupting the habitat requirements of the crayfish. The use of chemical or foam retardants could also impact the crayfish by reducing oxygen levels in the stream, therefore these methods will not be utilized in areas where surface runoff could cause contamination.

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).

Only trained and qualified people will be assigned to fire management duties. Fire Management personnel will meet training and qualification standards established or adopted by the Service for the position they occupy. Agency Administrators will meet training standards established or adopted by the Service for the position they occupy. Employees who

are trained and certified will participate in the wildland fire management program as the situation demands. Non-certified employees with operational, administrative, or other skills will support the wildland fire management program as needed. Agency Administrators will be responsible, be held accountable, and make employees available to participate in the wildland fire management program.

Fire management planning, preparedness, wildland and prescribed fire operations, monitoring, and research will be conducted on an interagency basis with the involvement of all partners when appropriate. Every area with burnable vegetation must have an approved Fire Management Plan. Fire Management Plans must be consistent with firefighter and public safety, values to be protected, and land, natural, and cultural resource management plans, and must address public health issues. Fire Management Plans must also address all potential wildland fire occurrences and may include the full range of appropriate management responses. Fire Management Plans must be coordinated, reviewed, and approved by the responsible agency administrator, to ensure consistency with approved land management plans.

Fire, as an ecological process, will be integrated into resource management plans and activities on a landscape scale, across jurisdictional boundaries, and will be based upon best available science. All use of fire for natural and cultural resource management requires an approved plan which contains a formal prescription. Wildland fire will be used to meet identified resource management objectives when appropriate.

The Service will employ prescribed fire whenever it is an appropriate tool for managing Service resources and to protect against unwanted wildland fire whenever it threatens human life, property and natural/cultural resources. Once people have been committed to an incident, these human resources become the highest value to be protected. If it becomes necessary to prioritize between property and natural/cultural resources, this is done based on relative values to be protected, commensurate with fire management costs.

Regions will ensure their capability to provide safe, cost-effective fire management programs in support of land, natural, and cultural resource management plans through appropriate planning, staffing, training, and equipment.

Management actions taken on wildland fires must consider firefighter and

public safety, be cost effective, consider benefits and values to be protected, and be consistent with natural and cultural resource objectives. Refuges will work with their local cooperators and the public to prevent unauthorized ignition of wildland fires on Service lands.

Structural firefighting is not the functional responsibility of the Service. Service assistance in structure protection should only be performed on an emergency basis to save lives. (See Fire Management Handbook, 1.5.4) Fire management policies and procedures for safety, training and equipment are mandatory. See 241 FW 7 (Safety Operations - Firefighting), 232 FW 6 (Firefighting Training), and 241 FW 3 (Personal Protective Equipment).

Further clarification and interpretation of policy may be found in Section 1.1.2 of the FWS Fire Management Handbook.

B. NEPA COMPLIANCE AND AUTHORITIES CITATIONS

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

1. Pilot Knob

Pilot Knob National Wildlife Refuge was established in 1987 under the authority of the Endangered Species Act. The total area is 90 acres.

The purpose of the Refuge at the time of establishment was to preserve a decreasing population of endangered Indiana Bats. At the time of purchase, there were an estimate of 144,000 bats. Since that time, the numbers have decreased to nearly 50,000. Because of this drastic change in population size, it becomes obvious that preservation must be given high priority when considering Refuge objectives. At the present time, the objectives for preservation can be met.

2. Ozark Cavefish

Ozark Cavefish National Wildlife Refuge was established in 1991 under the authority of the Endangered Species Act. The total area is 40 acres.

The purpose of the Refuge at the time of establishment was to preserve a decreasing population of endangered Ozark Cavefish and gray bat, as well as the bristle cave crayfish. It is obvious that preservation must be given high priority when considering Refuge objectives. At the present time, the objectives for preservation can be met.

D. REFUGE OBJECTIVES

1. Pilot Knob

- Augment opportunities for bat species to roost, rest, hibernate and forage, in particular the Indiana bat, by preserving the critical habitat and eliminating disturbances

to the population.
- Control and reduce predation of the bats by opportunistic visually-orientated predators.

2. Ozark Cavefish

- Augment opportunities for bat species to roost, rest, hibernate and forage, in particular the gray bat, by preserving the critical habitat and eliminating disturbances to the population.
- Ensure the protection of the Ozark cavefish, gray bat, and bristle cave crayfish and their habitat.
- Prohibit recreational visitation to the cave and spring areas.
- Seasonally limit and evaluate impacts from acceptable scientific studies conducted on the Refuge.
- Prevent polluted waters or other contaminants to enter the spring=s watershed.

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

There are no current plans to use prescribed fire on either refuge because of the lack of knowledge related to air circulation in the caves. Until more information on this subject becomes available only suppression operations are expected to occur.

At Ozark Cavefish, potential effects of suppression operations on water quality within the cave system preclude use of prescribed fire as well.

G. GENERAL MANAGEMENT CONSIDERATIONS

1. Area-wide Considerations

Interagency Relationships
While no formal agreement exists between the Refuges and the State of Missouri, frequent contacts occur to discuss population status and effects of outside influences on the endangered species found at each location. There are also contacts with non-governmental organizations, i.e. Bat Conservation International and others that are involved in monitoring populations and

providing a source of research results to improve management. Local cooperative efforts have not been as intensive as local assistance is more apt to be in the physical protection realm.

Regional Strategies
No regional strategies related to fire management exist at either Refuge.

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

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

Collaboration beyond the local level is not likely as the individual Refuges only cover 90 and 40 acres of surface area and are roughly 250 miles apart.

Priority Setting
As no hazardous fuels reduction projects are planned during the life of this plan, priority setting on a local, regional or national basis will not be necessary.

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

National Fire Plan
Due to the small size of the individual Refuges and lack of fire history since acquisition, wildland fire operations will not

contribute significantly to any of the National Fire Plan goals.

Restore Fire-Adapted Communities
Due to the potential of irreparable damage to the involved endangered species population protected at each location, prescribed fire application will not occur until further knowledge of airflow in the caves is gained. Use of prescribed fire would enhance current surface habitat at Ozark Cavefish and would not be of substantial benefit at Pilot Knob. In any case, current acreages are insignificant in the southern part of Missouri to have any measurable effect on National Fire Plan Goals.

4. 10 Year Comprehensive Strategy

Priorities to Protect Communities and High Risk Watersheds - There are no communities near either Refuge that are at risk. The watershed of Turnback Creek at Ozark Cavefish is a high risk watershed. This designation is a result of the potential for adverse effects on the cavefish population. To protect the watershed, no retardant chemicals will be used on the refuge.

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

Performance Measures and Results Monitoring - The primary performance measure applicable to these Refuges involves effective protection of life, property and existing habitat conditions. Should application of prescribed fire become a viable management tool at Ozark Cavefish, a second measure is the restoration of fire to its traditional role in the affected communities.

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

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 satellite Refuge needs will be addressed when they reach a higher priority.

Program Management Budgets and Authorities - At the present time, with no fire history, and their status as small un-staffed units,

neither Refuge generates any support from the FIREBASE fire planning and budgeting tool. Future support will be continue to be provided by Mingo NWR staff.

Social Awareness and Support - 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 AND OBJECTIVES

Fire has played a historical role in shaping the development and maintenance of North American ecosystems. 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. This Fire Management Plan provides a detailed course of action to implement fire management policies for the Refuges for the purpose of achieving management objectives.

A. 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.
- $ Develop and implement a process to ensure the collection, analysis, and application of fire management information needed to make management decisions.

B. FIRE MANAGEMENT OBJECTIVES

- Protect from fire all important scientific, cultural, historic, prehistoric, visitor facilities, administrative sites, and Refuge housing.
- $ Perpetuate habitat important to native wildlife species by maintaining a diversity of plant communities.
- $ Prevent human-caused wildland fires.
- $ Educate the public regarding the role of prescribed fire within the Refuge.

V. FIRE MANAGEMENT STRATEGIES AND LIMITS

A. STRATEGIES TO MEET FIRE MANAGEMENT OBJECTIVES

1. Refuges will utilize the appropriate management response to suppress all wildland fire including lightning ignitions occurring within the boundaries of the Refuge.

2. Suppress all wildland fires in a safe and cost effective manner consistent with resources and values at risk.

3. 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 critical habitats.

4. Minimum impact strategies and tactics will be used whenever possible.

B. LIMITS TO STRATEGIES

1. Prescribed fire will not be used to reduce hazardous fuel accumulations.

2. Utilization of heavy equipment during wildland fires will be allowed only with the approval of the Refuge Manager or their designee.

3. Wildland fire use for resource benefit will not be utilized.

4. The minimum tool necessary will be used when possible.

5. The use of retardant or foam will not be allowed near streams due to toxicity to aquatic species.

VI. FIRE MANAGEMENT UNITS (FMU)

Each Refuge will be considered a separate Fire Management Unit for wildland fire suppression. Prescribed fire will not be used on either refuge and will not be discussed further.

A. FMU CONDITIONS

Current estimates of fire regime and condition class are shown in Table 1, below.

Table 1 - Fire Regime and Condition Class

Refuge Name	Acres	Fire Regime	Condition Class
Pilot Knob	90	IV	1
Ozark Cavefish	40	I	2

Fire Regime I - This fire regime with a return interval of 0-35 years, can be identified with most grasslands across the U.S. It has been most affected by the presence of human activity and generally demonstrates the most significant departure from historical levels of fire occurrence.

Fire Regime IV - This fire regime with a return interval of 35-100+ years is identified with lands where fire is only an occasional factor in disturbance and any fire in this regime may be of mixed severity. This indicates that some areas could be burned and lose all vegetation while other areas may suffer only minor damage and scattered plant mortality. Oak-hickory woodlands like those in the area on Pilot Knob are examples.

Three Condition Classes have been developed to categorize the current condition with respect to each of the Fire Regime Groups. The relative risk of fire-caused losses of key components that define the system increases for each respectively higher numbered condition class, with little or no risk at the Class 1 level. Class 2 infers a departure of one or more Anormal@ fire return intervals either by suppression action or disturbance such as that indicated around Ozark Cavefish.

B. 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.
- $ Prevent fires from burning off of the Refuge onto adjacent lands.
- $ Prevent damage to cultural and historic resources.

C. SUPPRESSION STRATEGIES AND TECHNIQUES

1. 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.

2. When appropriate, conduct backfiring operations from existing roads and natural barriers to halt the spread of fire.

3. Use burnouts to stabilize and strengthen the primary control lines.

4. If the use of heavy equipment is warranted, upon approval of the Refuge Manager, construction of control lines will border existing roads whenever possible.

5. Constructed firelines will be rehabilitated after the fire.

6. 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 constructed fire barriers may be utilized. Those barriers should be selected to safely suppress the fire, minimize resource degradation and damage, and be cost effective.

D. LIMITS

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

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

E. 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.

F. PREDICTION OF FIRE BEHAVIOR

Neither Refuge has a weather station, therefore the necessary data has not been collected to accurately determine a fire weather history. The Mark

Twain National Forest office at Potosi calculates fire danger rating criteria for grass and timber fuels. Theses criteria will be used to determine potential fire behavior and trends necessary to properly manage the fire suppression program at Pilot Knob. Similar information is available from the Cassville office of the Forest Service for use at Ozark Cavefish. Additionally, Missouri Department of Conservation stations are being upgraded and information from that source may also be available.

G. RELATIONSHIP OF FIRE MANAGEMENT UNIT TO STATION OBJECTIVES

Each Refuge is considered a separate Suppression Unit. Therefore, the previous discussion of Station Objectives (Section III- D and E) fully addresses the unit objectives for each Suppression Unit.

VII. FIRE MANAGEMENT AND RESPONSIBILITIES

The suppression of wildfire is given priority over all activities except the safeguarding of human life (910 DM 1.4). It is expected that all fire trained Refuge employees will be available to assist with emergency suppression as needed on either 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, although not used on these Refuges, require the use of 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.

It is expected that due to the distance to Ozark Cavefish NWR, MDOC or local fire departments will assume initial attack responsibilities and wildland fires are likely to be extinguished or spread from Refuge lands before Refuge staff arrives.

Table 2 - Optimal Staffing To Conduct A Fire Management Program

Fire Management Positions Needed	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

1. 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)

2. 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.

3. 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.

4. 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 fire 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)

5. 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 the Crab Orchard NWR will assist 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.

6. 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)

7. 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.

8. 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.

9. 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. FIRE COOPERATORS AND INTERAGENCY COORDINATION

No formal cooperative agreements are required to receive help from other governmental agencies in fighting wildland fires. The Refuge currently receives assistance whenever requested. 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 portion of students are qualified and available for immediate assistance on any Refuge fire. Escape fires would constitute an emergency situation and require the assistance of professional fire fighters. Both Pilot Knob and Ozark Cavefish NWRs are

almost entirely surrounded by private and state owned lands. The local fire departments have primary fire suppression responsibilities for these lands. 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 both Refuges, 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 cooperators to detect fire ignitions. Actions taken to implement this include:

- $ 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.
- $ 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.
- $ During periods of high fire danger, warnings will be posted at information stations.
- $ Public contacts will be made via press releases and verbal contacts during periods of high fire danger.
- $ 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

B. FIRE PREVENTION ANALYSIS

An 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. The Fire Management Plan will be reviewed and modified, if necessary.

C. 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.

D. FIRE BEHAVIOR

This was also discussed in detail in Section VI.D. 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 (trespassers) are common.

E. 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 revision and evolution of policy, the training process is not described in this section.

2. Annual Refuge Fire Management Activities

Table 3 - Annual Refuge Fire Management Activities

ACTIVITY	1	2	3	4	5	6	7	8	9	10	11	12
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										
Review and Update FMP	x											
Prepare Pre-Season Risk Analysis		X										

Activities in the table above are completed as part of the fire management process as Mingo NWR.

3. Emergency Preparedness / Preparedness Levels

Local dispatch centers shall be made aware of Refuge fire situations and be consulted to determine the availability of contingency resources in the event of an escape. Local, regional and national preparedness levels may be obtained from the Missouri Interagency Coordination Center.

F. NORMAL UNIT STRENGTH

All equipment will be stored at the Mingo NWR 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 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 F.

G. 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.

H. DETECTION

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

I. FIRE SUPPRESSION

1. General

Service policy requires the Refuge to utilize the Incident Command System (ICS) system and firefighters meeting National Wildfire 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 G) 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 Wildland fire Coordination Group standards will be dispatched.

3. Communications

Appendix H contains a listing of Radio Communication Frequencies commonly used on Pilot Knob, Ozark Cavefish and Mingo NWRs.

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 National Forest, Missouri Department of Natural Resources, Mingo Job Corps, and the local communities of Ironton and Arcadia for Pilot Knob and Halltown for Ozark Cavefish. 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 I) and Delegation of Authority (Appendix J).

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 either Refuge will not be permitted without the approval of the Refuge Manager. The minimum tool necessary will be used when possible.

J. 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.

K. 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

There will be no prescribed fire activities under this plan. As information about air circulation in the mine and caves becomes available this decision will be reviewed and the Fire Management Plan modified accordingly.

Neither Refuge is expected to implement a hazardous fuel reduction program at this time.

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 Wildfire 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.

There are no non-attainment areas near or on either Refuge. Smoke sensitive areas in the area include county, and state roads.

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

1. 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. All attempts will be made to reduce smoke emissions from the burn as quickly as possible. Mopup will also be initiated in order to eliminate as much smoke production as possible.

3. 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. 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

As prescribed fire application is not planned on either Refuge, monitoring may occur following wildland fires if deemed necessary by the Refuge Manager. Any monitoring will comply with accepted scientific methods. Specific methodology is described in the Mingo NWR Fire Management Plan. 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. Fire crews will be briefed, that should an individual who is not a member of the fire crew be observed in the burn area, 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.

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.

XIV. ARCHEOLOGICAL/CULTURAL/HISTORIC RESOURCES

Since neither Refuge has had a cultural resource survey, if 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.

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

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. 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. The following were consulted and cited in the development of this plan:

Soil Survey of Iron County, Missouri USDA, Soil Conservation Service
Soil Survey of Lawrence County, Missouri USDA, Soil Conservation Service
Cave Management Plan- Trunback Cave, Paris Springs Access
Turnback Creek Cave Springs Environmental Assessment
The Troglobitic Crayfish of Missouri, Duane Marquart, 1979, Central Missouri State University
Appraisal Report- Rickey Gene Harrison Tract, Lawrence County, MO
Division of Realty- Region 3
Bill Elliot, MDOC, Cave Biologist
Rick Clawson, MDOC,
Jeneane Latch, MDOC, Cape Girardeau, MO
Paul McKensie, ESO, Columbia, MO
Jim Kennedy, Bat Conservation International, Inc.
FMP- Mingo NWR
FMP- Big Stone NWR
FMP- Desoto NWR
FMP- Swan Lake 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
Zone FMO, Thomas Zellmer, Leopold WMD, WI

APPENDIX A - Species Lists

A current list of species for Ozark Cavefish is not available.

Pilot Knob NWR Species List

Plants			
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Aster	*Aster spp.*	Pansy Violet	*Viola tricolor*
Blackberry	*Rubus allegheniensis*	Poison Ivy	*Rhus radicans*
Black-eyed Susan	*Rudbeckia hirta*	Post Oak	*Quercus stellata*
Black Oak	*Quercus velutina*	Prairie Tea	*Croton monanthogynus*
Box Elder	*Acer negundo*	Pussy=s Toes	*Antennaria plantaginifolia*
Broadleaf Goldenrod	*Solidago flexicaulis*	Red Maple	*Acer rubrum*
Calamint	*Calamintha nepeta*	Red Root	*Ceanothus americanus*
Common Ragweed	*Ambrosia artemisiifolia*	Rushfoil	*Crotonopsis linearis*
Dandelion	*Taraxacum officinale*	Sedge	*Carex spp.*
Desmodium	*Desmodium spp.*	Short Blazing Star	*Liatris ligulostylis*
Devil=s Walking Stick	*Aralia spinosa*	Silver Maple	*Acer saccharinum*
Dittany	*Origanum dictamnus*	Skullcap	*Scutellaria montana*
Dogwood	*Cornus spp.*	Snakeroot	*Aristolochia serpentaria*
Dropseed	*Sporobolus spp.*	Spreading Aster	*Aster patens*
Elm	*Ulmus spp.*	Sumac	*Rhus spp.*
Goldenrod	*Solidago canadensis*	Sunflower	*Helianthus spp.*
Green Ash	*Fraxinus pennsylvanica var. subintegerrima*	Tick Trefoil	*Lonicera sempervirens*
Hickory	*Carya spp.*	Tickseed	*Coreopsis spp.*
Hogwort	*Croton capitatus*	Toothwart	*Dentaria lacinata*
Indian Physic	*Gillenia trifoliata*	Upland Pin Oak	*Quercus palustris*
Ironweed	*Veronia noveboracensis*	Violet	*Viola spp.*
Lespedeza	*Lespedeza spp.*	Virginia Creeper	*Parthenocissus quinquefolia*
Lobelia	*Lobelia spp.*	White Oak	*Quercus alba*
Mint	*Mentha spp.*	White Lettuce	*Prenanthes spp.*
Mulberry	*Morus spp.*	Wild Bergamot	*Monarda fistulosa*

Plants			
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Nightshade	*Solanum spp.*	Wild Crocus	*Cucumis sativus*
Oldfield Goldenrod	*Solidago nemoralis*	Wild Grape	*Vitus spp.*

Mammals			
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
13 Lined Ground Squirrel	*Spermophilus tridecemlineatus*	Mole	*Scalopus aquaticus*
Big Eared Bat	*Corynorhinus townsendii*	Opossum	*Didelphis marsupialis*
Bobcat	*Lynx rufus*	Racoon	*Procyon lotor*
Chipmunk	*Tamias striatus*	Skunk	*Mephitis mephitis*
Coyote	*Canis latrans*	Squirrel	*Sciurus carolinensis*
Deer Mouse	*Peromyscus maniculatus*	Whitetail Deer	*Odocoileus virginianus*
Eastern Cottontail	*Sylvilagus floridanus*	Woodchuck	*Marmota monax*
Indiana Bat	*Myotis sodalis*	Wood Rat	*Neotoma spp.*
Little Brown Bat	*Myotis lucifugus*		

Reptiles & Amphibians			
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Black Rat Snake	*Elaphe obsoleta*	Mole Salamander	*Ambystoma talpoideum*
Box Turtle	*Terrapene carolina*	Ribbon Snake	*Thamnophis sauritus*
Broad Headed Skink	*Eumeces laticeps*	Ringneck Snake	*Diadophis punctatus*
Copperhead	*Agkistrodon contortrix*	Speckled Kingsnake	*Lampropeltis getula holbrooki*
Five-lined Skink	*Eumeces fasciatus*	Tiger Salamander	*Ambystoma tigrinum*
Garter Snake	*Thamnophis sirtalis*	Toads	Various Species
Green Treefrog	*Hyla cinerea*	Upland Chorus Frog	*Pseudacris feriarum feriarum*

Birds

Common Name	Scientific Name	Common Name	Scientific Name
American Crow	*Corvus brachyrhynchos*	Parula Warbler	*Parula americana*
American Redstart	*Setophaga ruticilla*	Pileated Woodpecker	*Dryocopus pileatus*
Barred Owl	*Strix varia*	Red-bellied Woodpecker	*Centurus carolinus*
Blue Jay	*Cyanocitta cristata*	Red-headed Woodpecker	*Melanerpes erythrocephalus*
Brown Creeper	*Certhia Americana*	Red-tailed Hawk	*Buteo jamaicensis*
Carolina Chickadee	*Parus carolinensis*	Robin	*Turdus migratorius*
Carolina Wren	*Thryothorus ludovicianus*	Tanagers	*Piranga spp.*
Cedar Waxwing	*Bombycilla cedrorum*	Tufted Titmouse	*Parus bicolor*
Dark-eyed Junco	*Junco hyemalis*	Turkey Vulture	*Cathartes aura*
Eastern Bluebird	*Sialia sialis*	Whip-Poor-Will	*Caprimulgus vociferus*
Eastern Wood-pewee	*Contopus virens*	White-breasted Nuthatch	*Sitta carolinensis*
European Starling	*Sturnus vulgaris*	White-throated Sparrow	*Zonotrichia albicollis*
Flycatchers	*Empidonax spp.*	Wild Turkey	*Meleagris gallopavo*
Great Horned Owl	*Bubo virginianus*	Wood Thrush	*Hylocichla mustelina*
Mourning Dove	*Zenaida macroura*	Wood-warblers	Various Species
Northern Cardinal	*Cardinalis cardinalis*	Yellow-breasted Chat	*Icteria virens*

APPENDIX B - T&E Species

Rare, Threatened, and Endangered Species / Habitat

Federally Listed Species Found in Missouri -- 25 listings

Animals -- 17

Status	Listing
E	Bat, gray (*Myotis grisescens*)
E	Bat, Indiana (*Myotis sodalis*)
T	Cavefish, Ozark (*Amblyopsis rosae*)
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 - Employee Qualifications

Current Employee Qualifications
As of August, 2003

Name	Position	Qualifications
Kathleen A. Maycroft	Refuge Manager	FFT2
Richard Speer	Assistant Manager	FFT2, RXB3
Doug Siler	Equipment Operator	FFT2
Dan Wood	Biological Science Aid	FFT2

FFT2 - Firefighter Type 2
RXB - Prescribed Burn Boss Type 3

APPENDIX D - Cooperators

FIRE COOPERATORS - Pilot Knob NWR

AGENCY	NAME/TITLE	PHONE NUMBER
Iron County Sheriff/ Dispatch		573-546-7321
Pilot Knob Fire Department	Chief Richard Stewart	573-546-2113 or 573-546-7762
Arcadia Valley Fire Department		573-546-7573
Mingo Job Corps	Don Riggle, Director	573-222-2649
Ironton Fire Department		573-546-7132
Forest Fire Potosi		573-438-5427
Acting Refuge Law Enforcement	Chris Eely (MDOC Officer)	573-546-1189 cell 573-576-1353
Ambulance Service	Don Wynn	573-546-2311
Missouri Dept Conservation at Cape Girardeau		573-290-5730
Zone FMO	Cliff Berger	217-224-8580
Missouri Interagency Coordination Center	Temporary Lynn Carpenter	573-341-5584
National Interagency Fire Center	U.S. FWS Fire Management Coordinator	208-387-5594
Missouri Interagency Fire Center	Lynn Carpenter	573-341-7484

FIRE COOPERATORS Ozark Cavefish NWR

AGENCY	NAME/TITLE	PHONE NUMBER
Halltown Fire Department		417-749-9911
National Weather Service Forecast Office		417-869-4491
Mingo Job Corps	Don Riggle, Director	573-222-2649
Lawrence County Sheriff=s Office	Doug Seneker, Sheriff	417-466-2131
Forest Fire Poplar Bluff		573-785-1475
Forest Fire Piedmont		day 223-4525 night 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 St. Johns- Mt. Vernon Halltown Exchange		 417-466-3280 417-491-3133
Missouri Dept. of Conservation District Office		417-334-3324
Zone FMO	Cliff Berger	217-224-8580
Missouri Interagency Coordination Center	Temporary Lynn Carpenter	573-341-5584
National Interagency Fire Center	U.S. FWS Fire Management Coordinator	208-387-5584
Missouri Interagency Fire Center	Lynn Carpenter	573-341-7484

APPENDIX E - 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, 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. Due to the distance from each satellite, only minimal actions are included in the following table.

Table 4 - Preparedness Actions

PREPAREDNESS ACTION	Fire Danger Rating (WFAS)				
	Low	**Moderate**	**High**	**Very High**	**Extreme**
Maintain Radio Contact	**X**	**X**	**X**	**X**	**X**
Fire-ready engine at Refuge Headquarters		**X**	**X**	**X**	**X**
Carry PPE while on duty					**X**
Tour of duty changed at Manager=s discretion			**X**	**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 F - NUS

Normal Unit Strength Inventory of Fire Supplies

INVENTORY OF FIRE SUPPLIES	
Item	**Qty**
Chainsaw	1 per qualified individual
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

INVENTORY OF FIRE SUPPLIES	
Gas Filter	1
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 G - Fire Dispatch Plan

FIRE DISPATCH PLAN

MINGO NWR and Satellites

Upon report of smoke or fire:

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

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

Initial information from reporting party:

A. Name: _____

B. Callback number: _____

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

D. Access to fire: _____
_____

E. Color of smoke: _____

F. Size of fire: _____

G. Type of vegetation: _____

H. Fire behavior: _____

I. Improvements threatened: _____

J. Anyone at the fire scene: _____

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

III. Check map for ownership/protection status.

IV. If fire is on Refuge or threatening:

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:

1. Notify Refuge Manager.

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

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

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

5. 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.

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

V. If fire is not on or threatening Refuge:

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

1. Take resource order information:

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

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

3. Notify Refuge Manager and get approval for dispatch.

4. Dispatch resources requested and approved by Refuge Manager. Additional resources can be obtained from other Refuges if needed and available.

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

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

7. Remain on duty until relieved.

FIRE LOG

TIME	TX	RX	TRANSMISSION

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

    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.

FIRE DIRECTORY
MINGO NWR
FIRE PERSONNEL DIRECTORY-2003

FIRE REPORTING OR ASSISTANCE REQUEST:

NAME	WORK PHONE	HOME PHONE
Kathleen A. Maycroft (RefugeManager)	573-222-3589	573-785-3553
Richard Speer (Asst. Manager)	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 H - Communication Frequencies

PILOT KNOB NWR
COMMUNICATION 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
4		Mutual Aid	155.47500	155.47500	
5		Civil Defense	155.14500	155.14500	
6		Iron County	155.73000	155.73000	

MINGO NWR
COMMUNICATION 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

Due to the remote location of Ozark Cavefish NWR, there are no specific frequencies other than the Mingo frequencies in the table above.

APPENDIX I - 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)			
	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

A. FIRE BEHAVIOR: Observed or Predicted	Yes	No
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 2 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 J - 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 K - Section 7 Consultations

Intra-Service Section 7 Biological Evaluation Form
(Pilot Knob NWR)
Originating Person: Kathleen A. Maycroft
Telephone Number: (573)222-3589
Date: August 2, 2002

Region 3

Service Activity (Program) and Geographic Area or Station Name: Pilot Knob National Wildlife Refuge, Ironton, Missouri.

List Species (including proposed and candidate species) or critical habitat (including proposed) found within action area: Indiana Bat (*Myotis sodalis*), Gray Bat (*Myotis grisescens*).

Describe location including County, State, and TSR (township, section & range): Iron County in Missouri, Township 34 North, Range 4 East, southern 2 of section 29.

Description of proposed action: Pilot Knob NWR is developing a Fire Management Plan which will delineate guidelines to use whenever a wildfire is detected.

Description of effects:

A. Prescribed fire is not planned for application under this FMP. There will be no adverse impacts to endangered/ threatened/species of concern or critical habitat. Wildfire will be suppressed in all areas of the Refuge to prevent adverse impacts, due to smoke or temperature increase year-round.

B. Determination (check all that apply) — Response Requested

No effect on species/critical habitat
list species/critical habitat: ___Concurrence (optional)

Not likely to adversely affect species/critical habitat
list species/critical habitat: _X_ Concurrence

Likely to adversely affect species/critical habitat
list species/critical habitat: ___Concurrence

Likely to jeopardize candidate or proposed species/critical habitat, list species/critical habitat: ____

Concurrence

Not likely to jeopardize candidate or proposed species/critical habitat, list species/critical habitat: ____

Concurrence

Signature 8/20/03 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):

Signature 8/20/03 Date

(ES Office Supervisor)

Intra-Service Section 7 Biological Evaluation Form
Ozark Cavefish NWR

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: Ozark Cavefish National Wildlife Refuge, Lawrence County, Missouri.

III. List Species (including proposed and candidate species) or critical habitat (including proposed) found within action area: Ozark Cavefish (*Amblyopsis rosae*), Gray Bat (*Myotis grisescens*), Bristle Cave Crayfish *(Cambarus setosus*

IV. Describe location including County, State and TSR (township, section & range): Lawrence County, Missouri, The Northwest quarter of the Northwest quarter of Section 29, Township 29, Range 25.

V. Description of proposed action: Ozark Cavefish NWR is developing a Fire Management Plan which will delineate guidelines to use whenever a wildfire is detected.

VI. Description of effects:

A. Prescribed fire is not planned for application under this FMP. There will be no adverse impacts to endangered/ threatened/species of concern or critical habitat. Wildfire will be suppressed in all areas of the Refuge to prevent adverse impacts, due to smoke or temperature increase year-round. Suppression of wildland fires will also reduce siltation on the refuge which is important to the long term health of Ozark Cavefish and Bristle Cave Crayfish populations.

B. Determination (check all that apply)	Response requested
No Effect on species/critical habitat list species/critical habitat:	____ Concurrence (optional)
Not Likely to Adversely Affect species/critical habitat list species/critical habitat:	___X_ 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

Signature 8/20/03 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):

Signature 8/20/03 Date
(ES Office Supervisor)