ENVIRONMENTAL ASSESSMENT

WILDLAND FIRE MANAGEMENT PLAN

DESERT NATIONAL WILDLIFE REFUGE

September 2003

U. S. DEPARTMENT OF INTERIOR
U.S. FISH AND WILDLIFE SERVICE
ENVIRONMENTAL ASSESSMENT

for

WILDLAND FIRE MANAGEMENT PLAN
Desert National Wildlife Refuge
Nevada

Summary:

The *2001 Federal Wildland Fire Management Policy* requires that each Federal land management agency develop fire management plans to, among other things, integrate fire management activities with other natural resource goals. The attached environmental assessment addresses the environmental consequences of implementing the Fire Management Plan for the Desert National Wildlife Refuge.

The Fire Management Plan calls for suppression of all wildland fires unless certain prescriptive criteria are met. When a wildland fire is ignited under specific conditions outlined in the fire management plan, the wildland fire may be managed primarily to achieve resource benefit. Prescribed fires (management-planned ignitions) are called for at the refuge in order to return fire as a natural process, maintain historic/cultural scenes, and to reduce fuel loads. Prescribed fires would only be started under project specific burning prescriptions (predetermined conditions of weather, fuel moisture, and personnel availability). Objectives of the prescribed fires would be documented in individual burn plans. A No Effect determination has been made by the Project Leader, thereby complying with Section 7 of the Endangered Species Act of 1973, as amended. Further consultation for fire management activities may be needed if additional species are listed or changes in fire management strategies are implemented. Monitoring and research of fire effects would determine if management goals are being achieved and if burn prescriptions are appropriate.

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PURPOSE AND NEED

The purpose of the *Desert National Wildlife Refuge Fire Management Plan* is to implement the *2001 Federal Wildland Fire Management Policy* and to achieve refuge resource objectives. This policy requires that each Federal land management agency develop fire management plans to, among other things, integrate fire management activities with other natural resource goals. Key points of the policy include:

- Firefighting - Ensure adequate preparedness for future fire seasons
- Rehabilitation and Restoration - Restore landscapes and rebuild communities damaged by wildland fire
- Hazardous Fuel Reduction - Invest in projects to reduce fire risk
- Community Assistance - Work directly with communities to ensure adequate protection
- Accountability - Be accountable and establish adequate oversight and monitoring for results

The development and implementation of the *Desert National Wildlife Refuge Fire Management Plan* is consistent with guidance from the US Fish and Wildlife Service s *Wildland Fire Management Handbook* (USFWS 2002). This handbook defines the US Fish and Wildlife Service, Service-wide goal of wildland fire management to achieve resource objectives through prevention of human-caused wildland fires, to minimize the negative impacts on resources from all wildland fires that occur, and to guide the use of prescribed fire as an integral part of resource management in a manner which would minimize the risk to the lives of employees, visitors, neighbors and their property.

The Refuge was established as the Desert Game Range on May 20, 1936, under the joint administration of the US Fish and Wildlife Service (Service) and the Bureau of Land Management (BLM). Currently, the Refuge is approximately 1.6 million acres. All but 265,000 acres of the Refuge have been proposed for wilderness. The Refuge lies in the transition zone or ecotone between the Mojave and the Great Basin Deserts. At lower elevations, typical Mojave species, e.g. saltbush, creosote brush and blackbrush, are common. At upper elevations, typical Great Basin species, e.g. pinyon, juniper, and sagebrush are common.

The desert bighorn sheep is the primary purpose for which the Refuge was established. Mountainous/ precipitous terrain is a very important habitat component for this species but, valleys without barriers are also important to bighorn as movement corridors. With the listing of the desert tortoise as an endangered species in 1990, valley habitat took on added importance. The lack of human activity, e.g. urbanization, mining and grazing on the Refuge has made it one of the most pristine areas left in southern Nevada. The one exception being the lands inside the southeast corner adjacent to the cities of Las Vegas and North Las Vegas. Here, habitat is being degraded by uncontrolled and unauthorized off-road vehicle use.

The use of fire is an important tool to maintain certain ecosystems, such as the pinyon-juniper woodland communities at the Refuge. Pinion-juniper could be maintained at an early, more

productive seral condition, with regard to fire. Wildland fires will continue to be suppressed as aggressively as feasible in lower elevation areas where the desert tortoise may reside, and to provide protection of life, property, and cultural resources.

Prescribed fire will be used as a complimentary management tool to other management actions to: reduce fuel loads, thus reducing the frequency and intensity of wildland fires; reduce weed infestations; increase native plant abundance and diversity; and improve water delivery systems.

Alternatives

The following alternatives were analyzed for this environmental assessment. Under these alternatives, appropriate suppression response would be taken on all wildland fires below 5000 feet, including human- and lightning-caused fires. Wildland fires above 5000 feet may be managed to achieve resource objectives, if the appropriate prescriptive criteria are met. Prescribed fire may be utilized on the refuge to achieve hazardous fuels and resource management objectives.

Alternative A: Full Suppression (No Action)

The No Action alternative represents continued suppression of all fires on the refuge. Under this alternative, all ignitions within the Desert National Wildlife Refuge, including those of natural origin would be suppressed. Suppression would be accomplished through the use of appropriate techniques. No prescribed burning or mechanical fuel manipulation would be conducted.

Alternative B: Prescribed Fire (Proposed Action)

Prescribed Fire is defined as any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan (burn plan) must exist, in conjunction with an approved fire management plan (FMP). A FMP is defined as a strategic plan that defines a program to manage wildland and prescribed fire. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.

Under this alternative, prescribed fires ignited by qualified fire personnel would be used to simulate the ecological effects of natural fire, reduce hazardous fuels and noxious weeds, and improve wildlife habitat. Prescribed fires would be intentionally ignited to accomplish management objectives in specific areas under prescribed conditions identified in approved prescribed burn plans. All other ignitions (whether of natural or human origin) would be suppressed. All prescribed fires would be monitored and be available as research projects. Mechanical manipulation of fuels for site preparation prior to ignition of prescribed fire projects might be used. If so, it will be implemented with the use of hand crews using chainsaws, shovels, and other hand tools for the purpose of creating firelines and moving and stacking of downed fuels for ignition during appropriate times of opportunity. Heavy equipment will not be allowed off of the existing road system.

All prescribed wildland fires will have measurable prescriptive criteria stated in the Refuge FMP. They are selected to define conditions under which the wildland fire will achieve the objectives developed for each fire management unit (FMU), and include provisions for public safety and the protection of property. They may vary between FMU s within a refuge. A FMU is defined as a land management area definable by objectives, management constraints, topographical features access, values to be protected, political boundaries, fuel types, major fire regime groups, and so on, that set it apart from the management characteristics of an adjacent FMU.

The prescriptive criteria that must be addressed in the FMP are the following:

- Environmental and Fire Behavior.
- Environmental and fire behavior prescriptions may include all or any of the following specific ranges depending on need:
  - Temperature
  - Relative humidity
  - Wind speed
  - Wind direction
  - Fuel moisture
  - Ignition component
  - Probability of ignition
  - Flame length
  - Rate of spread
  - Smoke duration, direction of movement, and
  - Spotting distance
  - Other conditions as defined in the refuge Fire Management Plan
  - Prescriptions must include at least one indicator of drought, such as:
    - 1000 hour time lag fuel moisture content
    - Water level
    - Keetch-Byram Drought Index
    - Palmer Drought Index
    - Energy release component.
  - Legal Limits. Each prescription must include elements which ensure compliance with legal limits and constraints. These may include, but are not limited to
    - Air quality laws
    - Threatened and endangered species protection
    - Mutual agreements and contingency plans
    - Cultural resources protection
  - Geographic Limits. Spatial or geographic prescriptions must include the Maximum Manageable Area (MMA). These may include:
    - Acres (single or multiple fire acreage)
    - Perimeter
    - Percent of area, fire management unit, ecosystem or sensitive resource(s) burned

Treatment will be used to open pinyon-juniper woodlands and as a means to dispose of brush piles. Prescribed fire will also be conducted within or near refuge development zones and boundary areas to reduce the risk from wildland fire damage. To the greatest extent possible, hazardous fuels reduction prescribed fires will only be used when they compliment resource management objectives. Prescribed burns may also be used in wetlands to open dense cattail stands and to develop fire breaks. This would be implemented to enhance wetland habitat for

fish and migratory birds. Burn frequency will vary from 2 to 10 years, depending upon specific management objectives, historic fire frequency, and funding.

A site-specific burn plan will be developed for each prescribed fire and will include site specific objectives to be achieved, the prescription to be used, and a plan of action for carrying out the burn. The plan will also identify resource concerns and specific mitigation measures or special precautions to alleviate potential detrimental fire effects.

The goals of the prescribed fire program are to:

- Reduce hazardous fuels
- Restore/perpetuate native grasses, forbs, and shrubs.
- Reduce non-native plant species.
- Maintain water delivery systems.
- Enhance wetland and upland habitats for fish and wildlife.

Alternative C: Wildland Fire Use above 5000 Feet and Prescribed Fire

Wildland Fire Use is defined as the management of naturally ignited (usually lightening) wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas (Fire Management Units or FMU s) outlined in Fire Management Plans.

Under this alternative, all wildland fires below 5000 feet would be suppressed using an appropriate management response. Any wildland fire above 5000 feet may be managed for resource benefit, if prescriptive criteria are met. These criteria will include specific weather and fuels conditions, fire preparedness and staffing levels, and smoke management concerns.

All wildland fires being managed for resource benefit (Wildland Fire Use fires) will have a defined Maximum Manageable Area (MMA). This is to ensure that there is a clear and common understanding of the authorized size and location of the fire among the various layers of Agency Administrators and cooperators. The MMA designates the ultimate acceptable size for a given wildland fire managed for resource benefits. It provides for a closely directed fire management application in a specific area defined by resource objectives, fire and weather prescription elements, social needs, political considerations, and management capability.

All wildland fires will have measurable prescriptive criteria for determining whether to suppress the fire or authorize another appropriate management response. These will be stated in the Refuge FMP. They are selected to define conditions under which the wildland fire will achieve the objectives developed for each FMU and include provisions for public safety and the protection of property. They may vary between FMU s within a refuge.

Operationally, the MMA of a fire should be defined and approved by the line officer in a manner similar to a suppression action. The ultimate MMA will be defined in the Interagency Wildland Fire Implementation Plan for the specific incident.

Prescriptive criteria must also include a written explanation of what the appropriate management response will be under these conditions, so that a clear action can be determined. A clear communication of what will be done must exist, to be a completed prescriptive condition.

Alternatives Considered But Found To Be Infeasible

No Wildland Fire Suppression or Prescribed Fire
Under this alternative all ignitions would be allowed to burn in all areas and at all times. This alternative was found to be undesirable due to unacceptable risk to human life and property, with significant political, socioeconomic, and environmental impacts.

Mechanical Manipulation of Fuels Only
Under this alternative, hazardous fuel buildups would be removed or manipulated strictly by mechanical means to the extent practicable. This alternative was found to be undesirable because it would be extremely expensive and in some cases not as effective as prescribed fires. However, mechanical manipulation will still be a management tool at the refuge as part of a holistic approach using prescribed fire.

AFFECTED ENVIRONMENT

BACKGROUND

The Refuge is situated in Clark and Lincoln Counties of southern Nevada. In the south, its boundary abuts lands incorporated by the cities of Las Vegas and North Las Vegas. On the north, its boundary abuts the Pahranagat National Wildlife Refuge. Refuge headquarters are located at Corn Creek Field Station 20 miles northwest of Las Vegas. The western one-half is overlain by the Nellis Test and Training Range and is closed to public entry for safety and security reasons.

The Refuge encompasses six major mountain ranges separated by relatively narrow, flat valleys. The Refuge lies in the transition zone, or ecotone between the Mojave and the Great Basin Deserts. At lower elevations, typical Mojave species, e.g. saltbush, creosote brush, and blackbrush are common. At upper elevations, typical Great Basin species, e.g. pinyon, juniper and sagebrush are common.

All but 265,000 acres of the Refuge has been proposed for wilderness. From Corn Creek Field Station, three main access roads, Alamo, Mormon Well, and Gass Peak Roads, traverse the Refuge in northerly, easterly, and southerly directions, respectively. Numerous side roads branch off the three main roads and dead end at trailheads reserved only for foot or horseback travel. All roads have native rock surfaces and are difficult to maintain. Public use is relatively light (approximately 57,000 visitors per year) as compared to that on other public lands surrounding the Las Vegas Valley. This use is increasing as Las Vegas and North Las Vegas expansion approaches the southern perimeter of the Refuge boundary.

The desert bighorn sheep is the primary purpose for which the Refuge was established. Mountainous/precipitous terrain is a very important habitat component for this species, but valleys without barriers are also important to bighorn as movement corridors. With the listing of the desert tortoise as an endangered species in 1990, valley habitat took on added importance. The lack of human activity, e.g. urbanization, mining and grazing, on the Refuge has made it one of the most pristine areas left in southern Nevada. The one exception being the lands inside the southeast corner adjacent to the cities of Las Vegas and North Las Vegas. Here, habitat has been and continues to be degraded by uncontrolled and unauthorized off-road vehicle use.

Vegetation
Four distinct vegetative types have been documented on the Refuge. Publications of Spaulding (1981), and Bradley and Deacon (1967) describe these in detail and are the basis for the following discussion. Transitions between vegetative types and their integrated communities are often subtle and occur at different elevations due to local environmental anomalies.

Desert Shrub Vegetative Type: Most of the habitat on the Refuge is classified as the desert shrub vegetative type. On the valley floors and lower bajadas (alluvial fans) below 1,280 meters (4200 feet), the creosote bush (*Larea divaricata*) community predominates. The blackbrush (*Coleogyne ramosissima*) community predominates on the upper bajadas and lower slopes between 1,280 and 1,829 meters (4,200 to 6,000 feet). Saltbush (*Atriplex confertifolia*) communities occur in various basins within the blackbrush and creosote bush communities. Soils in these depressions tend to be highly saline. A variety of shrubs are more common along the lower washes that traverse the various communities than in the surrounding desert.

Woodland Vegetative Type: The pinyon-juniper (*Pinus monophylla* and *Juniperus osteosperma*) community is most prevalent on the drier slopes between approximately 1,829 and 2,286 meters (6,000 and 7,500 feet). Pinyon-juniper is often displaced by mountain mahagony (*Cercocarpus sp.*) on the driest, southern exposures of the Sheep Mountain Range. Sagebrush (*Artemisia sp.*) is dominant in some transitional zones between the desert shrub and woodland vegetative types, especially in the Searle's Reservoir watershed and above Deadhorse Trailhead and Yucca Forest.

Coniferous Forest Vegetative Type: The coniferous forest vegetative type is restricted to the Sheep Mountains. The fir-pine (*Abies concolor* and *Pinus ponderosa*) community extends from approximately 2,286 meters (7,500 feet) to over 2,743 meters (9,000 feet) and accounts for most of the acreage in this vegetative type. The closed canopy of this community suppresses understory development. Shrubs and small trees such as Rocky Mountain maple (*Acer glabrum*), littleleaf mock-orange (*Philadelphus microphyllus*), and fernbush (*Chamaebatiaria millifolium*) occur in the more open canyon bottoms,.

Bristlecone pine (*Pinus aristata*) community generally occurs from 2,743 meters (9,000 feet) to timberline. However, on steep north- and east-facing slopes, it extends to lower elevations. Few shrubs are abundant in this community.

Psuedo-Alpine Vegetative Type: The pseudo-alpine vegetative type encompasses only approximately 80 hectares (200 acres) on the south and west facing slopes of Hayford and Sheep Peaks above 2,895 meters (9,500 feet). It is comprised of a black sagebrush (*Artemisia nova*) community.

Wildlife
Fish: There are no fish indigenous to the Refuge. The Corn Creek ponds contain exotic species, e.g. carp and goldfish, introduced without authorization by the public.

Reptiles and Amphibians: Due to the Mojave Desert's extremely arid environment, the only amphibians known to occur on the Range are those restricted to the Corn Creek impoundments. Reptiles are well represented on the refuge's faunal list. These include 14 species of snakes and 13 species of lizards. Most of the Range's reptilian species inhabit the lower, desert shrub vegetative type.

Birds: Including accidentals and rarities, over 300 species of birds have been observed on the Refuge. Many of the birds on the Refuge are migrants that stop temporarily on their flights between breeding and wintering grounds. Approximately 116 species are known to nest locally. Species diversity and population density tend to be higher in the vicinity of perennial springs. Water and the associated vegetation are a focal point for nesting, rearing young, gathering food and seeking cover. At no place on the Refuge is this more evident than at Corn Creek Field Station where the ponds and introduced vegetation (pasture grasses, sunflowers and fruit trees) attract one of the greatest variety of birds found anywhere in the State of Nevada.

The expansive, low/arid desert shrub plant communities may not concentrate species, but are still an important habitat component. Plant composition in the washes is quite diverse and generally exceeds that found at the higher, moister elevations. Many migrants use desert shrubs for temporary cover and foraging habitat, while other species, e.g. roadrunner, cactus wren, Le Conte's thrasher, and black-throated sparrow, are permanent residents.

Mammals: There are 53 species of mammals whose occurrence is documented on the Refuge. Desert bighorn sheep, the primary species for which the Range was established, are widely distributed throughout the Range s precipitous terrain. Currently, the refuge bighorn population is estimated at 700-750 individuals. This estimate is based on helicopter surveys conducted in 2000.

Migratory Birds

The Migratory Bird Treaty Act (MBTA) protects migratory birds and their active nests from take , which is defined as to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt those things (50 CFR. 10.12). Virtually all of the avian species that use the refuge are protected under the Migratory Bird Treaty Act.

Threatened And Endangered Species

There are no Federally listed threatened and endangered plant species on the Refuge.

Threatened and endangered (T&E) species that occur on the Refuge are the desert tortoise, Pahrump poolfish, and bald eagle. The Pahrump poolfish, a species indigenous to Manse Spring in the Pahrump Valley, was transplanted at the Corn Creek Ponds in 1971. It has since been extirpated. A concrete refugium at Corn Creek was constructed in 2002 for renewed propagation of this species, with fish being reintroduced in 2003. The bald eagle and peregrine falcon are rare migrants through the area. Therefore, the only endemic, resident, T&E species is the desert tortoise.

The desert tortoise is widely distributed on the Refuge below 1,280 meters (4,200 feet) in elevation and in association with the creosote bush community. Tortoise surveys indicate a low density population of approximately 1 tortoise per 20 acres (Schneider and Turner 1981, Sharp 1989, Zeller 1990). Desert tortoises are most active during spring and fall when green grasses and forbs are present for food. Tortoises spend the hottest part of the summer in burrows, usually dug in the root zone of desert shrubs to avoid overheating. Tortoises also hibernate in permanent dens during the coldest part of winter.

Fuels And Wildfire Occurrence

Fire occurrence on the Refuge has a higher incidence than what is recorded, because of the remoteness of the area and difficulties with detection. Numbers of detected fires per year vary from zero to usually less than ten. Most fires occur on the Sheep Range as a result of lightening. The largest fire in the Pinion- Juniper fuel type from records dating back to 1946 was 100 acres. Fires in the low desert shrub fuel type have burned in excess of 1000 acres, e.g. the Pinenut Fire of 1994. In most instances, fires are extinguished by rain or lack of adjacent fuels, rather than suppression efforts.

Wetlands

Corn Creek Field Station serves as the headquarters for Desert National Wildlife Refuge. It is located about 20 miles northwest of Las Vegas and four miles east of U.S. 95 in the NW 1/4 NE 1/4 of Section 34 in Township 17 South, Range 59 East (Mount Diablo Meridian). Vegetation around the Field Station and public use area consists of both native and non-native vegetation. Many of the non-native plants and trees were introduced by European settlers, refuge staff, the public or migratory birds. Dominant plants within and surrounding the ponds are cattails (*Typha latifolia*) and giant reed (*Phragmites australis).* The three man-made ponds total approximately 1 acre in size, average four feet in depth, and are spring-fed. The springs, which flow at about .5 cfs, serve both domestic (irrigation) and wildlife uses. As a desert oasis, the area is highly attractive to dozens of bird species and the most popular activity for local enthusiasts is bird watching. No native fish exist in the ponds. There are 33 additional seeps and springs scattered throughout the Refuge that support wildlife as sources for drinking water.

Woody plant species adjoining the ponds includes black locust, (*Robinia psuedoacacia*) Russian olive, (*Elaeagnus augustifolia*) Fremont cottonwood, (*Populus fremontii*), willows, (*Salix* spp.) honeybean mesquite *(Prosopis juliflora*) and mulberry (*Morus* spp). Only the willows, cottonwoods and mesquite are native to the Mojave Desert ecosystem.

Air Quality

Air monitoring in Las Vegas shows violations of two criteria pollutants--carbon monoxide (CO), and particulate matter with a diameter equal to or less than 10 microns (PM10). All other standards are met.

The entire Las Vegas airshed is considered to be in nonattainment for CO, even though testing is primarily conducted only within the City of Las Vegas. Portions of the airshed overlapping the Refuge (outside the city) are more likely to be in compliance (Quinn 1992).

The Refuge is due east of the Nevada Test Site (NTS) where three underground nuclear tests were conducted in 1991. U.S. Department of Energy (DOE) studies indicate that in 1991 the EPA detected no off-site airborne radioactivity above background levels that was related to current nuclear testing at NTS.

Soils

Detailed soil mapping and classification have not been completed on the Refuge. Soils are generally silty loams within the saltbush community. They are typically gray in appearance and, in some localities, several feet deep. There may be obvious salt deposits present or a layer of crust on the surface.

Cultural Resources

Data on cultural resources has been assembled by the Nevada Archaeological Survey and University of Nevada, Las Vegas. Review of this data indicates that only a small fraction of the Refuge has been surveyed for cultural resources resulting in the recording of 321 sites. All but three are prehistoric archaeological sites. Two hundred of the recorded sites occur on the portion of the Refuge overlaid by the Nellis Test and Training Range. Because activities of the Air Force have stimulated the greatest number of surveys, the distribution of known archaeological sites does not accurately reflect the actual distribution of sites across the landscape. Although the Service does not have an full picture of the cultural resources on the Range, the known sites provide a clue to the nature of cultural resources.

Six places on Desert National Wildlife Range are listed on the National Register of Historical Places. The Tim Spring/Wellington Canyon Petroglyphs and Pintwater Cave on the Nellis Test and Training Range have been described in detail by Stoffle, Zedeno, Eyrich and Barabe (2000) and Buck, Hockett, Wingard and Nials (1996), respectively. The other four places are discussed below:

Sheep Mountain Archaeological District

The Sheep Mountain Archaeological District was accepted for listing for the National Register of Historic Places in 1974. The 622,080-acre district covers 80 percent of that part of the Refuge that is not overlaid by the Nellis Test and Training Range. No formal archaeological inventory or evaluation has been accomplished for the District, and only a few sites have been recorded within it. Archaeologists suspect that the District contains hundreds of cultural resources, including lithic scatters, caves rock art, hunting facilities, roasting pits, wickiups, and sacred sites.

Corn Creek Springs
Corn Creek is an historic and prehistoric site covering some 1,280 acres on the south end of the Refuge. The site consists of springmounds and dunes dotted with mesquite. Human occupation of the site has been radiocarbon-dated at 5,000 years ago, but Native Americans used the place consistently up to Euro-American contact.

Hidden Forest Cabin
Hidden Forest Cabin is located high in the Sheep Mountains. Its exact construction date is unknown, but it is probably the work of a late 19th or early 20th century miner or cattleman.

Mormon Well Corral
Mormon Well Corral is a circular structure of standing juniper tree posts woven together with barbed wire. It was built in the late 1800s when cattlemen and settlers began to cross the Sheep Mountains in large numbers. The 4-acre site includes the corral, Mormon Well spring, and prehistoric and historic archaeological material.

CONSEQUENCES OF THE PROPOSED AND ALTERNATIVE ACTIONS

Vegetation

Alternative A: Full Suppression (No Action)
Full and immediate fire suppression activities will generally keep wildland fires relatively small. However, in some habitat types such as the ponderosa pine communities, a wildland fire could be catastrophic. Without large fire activity, stands of pinion - juniper are increasing, resulting in more fuel loading. The encroachment of pinion - juniper results in a loss of desert bighorn sheep habitat. Full suppression alternative would likely lead to shifts in forest succession and composition, leading to an increased woody component.

The refuge relies on USFS and BLM fire personnel stationed in Las Vegas and Indian Springs Nevada to respond to wildland fires. The response time is approximately 30 minutes. Suppression activities would result in localized adverse resource impacts from mechanically built firelines, helispot construction, cross-country vehicular travel and other activities.

Alternative B: Prescribed Fire (Proposed Action)
Effects of fire on vegetation are directly related to the type of vegetation and the fire behavior exhibited by the fire. Fire intensity, temperature, flame length, duration, time of day, and season influence fire impact. With a low temperature fire, root systems are generally not damaged and most plants can readily put on new growth. Rather than potentially altering a vegetative community that could occur from a wildland fire, a prescribed fire would maintain the plant community in a healthy condition.

Prescribed burns would prevent catastrophic damage to fire tolerant species and would reduce fuel accumulations that could contribute to large and potentially dangerous conflagrations. Prescribed burns could also be planned in a systematic way so that habitat types could be burned on a regularly scheduled rotational basis thus reducing dangerous fuel load buildups and maintaining a greater proportion of the refuge in good ecological condition.

Prescribed burns, especially for hazard fuel reduction projects, are often conducted during the season best suited to fire control efforts. Burning during these times of year can increase mortality rate of some plant species that are not fire adapted. Thus hazard fuel burning, in some instances, can reduce the biological diversity of an area.

Due to decades of fire suppression in the refuge, some areas have very high fuel loads. Prescribed fires in areas of high fuel loads could become uncontrollable or burn hotter than desired and might result in the mortality of plants that are fire adapted.

Preburn preparation of a prescribed burn project might include manual manipulation of fuels prior to ignition. This manipulation might include line preparation using hand tools, wet line, or foam techniques, and the movement of downed fuels to nearby areas where they might be safely ignited. Heavy equipment, if used, would remain on existing roads.

Alternative C: Wildland Fire Use above 5000 Feet and Prescribed Fire
The effects of prescribed fire with this alternative are the same as described in Alternative B.

The effects of fire on vegetation may vary based on the seasonality of any fire use occurrence.

Wildlife

Alternative A: Full Suppression (No Action)
Wildlife populations would be influenced directly and indirectly by the impacts on associated vegetative communities. The increased probability of intense wildland fires may lead to fire-caused mortalities in some species. The potential for catastrophic fire events in important habitat for the Federally listed desert tortoise is quite high. The potential for inadvertent wildlife habitat destruction could occur from fire suppression activities such as fireline construction as well as loss of successional stages for habitat.

Alternative B: Prescribed Fire (Proposed Action)
This alternative would allow greater flexibility in planning for, locating, and avoiding disturbance to wildlife populations. Habitat impacts would be determined by prescribed burn timing, location, conditions, and patterns. Long-term changes to wildlife populations may include increased populations of desert bighorn sheep. Prescribed fires would reduce fuel loads in wetlands.

Prescribed fires could occur anytime prescription is met. Timing of prescribed burning would be coordinated to minimize impacts on nesting birds.

Impacts to the mammals and birds on the federal and state species of concern list should be temporary in nature and minor in intensity. There should be no impacts on the Federally listed desert tortoise.

Alternative C: Wildland Fire Use above 5000 Feet and Prescribed Fire
The effects of prescribed fire with this alternative are the same as described in Alternative B.

Fire Use will have the same effects on mammals as described in Alternative B, although there may be an increase in acreage. There is potential for a Fire Use fire to occur during nesting season, and there may be localized impact to birds. Fires at this time of year are historically infrequent and usually less than five acres.

Threatened and Endangered Species

Alternative A: Full Suppression (No Action)
The desert tortoise may be affected by ground disturbing suppression related activities. Resource Advisors will be utilized to minimize impacts in these areas. The desert tortoise, bald eagle, and pahrump poolfish will not be affected by any of the Alternatives.

Alternative B: Prescribed Fire (Proposed Action)
Effects will be the same as in Altemative A. Prescribed fire operations will not be conducted in areas that may affect listed species.

Alternative C: Wildland Fire Use above 5000 Feet and Prescribed Fire
Effects will be the same as in Altemative A. Prescribed fire operations will not be conducted in areas that may affect listed species. Fire use will take place above 5000 feet. No resident listed species occur in these areas.

FUELS

Alternative A: Full Suppression (No Action)
Implementing this alternative would create a gradual and unnatural increase in fuel accumulations leading to increased potential of wildland fires of greater size and intensities than would occur under natural fire regimes. Control capabilities would be compromised or exceeded, and suppression expenses increased. The potential of threat to life and property rises, as well as an increased potential for large destructive fires.

Alternative B: Prescribed Fire (Proposed Action)
Prescribed burning, in conjunction with mechanical fuel manipulation, would reduce accumulations of fuels which contribute to large and potentially catastrophic fires.

Prescribed fires in areas where fuel loads are very high might escape control lines.

Alternative C: Wildland Fire Use above 5000 Feet and Prescribed Fire
With Fire Use there is likely to be an increase in acres burned, resulting in a reduction in fuels. Fire Use fires in Ponderosa Pine and Bristlecone FMU s, have the potential during the right conditions to create mortality in those stands.

AIR QUALITY

Alternative A: Full Suppression (No Action)
Implementation of this alternative would generate a short term reduction of particulate matter from fires due to suppression efforts. The type and amount of emissions would vary greatly dependent upon fuel moisture, fire intensity and other physical characteristics of the environment. This alternative would increase the potential for severe episodes of air pollution

due to accumulated fuels resulting from suppression actions. The potential for large, high intensity fires which might be difficult to suppress would continue to increase, further contributing to uncontrolled and undesirable impacts to air quality and visibility.

Alternative B: Prescribed Fire (Proposed Action)
Local air quality would be adversely affected for short periods of time during prescribed burns, with air quality returning to normal following the completion of burning. Particulate matter would be the primary pollutant with localized effects, therefore no significant long-term health impacts are expected. The effect of particulate matter and visibility on local communities and commercial establishments can be lessened by the proper use of smoke management and public notification. The controlled nature of these burns makes their effect on air quality less severe than from catastrophic wildland fires.

Alternative C: Wildland Fire Use above 5000 Feet and Prescribed Fire
Prescriptive criteria for fire use will be developed to minimize impacts to the non attainment area of Las Vegas (Clark County). Some FMU s occur in Lincoln County and fall under airshed managed by the state of Nevada. Currently, the Clark County Air Quality Board has not been approached by any agency with regards for planning prescriptive criteria for wildland fire use. Until criteria is in place, Clark County Air Quality Board s position is unknown with regard to fire use.

Soils

Alternative A: Full Suppression (No Action)
Long-term impacts of this alternative, with increased potential for catastrophic fire, would have adverse impacts to soils. Diurnal temperature regimes would be altered from effects of catastrophic fire due to loss of shading and insulating cover. High intensity wildland fires could severely impact soils by destroying soil organic material. Some erosive effects would result from the construction of firelines and other ground disturbing activities. Firelines created as a result of burn activities would be rehabilitated to minimize erosion. Soils stripped of vegetative cover might suffer severe erosion during certain periods of the year.

Alternative B: Prescribed Fire (Proposed Action)
Because of the controlled area, timing, and intensity of prescribed burning in this alternative, there should be little or no long or short term changes in soils within the prescribed burn areas. Lower temperature prescribed fires would have almost no affect on soil organic material. Some erosive effects would result from any construction of firelines and other ground disturbing activities. Firelines created as a result of bum activities would be rehabilitated to minimize erosion. Burning is often patchy which prevents soils in these areas from sheet erosion as well as increasing interception of precipitation.

Alternative C: Wildland Fire Use above 5000 Feet and Prescribed Fire
The effects of this alternative should be the same as Alternative B, or less, due to the diminished need for fire control lines.

Cultural Resources

Alternative A: Full Suppression (No Action)
Recorded cultural resources would receive protection from wildland fire under this alternative. Potential for cultural landscape damage by fire would increase in the long-term scenario. There would be an increased possibility of destruction of previously unrecorded cultural resources as a result of fire suppression activities such as fire line construction and backfiring operations. Risk to historic buildings increases as the chance for a catastrophic fire increases.

Alternative B: Prescribed Fire (Proposed Action)
With the scheduled nature of burning under this alternative, there would be an ability to plan for, locate, evaluate, and avoid the disturbance of cultural resources due to either ignition or fire control activities. Dangerous fuel buildups near known resources would be reduced. Cultural features, structures, and other resources would receive increased protection by reducing fuels through controlled burns in appropriate areas. Buffer zones will be established around National Register listed or eligible sites that would be adversely effected.

Alternative C: Wildland Fire Use above 5000 Feet and Prescribed Fire
Buffer zones will be established around National Register listed or eligible sites that would be adversely effected.

Safety

Alternative A: Full Suppression (No Action)
The occurrence of catastrophic fires resulting from high fuel loadings caused by fire suppression would pose a threat to the safety of both firefighters and the public. Efforts at direct attack or suppression of severe fires would pose a threat to firefighter safety due to the nature of the activity. Examples of this are fireline construction, helicopter transport, backfiring operations, and exposure to smoke.

Alternative B: Prescribed Fire (Proposed Action)
The implementation of prescribed burning would allow fireline construction to be accomplished in a safe manner by enabling managers to schedule such activities and to plan their construction in an orderly fashion. Fires would be ignited in a preplanned pattern. There would be a potential safety problem from prescribed fires that might cross control lines.

Alternative C: Wildland Fire Use above 5000 Feet and Prescribed Fire
For prescribed fire, effects are the same as Alternative B. Implementation of Fire Use lowers risk by reducing suppression activities.

Overall Program Risk

Alternative A: Full Suppression (No Action)
In the short term, full suppression poses the least amount of risk to natural resources and developments in the refuge and surrounding areas. In the long-term, fuel buildup would increase the potential for large, uncontrollable fires that would pose a significant risk to developed areas and natural resources in and near the refuge. The chance that a fire starting in the refuge and spreading to adjacent lands increases in the long-term.

Alternative B: Prescribed Fire (Proposed Action)
This alternative would present a low amount of short-term risk. Prescribed burns are conducted by trained fire personnel and would be conducted only in conditions that present an opportunity to control. There would be limited potential for loss of fire control. Long-term risk is moderate as compared to Alternative A.

Alternative C: Wildland Fire Use above 5000 Feet and Prescribed Fire
This alternative would present a moderate amount of short-term risk. Long-term risk would be reduced with regard to Alternatives A and B. Short term risk is higher due to the nature of Fire Use and variability of weather and other factors affecting fire behavior. Long term risk is reduced as fuels are reduced with the implementation of prescribed fire and Fire Use.

Cumulative Impacts

Alternative A: Full Suppression (No Action)

Implementing this alternative would create a gradual and unnatural increase in fuel accumulations leading to increased potential of wildland fires of greater size and intensities than would occur under natural fire regimes. These fires could result in catastrophic impacts to some wildlife species, especially those like the Desert Tortoise and many other species, as the chances for such fires increase over time without fuel load reductions. Suppression activities would result in adverse resource impacts from firelines, helispot construction and other activities. The potential of threat to life and property rises. The potential for inadvertent wildlife habitat destruction could occur from fire suppression activities. This alternative would increase the potential for severe episodes of air pollution due to accumulated fuels, especially given that wildland fires often occur simultaneously region-wide. Soil productivity could be reduced due to high intensity wildland fires. There would be an increased possibility of destruction of previously unrecorded cultural resources. Risk to historic buildings increases as the chance for a catastrophic fire increases. The occurrence of catastrophic fires resulting from high fuel loadings poses a threat to the safety of both firefighters and the public. As fire hazards increase due to the continuing buildup of fuels, the magnitude of the suppression effort would rise as would associated suppression costs.

Alternative B: Prescribed Fire (Proposed Action)

No adverse cumulative impacts would be expected from the Proposed Action. Local air quality may be affected for short periods of time during prescribed burns, with air quality returning to normal following the completion of burning. Effects of smoke from prescribed fires throughout the basin may be mitigated with careful planning. Particulate matter would be the primary pollutant with localized effects, therefore no significant long-term health impacts would be expected. The controlled nature of these burns would make the effect on air quality less severe than from catastrophic wildland fires. There should be little or no long- or short- term changes in soils within the prescribed burn areas. Some erosive effects would result from the construction of firelines and other ground disturbing activities. There is a potential safety problem from prescribed fires that might cross control lines. The use of prescribed fires is an important tool for managing various habitats at the appropriate ecological condition to meet refuge objectives. The use of mechanical means alone are too expensive and often less effective, than the use of fire to achieve the management objectives.

Alternative C: Wildland Fire Use above 5000 Feet and Prescribed Fire

No adverse cumulative impacts would be expected. Effects of smoke from fire use will be managed with implementation of the Wildland Fire Implementation Plan (WFIP). The specific occurrence of wildland fires cannot be planned for, and plans to manage them as fire use must be written as ignition occurs, including smoke management. Particulate matter would be the primary pollutant with localized effects, therefore no significant long-term health impacts would be expected. There should be little or no long- or short- term changes in soils within the prescribed burn and Fire Use areas. Erosion effects would decrease in Fire Use areas where construction of firelines and other ground disturbing activities should be decreased. Prescribed fire and fire use are important tools for managing various habitats at the appropriate ecological

condition to meet refuge objectives. The use of mechanical means alone are too expensive and often less effective, than the use of fire to achieve the management objectives. At this time the aspect of Fire Use is not being considered as the proposed action, due to the uncertainty of compliance with air quality issues. This alternative may be reconsidered after it is demonstrated that alternative B is effective.

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