

FIRE MANAGEMENT PLAN
FOR
LONG LAKE
NATIONAL WILDLIFE REFUGE COMPLEX

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Table 1: Appropriate Management Response

I. INTRODUCTION

U.S. Fish and Wildlife Service policy requires that an approved Fire Management Plan must be in place for all of Service lands with burnable vegetation. Service Fire Management Plans must be consistent with firefighter and public safety, protection values, and land, natural, and cultural resource management plans, and must address public health issues. Fire Management Plans must also address all potential wildland fire occurrences and may include the full range of appropriate management responses. The responsible agency administrator must coordinate, review, and approve Fire Management Plans to ensure consistency with approved land management plans.

Service policy allows for a wildland fire management program that offers a full range of activities and functions necessary for planning, preparedness, emergency suppression operations, emergency rehabilitation, and prescribed fire operations, including non-activity fuels management to reduce risks to public safety and to restore and sustain ecosystem health.

Prior to the 20th century the role of fire in the northern plains had been one of continued restoration of the prairie ecosystem. Fire restored vigor to plant growth, increased seed production, released nutrients, and reduced accumulated litter. This included the area now designated as Long Lake National Wildlife Refuge Complex.

Since the early 20th century and the establishment of the Complex in 1935, nearly all fires within the boundaries have been suppressed and adjacent habitat has been fragmented from agricultural practices. These activities have significantly reduced the role fire plays as a vital element of the prairie ecosystem in Long Lake NWR Complex. In more recent years there has been an accumulation of knowledge, now being translated into management practices, which recognizes fire as an essential process of the mixed grass prairie.

One of the primary objectives of the FWS in managing natural areas is the maintenance of ecosystems and their dynamic processes to ensure as nearly as possible a functional natural environment. As one of these natural processes fire constitutes one of the greatest influences on the ecosystem. This document addresses that issue by providing direction for the fire management program at Long Lake NWR Complex. This plan will help achieve resource management objectives for the Complex as defined in the Long Lake NWR Complex Goal and Objectives statement (8/30/91). This document can be found in Appendix A.

This plan addresses the use of prescribed fire as a management tool and therefore must meet NEPA/NHPA compliance. The original fire management plan and environmental assessment for the use of prescribed fire was submitted in 1983. A new

fire management plan and environmental assessment is necessary to meet new policy requirements. An environmental assessment for Upland Management on Long Lake NWR Complex including the use of prescribed fire was submitted for review on April 18, 1994 and was approved in September 1994 (Appendix B).

Authority and guidance for implementing this plan are found in:

1. Protection Act of September 20, 1922 (42 Stat.857;16 U.S.C. 594).
2. Economy Act of June 30, 1932.
3. Federal Property and Administrative Services Act of 1949 (40U.S.C. 471 et seq.).
4. Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856, 1856a and b).
5. National Wildlife Refuge System Administrative Act of 1966 as amended (80 Stat. 927; 16 U.S.C. 668d-668e).
6. Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121).
7. Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C. 2201).
8. Federal Grants and Cooperative Act of 1977 (Pub. L. 95-244, as amended by Pub. L. 97-258, September 13, 1982. 96 Stat. 1003 31 U.S.C. 6301-6308).
9. Wildfire Assistance Act of 1989, (Pub. L. 100-428,as amended by Pub. L. 101-11, April, 1989).
10. Department of Interior Departmental Manual, Part 620 DM-1, Wildland Fire Management (April 10, 1998)
11. United States Fish and Wildlife Service Wildland Fire Management Handbook (December 28, 2000).
12. United States Fish and Wildlife Service Manual, 621 FW1-3, Fire Management (February 7,2000).

II. COMPLIANCE WITH FWS POLICY

A. Purpose

The Long Lake NWR Complex consists of four administrative units including the Long Lake National Wildlife Refuge (LNLNWR), the Long Lake Wetland Management District (LNLWMD), the Slade National Wildlife Refuge (SLDNWR), and the Florence Lake National Wildlife Refuge (FLONWR).

Long Lake NWR was established in 1935 by Executive Order 5808 as a refuge and breeding ground for migratory birds and other wildlife. Long Lake Wetland Management District was established administratively as a district of land acquired through authorization and funding from Migratory Bird and Conservation Stamp Act. These lands were established with the primary purpose of waterfowl production and maintenance.

Slade NWR was donated to the Fish and Wildlife Service by a former railroad Barron to be managed as a refuge and breeding ground for migratory birds.

Florence Lake NWR was established as a refuge by Executive Order 8119 in 1939 to be managed as a refuge and breeding ground for migratory birds.

Easement Refuges (private land) were established by executive order with the intent of providing rest areas for waterfowl and other migratory birds. Areas in the Complex are: Canfield Lake NWR - Executive Order 8115, Appert Lake NWR - Executive Order 8110, Sunburst Lake NWR - Executive Order 8664, Springwater Lake NWR - Executive Order 8661, Lake George NWR - Executive Order 8153, and Hutchinson Lake NWR - Executive Order 8121. The FWS has no fire suppression responsibility on these refuges.

B. Objectives

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

Service policy and the Wildland Fire Policy and Program Review direct an agency administrator to use the appropriate management response concept when selecting specific actions to implement protection and fire use objectives. The resulting Appropriate Management Response are specific actions taken in response to a wildland fire to implement protection and fire use objectives. With an approved Fire Management Plan, the Refuge staff may use wildland fire in accordance with local and State ordinances and laws to achieve resource management objectives (habitat improvement).

Complex goals and objectives include managing, endangered species, migratory birds, public use and recreation, and optimizing abundance and diversity of wildlife and plant species. Complete copies of the Complex Goals and Objectives can be found in Appendix A. This Fire Management Plan is a detailed program of action to implement the above fire management policies and objectives.

At present the Complex does not have an approved Master or Comprehensive Plan. Various operational plans for the Complex include objectives which pertain to fire management.

The Complex Safety Plan objectives are:

- provide safe working conditions for employees
- provide a safe environment for the visiting public
- protect and ensure safety of government equipment
- define safety related responsibilities of station personnel
- promote a safety attitude

The Complex Fire Management Plan Objectives are:

- Safely suppress all wildfires using strategies and tactics appropriate to safety considerations and values at risk.
- Minimize the impact and cost of fire suppression.
- Use prescribed fire to the fullest extent possible within or near Complex development zones, wildfire sensitive resources, and boundary areas to reduce the risk from wildfire damage.
- Educate the public regarding the role of prescribed fire within the Complex.
- Use prescribed fire to restore and perpetuate native wildlife species, by maintaining a diversity of plant communities.

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

The 1994 Environmental Assessment for Upland Management on Long Lake NWR Complex addresses the use of prescribed fire as one of the management tools which is used to "rejuvenate dense nesting cover (DNC) and manipulate plant communities within native and tame grasslands, and to reduce wildfire danger by removing buildup of heavy fuels adjacent to values at risk from wildfire.

Fire is an integral part of the management of lands in the Complex. Primary objectives for wildlife and habitat cannot be met without a progressive fire program. The benefits, purposes, and manner of administering a fire program are summarized in detail in the Upland Management Plan and Environmental Assessment and in this Fire Management Plan. The primary objectives are to promote habitat and wildlife population diversity and abundance while integrating these objectives into fire preparedness and wildfire management needs on lands distributed throughout the three county area of responsibility.

III. DESCRIPTION OF AREA AND FIRE EFFECTS

A. General Description

As stated previously the Long Lake Complex consists of four administrative units. All

four units are administered from the Long Lake NWR office located at Moffit, North Dakota. The Complex contains 77 waterfowl production areas (WPA's), which total 21,789 acres in three counties. The Complex also has management responsibility for one Wildlife Development Area (WDA). WDA's are tracts of land that were purchased by the Bureau of Reclamation as mitigation for wetland losses during the construction of the Garrison Diversion Project. This tract of land is managed the same as WPA's. Additionally, Long Lake Refuge contains 22,310 contiguous acres, Slade Refuge 3,000 acres, and Florence Lake NWR 1,888 acres; collectively, the complex has management responsibilities on over 50,000 acres of fee title land.

The Complex is located in south central North Dakota in the Prairie Pothole Region which includes prairie communities with various types of native grasslands, riparian areas, and scattered woodland thickets. Woodland or forest communities are located along the Missouri River in the western part of the Complex and on scattered tracts throughout the Complex. Other dominant features in the Complex include wetland areas with a variety of aquatic plants, which are correlated with such factors as water permanence, water depth, salinity and land use. Dense stands of cattail dominate many of these sites. Agricultural communities are prevalent throughout the area and include croplands, haylands, grasslands, shelterbelts, tree plantings, and large areas of Conservation Reserve Program (CRP). CRP is a farm program which restores highly erodible farmland back to grassland and cannot be grazed, hayed, or farmed. CRP areas have heavy fine fuel loadings and are a concern for fire suppression agencies.

B. Topography and Soils

The Complex is spread out over two physiographic regions. Elevation varies from 1400 - 1900 feet. The soils are derived from parent materials which include glaciolacustrine sediments, early Wisconsin glacial drift, and late Wisconsin glacial drift (loess).

The eastern area of the Complex lies within the Missouri Coteau physiographic region. The Coteau has irregular terrain with an interspersion of wetlands, native prairie, hayfields, and a variety of grain crops. The Coteau is of major importance to the production of North American waterfowl. Glacial stagnation caused the rugged topography of the area, with pothole depressions between hills, knobs, and ridges. Soils are loamy, formed in glacial till. Risk of wildfires or prescribed fires escaping from refuge lands is moderate to high. Farming, grazing and wetlands create barriers to fire spread in some areas. Access for light and medium engines is fair considering slope, wetlands, rocks, and limited access roads or trails. The rugged nature of the topography requires specific "local" knowledge of access routes for fire suppression actions throughout refuge and adjacent lands.

The Missouri Slope covers the western half of the Complex. This glaciated area is characterized by gently rolling topography with numerous wetlands ranging from one-tenth acre to several hundred acres. Soils are silty loams and clay that are moderately well drained with areas of poorly drained soils. Most of the area is cropland; wheat, barley, and sunflowers and native rangeland. Risk of wildfires or prescribed fires escaping refuge lands is moderate. Intensive farming and grazing on adjacent lands create barriers to fire spread during portions of the year. Access is fair to good for light and medium engines. Wetlands can pose safety problems due to the combination of getting stuck amidst heavy fuel concentrations. Access roads and trails are generally available in most areas but a few large areas without trails and roads exist in this region.

Soil erosion resulting from suppression or prescribed fire actions is generally not a problem anywhere in the Complex. Occasionally local cooperators use disc lines as a fire suppression tactic. Disc lines on Complex land for suppression purposes are not recommended due to noxious weed invasion and soil erosion on slopes.

Land unit boundaries within the Complex were established along jurisdictional lines rather than geographic features. Many of the boundary lines for refuge units are conducive to fire spread onto private land due to topography.

C. Climate

The continental climate of the Complex is characterized by cold winters and hot summers, with rapid fluctuations of temperatures. The cool, dry, subhumid climate has an annual precipitation of 16 to 20 inches. Precipitation is normally heaviest in late spring and early summer, peaking in June. The average seasonal snowfall varies from 30-35 inches. The coldest temperatures vary from -40 F to -45 F to summertime highs up to 112 F. Intense thunderstorms occur frequently in summer. In the winter, snow and high winds bring blizzard conditions to the area. The frost free season generally runs from May 20 - September 15. January is the coldest month and July is the warmest. The prevailing wind flow is from the northwest with an average daily speed of 10 mph. Winds are usually sustained strong breezes rather than occasional gales. Wind speeds are usually highest during the afternoon and lowest at night. Winds of 25-30 mph often last for 6 hours and have been recorded for as long as 15 hours. Windspeeds of more than 30 mph have been recorded to last longer than 6 hours, sustained gusts of 35-50 mph are not uncommon.

Green up of cool and warm season grasses is dependent on precipitation and soil moisture. Drought years often produce little or no green-up for the entire year. Year to year variations in green up and curing of grasses affect fire danger throughout the growing season. The Complex fire season as determined by FMIS analysis of Long

Lake NWR is 130 days, from 4/1-6/9 and 8/9-10/7.

Long Term Mean Precipitation and Temperature Long Lake Complex

Month	mean precip "	mean temp F	veg. stage
Jan	.4	7	C
Feb	.4	10	C
Mar	.8	23	C
Apr	1.2	40	T
May	2.3	54	G
Jun	3.5	63	G
Jul	2.7	70	T
Aug	2.3	68	T
Sep	1.6	57	C
Oct	1.2	45	C
Nov	.8	26	C
Dec	.4	14	C
Annual	17.2	40	

C=cured, T=transition, G=green up

D. Vegetation

Comprehensive surveys of all units within the Complex have not been completed, a partial species list can be found in Appendix C.

1. Grasslands

One of the simplest and least expensive practices to improve and restore grasslands is prescribed burning. Selective suppression or promotion of a particular species depends on the date of the fire in relation to the phenology of the particular species (Higgins,

Kruse, Piehl 1986). Large wildfires could have negative effects on certain grass species depending on the time of year and drought conditions. Prescribed fires, appropriately timed will be used to manage Complex grasslands. Research conducted on the Complex found a marked increase in species diversity after prescribed burning (Kirsch, Kruse 1972).

The Complex is in the eastern mixed grass prairie region of North Dakota. Uplands are divided into high prairie, mid prairie, and low prairie, and lowlands into meadow and marsh (Dix and Smeins, 1967).

High prairie sites are usually on well drained soils. Brush species, except for Rosa, are nearly always absent. Grass stands are usually dominated by various combinations of grasses and herbs of; blue grama, needle and thread, fringed sage, narrow leaved blazing star, prairie wild rose, hairy golden aster, pasque flower, threadleaf sedge, and Missouri goldenrod.

Mid prairie sites are usually on level to slightly sloping terrain. Stands on these sites are dominated by various combinations of green needlegrass, Kentucky bluegrass, needle and thread, western wheatgrass, wolfberry, northern bedstraw, chickweed, white sage, yellow sedge, stiff sunflower, and silver leaf scurf pea. The mid prairie sites are vegetationally the most complex communities in the area.

Low prairie sites are on moderately drained soils. Dominant species include big bluestem, little bluestem, Baltic rush, cordgrass, switchgrass, blackeyed Susan, and Maximilian's sunflower. Less common species of these sites are smooth aster, prairie dropseed, wild licorice, and Canada anemone.

Lowland meadow sites are poorly drained and the water table is usually within the rooting depths of most plants. Water is usually present in the marsh sites, and in these depressions or potholes, soils are usually inundated for extended periods. Dominant species of meadows on the area are northern reedgrass, narrow leafed sedge, foxtail barley, cordgrass, Baltic rush, smooth aster, wild mint, fowl bluegrass and hedge nettle.

Lowland marsh sites are dominated by slough sedge, white top, common cattail, hybrid cattail, hardstem bulrush, softstem bulrush, spikerush, common smartweed, sloughgrass, water plantain, bur reed, water parsnip, and tall mannagrass. Cattails are a significant management problem for maintaining productive wetlands in the Complex. Wetlands become choked with dense stands of cattail. Prescribed fire is used with some degree of success in opening up cattail choked wetlands.

Seeded grasses Portions of the upland areas of the Complex have been seeded to dense nesting cover (DNC). DNC is composed of intermediate wheatgrasses, alfalfa, big bluestem, and sweet clover. DNC areas have proven very attractive to nesting waterfowl and are known to show increased nest success within their confines. Wildfire or prescribed fire can negatively effect the alfalfa component of DNC if burned during the active growth stage.

Generally, all of the grassland sites are partially invaded to various degrees by non native Kentucky bluegrass, smooth brome, quackgrass, and stands of native shrubs, mainly western snowberry, silverberry, and chokecherry. The Control of these species is the main goal of the Complex prescribed fire program.

2. Noxious Weeds

Leafy spurge, Canada thistle, and wormwood sage are the three most common noxious weeds found throughout all vegetative types. State law dictates control efforts for noxious weeds and the Complex voluntarily participates in control programs, including the use of prescribed fire. Herbicides applied in the fall followed by spring burning provided the best control of leafy spurge density and seed germination on similar sites in North Dakota (Hull-Sieg 1994). Prescribed fires or wildfires can increase the spread and density of some noxious weeds depending on several environmental and phenological factors. Initial results of late fall burning for control of wormwood sage at nearby Audubon NWR, ND. have been very positive (Hultburg, personal conversation).

3. Trees

Riparian woodlands, planted shelter belts, and single trees are scattered throughout the Complex. The majority of these areas are associated with river valleys. Trees common and or native to the area are bur oak, cottonwood, green ash, hackberry, Siberian elm, cedar, and Russian olive. Bur oak regeneration is declining, due in part to fire exclusion. Cedar trees are valued by some of the public for aesthetic reasons and by upland game for winter cover. Specific efforts are made to protect cedar trees during prescribed burns. Russian olive is considered an invader species on grassland sites due to lack of fire. Control of Russian olive trees with prescribed fire has been effective at Long Lake Complex if the trees are very young.

4. Shrubs

Shrubs common to the area are western snowberry, silverberry, prairie wild rose, thorn apple, chokecherry, Juneberry, wild black currant, and willow. The exclusion of fire has

led to extensive shrub invasion of grassland sites primarily by western snowberry and silverberry. Historical records for the area indicate shrubs occupied draws, ravines, depression areas, fire shadows around wetlands, and river/creek valleys (Higgins).

The exclusion of fire has resulted in expansion of shrubs from their historic sites. Shrubs occupy as much as 30-50% of some Long Lake Complex uplands. Reducing the density of shrubs has required 3-4 prescribed burns over a 10-12 year period at Lostwood NWR, ND. (Smith, personal conversation).

E. Reptiles, Fish, and Amphibians

Several species of reptiles and amphibians have been documented on the Complex but comprehensive surveys of all units have not been done. Six fish, two frog, two toad, one salamander, three snake, and two turtle species are relatively common in the Complex. Appendix D. lists reptiles, amphibians, and fish common to the Complex.

F. Mammals

Comprehensive inventories of mammal species have not been completed for all units in the Complex. Appendix E. lists common mammals on the Complex. The Complex's upland habitats support healthy populations of white-tailed deer along with coyote, fox, muskrat and beaver. Several species of small mammals are also common, including; deer mice, ground squirrels, voles and shrews.

Generally the direct impacts of fire on wildlife include disturbance or infrequently mortality of individuals or groups of individuals, particularly slow moving and or sedentary species. The Complex's larger mammals (deer, coyote, fox) will generally move away from fire. However the availability of suitable adjacent habitat is important for local populations. This factor is particularly important. Extensive fall prescribed burning is generally not conducted for this reason.

Fire in the mixed grass prairie has shown to generally favor deer and other mammals (Coppock and Detling, Herman and Wright, and others). Information concerning the effects of fire on wildlife can be reviewed in The Effects of Fire in the Northern Great Plains, prepared by Higgins, Kruse, and Piehl.

Staff at Long Lake NWR Complex realize that Complex ecosystems are not complete. Uncontrolled wildfire has a potential for negative impacts on wildlife, conversely prescribed fire under the correct prescriptions can be used as a tool to improve habitat.

The Complex has been managing habitat with prescribed fire since 1968 (Long Lake Refuge files).

G. Threatened, Endangered, and Candidate Species

Long Lake Complex contains a number of threatened, endangered, and candidate species. The Complex will implement its fire management program within the constraints of the Endangered Species Act of 1973, as amended, and will take appropriate action to identify and protect from adverse effects any rare, threatened, or endangered species located within the Complex. US Fish and Wildlife Service policy requires that State threatened and endangered species and Federal candidate species will be incorporated into any planning activities. Appendix F. contains a list of Endangered, Threatened, and Candidate Species Occurring in North Dakota by County.

Threatened, Endangered, Candidate Species Found in LL Complex

Bald Eagle (<i>Haliaeetus leucocephalus</i>)	endangered
Peregrine falcon (<i>Falco peregrinus</i>)	endangered
Whooping crane (<i>Grus Americana</i>)	endangered
Piping plover (<i>Charadrius melodus</i>)	threatened
Black tern (<i>Chlidonias niger</i>)	candidate
Ferruginous hawk (<i>Buteo regalis</i>)	candidate
Baird's sparrow (<i>Ammodramus bairdii</i>)	candidate
Loggerhead shrike (<i>Lanius ludovicianus</i>)	candidate
Dakota skipper (<i>Hesperia dacotae</i>)	candidate
Firefly (<i>Pyractomena sinuata</i>)	endangered

Fire is a natural and essential part of the Complex's ecosystems. Native wildlife evolved with fire and have developed means of tolerating and/or benefitting from fires. However the sensitive nature of some of the above species require that their habitats be protected from large wildfires especially where adjacent habitat is lacking. Prescribed burning in areas where threatened, endangered, and candidate species exist will be conducted such that small to medium size burns (10-300 acres) can increase local habitat diversity by creating a mosaic of habitats and increased habitat interspersions and edge.

Studies conducted at Lostwood NWR, North Dakota found that piping plover nesting

success increased as a response to prescribed burning on beaches (Smith, Murphy, Michaelson, Viehl 1993). Increases were attributed to the reduction of live and residual vegetation.

Baird's sparrows have been observed at Long Lake NWR and elsewhere in the Coteau areas of the Complex. Baird's sparrows nest in extensive idle or lightly grazed mixed grass prairie in the prairie pothole region. Baird's sparrow populations increased on areas treated with at least three prescribed burns over a 12 year period at Lostwood NWR, North Dakota (K. Smith, personal conversation).

The Dakota skipper has been observed in the Coteau areas of the Complex. Initial surveys for Dakota skippers will be started at Long Lake NWR Complex in the near future. The Complex contains large areas of suitable habitat. Confirmed sites where Dakota skippers are found will be protected from large wildfires, especially during skipper egg, larval, and pupal stages. Additionally, confirmed skipper sites will be treated with prescribed fire very carefully. Mosaic unit management, time of year, rotational schedules, and intensity of the burns should be considered. Fire is not recommended on small sites (Royer 1992). However Dakota skippers and other native prairie butterflies can recolonize from adjacent unburned suitable habitat, if timing has allowed host plants to recover (Moffat and McPhillips 1993). Dakota skippers were found only on native prairie sites treated with 3-4 prescribed burns and light grazing at Lostwood NWR, North Dakota (Smith personal conversation).

H. Birds

Two hundred and nineteen species of birds have been observed on the Complex. Of these, 112 species are known to nest on the Complex. Spring and fall migrations find spectacular numbers of waterfowl passing through the area and the Complex is an important stop for many on the journey north or south. Numbers of upland birds are cyclic but populations are normally present. Appendix G. is a species list of birds observed on the Complex.

Bird species evolving with fire may show fire adapted behavior and responses, whereas other species exposed infrequently to fire in their evolutionary history may be severely inhibited by it (Best 1979). Research conducted on lands similar to those found in the Complex from 1969-1971 concluded a greater variety of nesting bird species was found on burned areas, duck and sharptail grouse production was higher on burned areas, hatching success of ducks was higher on burned areas, and there was a marked increase in plant variety after burning (Kirsch and Kruse 1972). Another study conducted on lands adjacent to the lands in the Complex concluded duck nesting success was significantly greater in fall burned plots than in spring burned plots for all

species (duck) and years combined. Results suggested that vegetation structure and duck nesting response to spring and fall burns became similar after the third post fire growing season (Higgins 1986).

I. Insects

Insect life and range of occurrence of insects are not well documented at the Long Lake Complex. Fire causes an immediate decrease in insect populations (except ants, other underground species, and flying insects), followed by a gradual increase in numbers as the vegetation recovers. The insects eventually reach a population level higher than adjacent areas, then decline to near present levels as vegetation and soil litter stabilize (Higgins, Kruse, and Piehl 1986).

J. Cultural Resources

Fire management activities within the Complex will be implemented in accordance with the regulations and directions governing the protection of cultural resources as outlined in Departmental Manual Part 519 (519M), Code of Federal Regulations (36 CFR 800), the Archeological Resources Protection Act of 1979, and the Archeology and Historic Preservation Act of 1974. All fire management activities will be in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended.

Little of the Complex has been surveyed for archeological resources. The database maintained at the Regional Office lists several recorded but unevaluated sites. None of these sites are listed as having specific significance or status. Several historic structures are located on the headquarters site at Long Lake.

Some of the above mentioned unevaluated sites are located on Long lake NGR and are identified on a map and documented on archaeological inventory forms.

Heat from grassland fires rarely penetrates more than a centimeter into the soil. Impacts of grassland fires on artifacts and other materials in subsurface settings will be negligible even if they are buried only a centimeter or less below the ground surface (Wright and Bailey, Vogl). Research conducted by Saylor, Seablom, and Ahler at Knife River Indian Villages National Historic Site in North Dakota indicated that fire related impacts to surface exposed artifacts will be significant, depending on fire conditions and artifact type and size. Damage includes scorching, fracturing, charring, and spalling. Secondary impacts are created by erosion and vandalism. The severity of fire related effects can be controlled and diminished to some degree by controlling the fire line

intensity at the time of the burn.

Files and records of cultural resources should be consulted by the fire management team when planning prescribed burns and Preparedness activities. The potential for adverse impacts to cultural resources will be evaluated prior to prescribed burning and in the selection of fire suppression strategies during wildfires. Protective black line may be used around sensitive sites.

Fire suppression and prescribed fire actions involve construction of black line and scratch line, use of swatters, and direct attack with engines, all primarily in fine fuels. Ground disturbance is minimal and not likely to adversely effect cultural resources.

K. Improvements

Wildfire damage to improvements on and off the Complex is a primary concern. While developments can generally be protected from fire damage, dispersed improvements, particularly fences and predator exclosure fences, are likely to be damaged by fires. The Complex has office/maintenance/residence/visitor service facilities at Long Lake NWR (total value \$1.5 million). Other improvements include 175 miles of fence valued at approximately \$750,000.

The dispersed nature of the Complex's waterfowl production areas create many situations where escaped prescribed fires or wildfires could damage adjacent private structures, equipment, and grazing/hay/cropland. Wildfire damage to non FWS public property can occur to wooden utility poles and utility junction boxes which are located on or adjacent to FWS land. Adjacent land ownership to the Complex is almost exclusively private. Private landowners generally have a low tolerance for wildfire. Due to the dominance of livestock throughout the District and view of all grass as 'food for cows', landowners in most areas of the Complex have a relatively low tolerance for the use of prescribed fire, although public information/education programs have made end roads into ingrained fire attitudes. The Complex relies heavily on volunteer fire protection districts for suppression at remote WPA's.

L. Wilderness

No wilderness exist in the Complex.

M. Air Quality/Smoke Management

The management of smoke is incorporated into the planning of prescribed fires, and to the extent possible, in suppression of wildfires. Sensitive areas are identified and precautions are taken to safeguard visitors and local neighbors. Smoke dispersal is a consideration in determining whether or not a prescribed burn is within prescription. Generally the fine grass fuels and small burn size (80-600 acres) generate low volumes of smoke for short duration (4-5 hours).

Long Lake Complex fire management activities which result in the discharge of pollutants (smoke, carbon monoxide, particulates, and other pollutants from fires) are subject to and must comply with all applicable Federal, State, and local air pollution control requirements as specified by Section 118 of the Clean Air Act, as amended 1990.

The North Dakota State Department of Health, Environmental Health Section implements the requirements of the Clean Air Act. Permits to open burn are required under the authority of the North Dakota Air Pollution Control Rules (Article 33-15, North Dakota Administrative Code). Written requests are submitted by the Complex to the Department of Environmental Health for each planned prescribed burn. Requests must identify acres, location, and purpose of the burn. The State grants approval in letter form and also notifies local and district Environmental Health Practitioners. Appendix G. is a copy of the state of North Dakota Conditions/Restrictions Applicable to an Approval to Open Burn. Smoke complaints are also investigated by the State Department of Environmental Health. To date the State has received no complaints concerning smoke from Long Lake Complex prescribed fires or wildfires. Complex personnel also take special care to notify neighbors, fire departments, and local law enforcement agencies on burn day. These actions are specific requirements of individual burn plans.

Smoke from wildfires and prescribed fires is a recognized health concern for firefighters. Prescribed burn bosses and wildfire incident commanders must plan to minimize exposure to heavy smoke by incorporating the recommendations outlined in the publication Health Hazards of Smoke (Sharkey 1997). The use of respirators is not recommended.

N. Water Resources

The wetlands in Long Lake Complex are extremely productive and very attractive to migratory waterfowl and resident wildlife. They serve as breeding and nesting areas for many migratory birds and as wintering habitat for many species of resident wildlife. Most of the wetlands are potentially burnable at one time or another. Many of the prescribed burns conducted in the Complex are adjacent to water resources; some, such as cattail reduction burns, take place right over water or ice. Post fire erosion and

wind born ash deposition impacting water resources is not a concern for the type and scale of burns conducted on the Complex. Burn size is generally small (average 170 acres) and grass fuels do not produce heavy volumes of ash as compared to forest fuels. Supporting documentation regarding fire effects on water resources can be found in Effects of Fire on Water: A State of the Knowledge Review (1979).

O. Complex Fire Environment and History

1. Fuel Types

Fuel and vegetation types and characteristics of the Complex and surrounding area are:

a. NFDRS Fuel Model L (western grasslands): Approximately 55% of the total burnable acres fit fuel model L. Perennial grasses are the primary fuel, loadings are heavier than model A (annual grasses), and the fuel quantity is more stable from year to year. Decomposition rates of grass fuels are slow which leads to heavier than natural fuel loadings if fire is absent. Invading woody plants are mixed in the grasses throughout 50-70% of the units. This fuel model also fits some of the private lands adjacent to Complex lands, particularly grazed pastures and hayland.

b. NFDRS Fuel Model N (tall grass): Approximately 44% of the acres of the Complex fit fuel model N. Described as tall grass, perennial grasses, and or marshland grasses approximately 3 feet tall, one third of the aerial portion of the plant is usually dead. Invading woody plants are mixed with these fuels, throughout 50-70% of many of the upland areas. This fuel model fits adjacent private land enrolled in the Conservation Reserve Program (CRP). CRP is a major concern for fire suppression agencies in this area.

c. NFDRS Fuel Model E (hardwood leaf litter): Approximately 1% of the acres of the Complex fit this fuel model. Riparian woodlands, wooded draws, and planted shelter belts are included in this model.

2. Fire Behavior

a. Fuel Model L/Fire Behavior Model 1: shortgrass. Fire spread is governed by the fine, very porous and continuous fuels that have cured or are nearly cured. Fires are surface fires that move rapidly through the cured material. Fuel loading consists of fine dead fuels only, but average 1.5-2 tons per acre.

Fire behavior is directly related to the fine fuel moisture and windspeed. Spread rates with moderate to high windspeeds can reach 255 chains per hour or feet per minute, with flame lengths exceeding seven feet. Spot fires are generally not produced because fuels are consumed too quickly and thoroughly. Fire fronts tend to become irregular as topography, fuel loads, winds, and/or natural barriers speed up or slow movements. Resistance to control is low to moderate, depending on windspeed.

b. Fuel Model N/Fire Behavior Model 3 tallgrass. This model displays high rates of spread under the influence of wind. Wind may drive fire into the upper heights of the grass and across standing water. Fuel loading consists of fine and coarse dead fuels, averaging 3 tons per acre. Spread rates with moderate to high windspeeds can reach 200 chains per hour, with flame lengths exceeding 20 feet. Short range spotting (up to 500 feet) is common. Resistance to control is very high to extreme.

c. Fuel Model E/Fire Behavior Model 9 hardwood litter. This model displays moderate to low fire intensity. Fires are carried by dead, loosely compacted leaves. Concentrations of dead downed woody material will contribute to more intense burning as well as moderate spotting. Fuel loads consist of leaves, needles, and small stems and branches, 3.5 tons per acre. Spread rates are generally slow, 7.5 chains per hour. Flame lengths average 2-3 feet. Resistance to control is low except during drought conditions.

3. Fire Occurrence/History

Wildfire is one of the primary natural forces which created native prairie. Historic records describe huge prairie fires started by lightning or humans. Fires burned millions of acres as there were few natural fuel breaks and no suppression. Wright, and others (1978) believe that fire frequency in the prairie grasslands is on the order of 5-10 years. Other studies indicate that a longer frequency of 10-20 years may be more accurate. Very little local data exists for Long Lake Complex. Between 1941 and 1981, research indicates lightning-caused fires occurred as frequently as once every 12 years on 9,603 acres of privately owned pasture in the Missouri Coteau of Stutsman County, an area adjacent to and characteristic of lands in the Long Lake Complex, (Higgins 1984).

Fire records of the Complex are scant but generally, Long Lake Complex has an average of 2 wildfires per year. Human caused ignitions account for 87% of all

recorded fires. Fires were also caused by lightning. Research indicates lightning-caused fires are less frequent in the eastern portion of North Dakota (Higgins 1984). Equipment and agricultural field burning account for the majority of human-caused starts. The agricultural field burning season occurs during spring and fall, and is widespread throughout the Complex. Private landowners are not subject to the same burning regulations as government agencies. Farm fields are often ignited and left unattended, sometimes resulting in wildfires.

All fires on record were controlled during the first burning period. Many of the wildfires were suppressed with the help of volunteer fire department resources or solely by volunteer fire departments.

The use of prescribed fire to manage FWS grasslands has been used sporadically throughout the history of the station. All previous managers recognized the need for application of prescribed fire for managing grass to maintain diversity, assist with avian botulism control, and to manage grass for nesting cover and for other primary wildlife management purposes. The primary factor limiting prescribed fire use has been the lack of qualified, trained personnel, adequate funding, and equipment. The station currently has a substantial backlog of areas in dire need of burning. Years of fire exclusion combined with extensive use of grazing and rest, which tends to build litter - and wildfire potential, has produced a critical fire situation.

The maximum staffing for the Long Lake Complex was three people and it was a sub-unit of the Arrowwood Complex until 1992. Even if the three staff were fire qualified, this situation made prescribed burning an extremely risky situation. Since 1992, the station has become a stand alone project, fully budgeted with a slightly increased staffing level. Today, there are four permanent fire qualified staff available to address station wildfire suppression and prescribed burning needs. High priority, low complexity prescribed burns can now be completed, and with assistance from fire crews stationed at other refuges we are starting to make end-roads into our prescribed burning management/wildfire pre-suppression needs backlog.

The funding and staffing situation has produced a limited historical fire accomplishment record. The result is a relatively high wildfire potential on lands managed in the District due to limited previous litter control. Without assistance through fire program funding and staff allocation to write burning plans, prepare firebreaks, assist with burns, and monitor our burning results and assess wildfire potential through litter monitoring, we will continue to fail to meet our habitat, wildlife, and wildfire potential reduction objectives. We recognize that fire is currently a moderate risk due to manpower and funding limitations. The addition of manpower and equipment will allow for a reduction in fire risk throughout the Complex by addressing pre-suppression needs including reducing the litter layer on grasslands, and addressing wildfire suppression needs.

IV. LONG LAKE COMPLEX FIRE MANAGEMENT POLICY AND OBJECTIVES

A. General

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

1. Fire is an essential natural part of the Complex's native biotic communities.
2. Uncontrolled wildfire has the potential for negative impacts on and off the Complex.
3. Positive or negative effects of prescribed fire on vegetation, wildlife, and cultural resources depend on burning conditions and plant phenology.
4. Rapid rates of spread, potentially long response times, and the large number of individual land units (WPA's) pose suppression problems and increase the likelihood of escape onto adjacent lands.
5. Use of the "minimum tool" concept to minimize environmental damage is important throughout the Complex.

B. Complex Fire Management Goals

1. Protect life, property, and other resources from wildfire
2. Use prescribed fire as a tool to accomplish Complex habitat management objectives.

C. Complex Fire Management Objectives

1. Using the Appropriate Management Response concept, suppress all wildfires commensurate with values at risk. Strategies

employing a range of suppression options will be considered, and minimum impact suppression techniques (MIST) will be utilized, where appropriate.

2. Minimize the impact and cost of fire suppression.
3. Use prescribed fire to the fullest extent possible within or near Complex development zones, wildfire sensitive resources, and boundary areas to reduce the risk from wildfire damage.
4. Educate the public regarding the role of prescribed fire within the Complex.
5. Use prescribed fire to restore and perpetuate native wildlife species, by maintaining a diversity of plant communities.

V. FIRE MANAGEMENT STRATEGIES

General

This plan is intended to establish and provide an integrated fire management program on lands administered by the Long Lake NWR Complex. First, the fire program must provide for human health and safety and the protection of public and private property. Second, the program must be resource based, that is, it must meet the needs of the primary resources (wildlife and habitat) the FWS is charged to manage.

Integrating strategies to provide for human and property protection include management of fine grass fuels on areas which also when planned properly provide management for improved wildlife populations and their habitat. Combining Preparedness and resource needs is possible in most situations and is prudent management.

The following will be employed to meet fire management objectives.

A. Suppress all wildfires in a safe and cost effective manner consistent with resources and values at risk. Minimum impact strategies and tactics will be used when possible. Actively suppressing wildfire in flash fuels such as grass, which is the dominant fuel in this region, most often is accomplished by flanking the fire and working sides until the firefront is captured. That is the primary strategy on most wildfires where human safety and property is not a concern. Initial wildfire assessments are required to determine fire fighting strategies. In instances where human safety and property are a concern, establishing backfiring lines (roads, wetlands, lakes, no/low fuel fields) would be more prudent if sufficient lead time is available to do so. Blacklining around these interests is also a possible strategy if time is available. Fire assessment including flame length and rates of spread will determine if direct attack on the fire front is possible. Most often, indirect attack and flanking the fire will be used in wildfire efforts unless models show that direct attack can be safely attempted. These and other options are summarized in the following table:

Table 1: Appropriate Management Response

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

B. Conduct all fire management programs in a manner consistent with applicable laws, policies and regulations.

C. Due to the wide-spread land holdings of the Complex (3 counties, 87 units), local fire agencies (volunteer fire departments) will be utilized for initial attack on wildfires in remote areas of the Complex. Complex initial attack equipment and personnel will be distributed to maintain a maximum response time of one hour to fires on Long Lake NGR during the fire season. Cooperative agreements with

local fire agencies will be maintained to provide for cooperative suppression actions and ensure reimbursement is appropriately made and to provide assistance to local or federal cooperators under the "closest resources" and "total mobility" principles in accordance with Service policy. (See Appendix J for distribution and location of FWS District lands)

D. Utilize prescribed fire as a management tool for achieving hazard fuel and resource management objectives. To the greatest extent possible, hazard fuel prescribed fires will be used only when they can compliment resource management objectives. Resource management prescribed fire will be used to accomplish specific objectives established for individual land units. Combinations of farming, grazing, and haying will be planned and used in conjunction with prescribed burning to reduce the threat of large wildfire and to augment prescribed burning by establishing low fuel areas which serve as firebreaks and backfire lines. Fuel reduction considerations will be given to extremely large habitat blocks to reduce the occurrence of large wildfires which have potential for destruction of property and threaten human life. Such management adds diversity to the landscape which helps meet resource objectives while reducing the threat of raging wildfire.

E. Initiate cost effective fire monitoring which will tell managers if objectives are being met. Monitoring information will also be used to refine burn prescriptions to better achieve objectives.

F. Limits

G Heavy equipment (dozers, discs, plows, and graders) will not be used for fire suppression except in life/property threatening situations without the express approval of the Project Leader. While fire is a natural component of the prairie, plow lines and extensive sod disturbance are not. The primary reason for avoiding sod disturbance is that once the natural prairie is physically altered, it cannot recover its natural diversity. Anchor points from previously disturbed sod will be chosen if at all possible to protect the remaining size and natural diversity of the native prairie blocks. These anchor points commonly occur as section, half section and quarter section lines and prairie trails, current and/or previously farmed fields, and natural barriers such as wetlands, lakes and ponds. Such anchor points make much better fire breaks than disced or plow lines in most instances. In circumstances where the choice is the prairie or imminent threat to human health and/or property, the mentioned sod disturbance techniques and all possible measures of control will be employed.

G Smoke management will be carefully considered for all prescribed burns and will be addressed in all prescribed

burn plans.

- G All fires occurring on the Refuge will be staffed or monitored until declared out.

- G Prescribed burning in areas where threatened, endangered, and candidate species exist will not be conducted if the prescribed fire will be detrimental to the species or any adverse impacts cannot be mitigated, Section 7 clearance will be secured, as appropriate.

- G The use of prescribed fire to achieve management objectives must be conducted in a cost effective manner.

- G Aerial Retardants and foams will not be used within 300 feet of any waterway as described in the Guidelines for Aerial Delivery of Retardant or Foam near Waterways.

- G. Impacts of Fire Management Activities

This area of North Dakota is rural and sparsely populated. Outdoor recreation activities allowed on the Complex include hiking, photography, picnicking, bird watching, fishing and especially hunting. Most WPAs are open to public hunting as specified in the Code of Federal Regulations and in accordance with State law. Long Lake National Wildlife Refuge allows public hunting on portions of the refuge at times of the year when the use will not conflict with the primary purposes of the refuge. The Refuge and WPA's are also utilized by local cooperators for haying, grazing and cropping.

Recreational use and fire management can interact in several ways. Obviously the more recreational use the Complex receives, the greater the likelihood of human caused wildfire. Since the lands within the Complex fall under regulation by the State of North Dakota Rural Fire Suppression Plan, regulated by the North Dakota Fire Marshall's Office, some recreational activities may be eliminated or restricted when the fire danger rating in the area hits the very high to extreme categories.

Prescribed fire programs may also be limited by recreational use patterns. These are management decisions based upon public safety. It would be nearly impossible to check

certain units to insure no hunters are caught inside the burn perimeter prior to burn execution, however, reconnaissance of burn areas in order to locate vehicles will virtually eliminate the potential conflicts due to current low public use levels. Other areas of the refuge must be carefully checked, roads and trails closed or other measures taken prior to a burn to insure recreational user safety is not compromised.

To minimize negative impacts of prescribed burning; adjacent residents, landowners and cooperators are notified of potential burn units and also notified on day of burn. Questions or complaints can be worked out prior to implementing the prescribed burn. A news release is sent out to local news papers every spring prior to burn season stating that the Refuge may be burning in the area and questions are directed to the Refuge Office.

Timing of burn units may be dependent on adjacent fuels. Spring burns may be utilized if adjacent crop land or fuel loadings make it unsafe to burn in the fall. Disked or mowed fire breaks may be used to provide protection for adjacent lands.

VI. FIRE MANAGEMENT UNITS

Consistent with FWS policy all fires will be managed as either wildfires or prescribed fires. Suppression strategies, management restrictions, fuels, fire environment, and values at risk are similar throughout the Complex. Thus all lands within the Complex will be managed as a single fire management unit. Information regarding the Complex's fire history, fuel types, values at risk, fire behavior, fire effects, and fire weather is discussed in previous sections of this plan.

Areas in the immediate vicinity of developments will be defined as full suppression zones. Remote areas of grassland, where natural anchor points offer firebreaks, may be suppressed in wildfire situations by indirect attack and burnout of a unit from the anchor points or through actively pursuing the flanks to pinch off the headfire. In rare situations where models indicate potential to attack the headfire (generally flame lengths of less than 4 feet), this method of control may be employed. Situational decisions will be made accordingly regarding active control and pulling out all stops to contain and control a fire and/or to employ backfiring from appropriate anchor points to control wildfires. The decisions will be based primarily on the presence or absence of threat to human life and/or property.

VII. FIRE MANAGEMENT ORGANIZATION AND RESPONSIBILITIES

A. General

1. Personnel

The safety of firefighters and the public is the first priority. Persons engaged in fire suppression activities are exposed to a high element of risk. The Refuge Manager and fireline supervisors must make every effort to reduce the exposure to risk and enhance performance. One way is through formal and on-the-job training and improved physical fitness. The Service has adopted the training and fitness standards established in 310-1, and all firefighters must meet these and other standards established by the Service to participate in fire management activities.

Only qualified employees meeting the fitness and training requirements of assigned positions will be dispatched to fires. Employees not meeting requirements may assist in support capacities, but will not be permitted on the fire line. The FWS Fire Management Handbook should be referred to for specific policy guidance. The following minimum fire qualification levels will be maintained at the perspective District headquarters.

<u>Position</u>	<u>Number needed</u>
initial attack incident commander (ICT5)	1
firefighter (FFT2)	1
engine operators (ENOP)	1

In addition to collateral duty fire personnel, the Complex needs to maintain a seasonal engine crew during the fire season. Fire crew members will be qualified at the firefighter type 2 (FFT2) level for fire suppression. Fire crew members will be targeted for prescribed burn boss qualification (RXB3) in order to assist in the Complex's hazard fuel and resource management prescribed fire program. Currently these positions are located at Arrowwood NWR Complex, but hopefully in the future, positions can be added so they are on site and available to assist with Long Lake Complex fire needs.

Additional firefighters may be temporarily positioned at the Complex, or existing fire crew seasons may be extended using severity or emergency Preparedness funding when very high or extreme fire conditions warrant.

2. Training and Physical Fitness

Annual Refresher Training

The safety of firefighters and the public is the first priority. Persons engaged in fire suppression activities are exposed to a high element of risk. The Refuge Manager and fireline supervisors must make every effort to reduce the exposure to risk and enhance performance. One way is through formal and on-the-job training and improved physical fitness. The Service has adopted the training and fitness standards established in 310-1, and all firefighters must meet these and other standards established by the Service to participate in fire management activities.

All personnel involved in Fire Management activities are required to annually complete fire management refresher training in order to be qualified for fire management activities in that calendar year. Refresher training will concentrate on local conditions and factors, the Standard Fire Orders, LCES, 18 Situations, and Common Dominators. NWCG and other courses are available that meet the firefighter safety requirement; but, efforts will be made to vary the training and use all or portions of other NWCG courses to cover the required topics. Fire shelter use and deployment under adverse conditions, if possible, must be

included as part of the annual refresher.

Physical Fitness

All personnel involved in fire management activities will meet the fitness standards established by the Service and Region. At this point in time, firefighters participating in wildfire suppression must achieve and maintain an Arduous rating. Firefighters participating in Prescribed Burns must achieve and maintain a Moderate rating. Information found in Appendix H provides specific instructions to administer the tests, a health screening questionnaire to aid in assessing personal health and fitness of employees prior to taking the test, an informed consent form, and safety considerations. A trained and qualified American Red Cross First Responder (or equivalent) who can recognize symptoms of physical distress and appropriate first aid procedures must be on site during the test.

Wildland fire fitness tests shall not be administered to anyone who has obvious physical conditions or known heart problems that would place them at risk. All individuals are required to complete a pre-test physical activity readiness questionnaire prior to taking a physical fitness test. They must read and sign the Par-Q health screening questionnaire, an informed consent form (Appendix ???). If an employee cannot answer NO to all the questions in the PAR-Q health screening questionnaire, or is over 40 years of age, unaccustomed to vigorous exercise, and testing to achieve a Moderate or Light rating, the test administrator will recommend a physical examination. As noted below, all individuals over 40 years of age must receive an annual physical prior to physical testing.

Physical Examinations

In keeping with Service Policy, a physical examination is required for all new permanent employees and all seasonal employees assigned to arduous duty as fire fighters prior to reporting for duty. A physical examination may be requested for a permanent employee by the supervisor if there is a question about the ability of an employee to safely complete one of the work capacity tests. All permanent employees over 40 years of age who take the Pack or Field Work Capacity Test to qualify for a wildland or prescribed fire position are required to have an annual physical examination before taking the test.

3. Equipment

Engines are the primary initial attack resource on the Complex because of the predominance of fine fuels. Earth moving equipment is available but not recommended for use due to resource damage concerns.

Currently the Complex maintains the following equipment at the headquarters location:

- medium engine 500 gallon (type 4) one
- light engines 200 gallon (type 6) one
- 6 person equipment and PPE cache

B. Fire Management Team - Wildfire assignments are made on the basis of individual qualifications and position requirements. Principal members of the Complex fire management organization are the Complex Project Leader, collateral duty fire management officers(asst-Managers), the Administrative Support Assistant, and the Tractor Operator.

B. Complex Managers: (Project Leader, Primary Assistant Manager, and Assistant Manager)

1. Responsible for the overall management of the Complex program. including the fire
2. Insure that Department, Service, and Complex policies are followed. maintained and
3. Insure sufficient collateral duty firefighters meeting Service standards are available for initial attack.
4. The Complex Project Leader is responsible for maintaining readiness of engines and fire equipment cached at Long Lake Refuge.
5. Supervise the resource management activities on land management units within the District including the selection of objectives and tools to be used in achieving objectives (including prescribed fire). Work with the asst. Managers in selecting objectives and tools to achieve them including prescribed fire.
8. Supervise the writing of prescribed burn plans for their units.
9. Approves prescribed burn plans.

C. Collateral Duty Fire Management Officer:

1. Delegated the responsibility for coordination of the fire management program.
2. Provides guidance to the Project Leader concerning the Complex fire management staff.
3. Responsible for planning, coordinating, and directing Preparedness activities including:
 - a. fire training
 - b. physical fitness testing
 - c. fire weather station operation
 - d. fire cache and equipment inventories
 - e. insures step up plan is followed
 - f. coordinates with cooperating fire agencies
 - g. Assists with preparing annual FireBase budget request, and approving and tracking use of FireBase accounts.
4. Insures fire management policies are observed.
5. Has lead responsibility for managing the prescribed fire program including:
 - a. as available, serves as prescribed burn boss, if qualified.
 - b. proposes annual hazard fuel reduction and resource management prescribed fire projects.
6. Assists with fire effects monitoring.
7. Prepares a Complex fire prevention plan, and coordinates fire prevention with other employees.
8. Maintains liaison with Regional Fire Management Coordinator and Zone Fire Management Officer.
10. Updates the Fire Management Plan, maintains fire records, and reviews fire reports for accuracy.

D. Seasonal and Collateral Duty Firefighters:

1. Responsible for their personal protective equipment and physical conditioning.
2. Qualify annually on the pack test or other prescribed physical fitness standard of the fire program. Before April 1, or within two weeks of EOD date.
3. Maintain assigned fire equipment in ready state and use required safety gear.
4. Assist Collateral Duty Fire Management Officer in maintaining accurate records.

E. Wildfire Incident Commander (as assigned):

1. The incident commander (IC) will be responsible for the safe and efficient suppression of the assigned wildfire.
2. Fulfill the duties described for the IC in the Fireline Handbook (PMS 410-1) and insures that assigned resources are briefed on the strategy and tactics to be used, expected fire behavior, historic weather and fire behavior patterns, impacts of drought, live fuel moisture, escape routes and safety zones, and radio frequencies to be used.
3. Ensure that personnel are qualified for the job they are doing.
4. Submit information needed to complete DI-1202 (fire report) to the Collateral Duty FMO within 3 days of the fire being out. Reviewed 1202's will be filed in station files for record.

F. Prescribed Burn Boss (as assigned):

1. Implement approved prescribed burn plans within prescriptions.
2. Assist with the administration, monitoring, and evaluation of prescribed burns.
3. Document necessary information to complete DI-1202 (fire report) and submit to Collateral Duty FMO within 3 days of fires being declared out. Reviewed 1202's will be filed in station files for record.

G. Fire Cooperators:

Provide assistance in suppression of wildfires as defined in cooperative agreements and memorandums of understanding. The Complex currently has an agreement with the Sterling RFD (see Appendix L). Attempts will be made to enter agreements with the other RFD's to obtain complete fire coverage in the three county area. Currently all lands administered by the FWS are covered and responded to by the RFD's. The agreements would provide a better means of communicating our fire needs and objectives with them as well as tracking wildfires occurring on our lands and better accounting for fire needs in these areas. It would also allow us to combine our fire resources.

Along with other land management agencies, the Service has adopted the National Interagency Incident Management System (NIIMS) Wildland and Prescribed Fire Qualification Subsystem Guide, PMS 310-1 to identify minimum qualification standards for interagency wildland and prescribed fire operations. PMS 310-1 recognizes the ability of cooperating agencies at the local level

to jointly define certification and qualification standards for wildland fire suppression. Under that authority, local wildland fire suppression forces will meet the standards established for their agency or department. All personnel participating in prescribed fire management activities must meet Service fitness and training standards.

H. Normal Unit Strength

1. People

The NUS staffing required to meet the enhanced Level 2 as listed in IX.A. below includes 1 permanent fire position and two seasonal fire employees in addition to four fire qualified regular staff members. The normal fire response units for wildfire and prescribed burning are listed below:

Wildfire Crew (total 6 needed, min 4)

- ICT4 qualified fire incident manager
- ENOP, engine operator
- FFT2, two entry level fire fighters*
- FFT1, advanced firefighter
- FIRB, firing boss*

** it is likely that the initial attack response will not include all of the people/positions identified as the wildfire crew during non-duty hours. The crew identified is for normal duty response to wildfires. The non-duty response may only include one or two people who would need to assess the fire situation and perform appropriate response which may be fighting the fire if conditions allow such, or making appropriate contacts for assistance.

Prescribed Fire Crew (total 6 needed, min 4)

- RXB3, qualified prescribed fire burn boss
- RXII, ignition specialist*
- ENOP, engine operator
- FFT2, two entry level firefighters*
- FFT1, one advanced firefighter

* under personnel and budget constraints, crews may exclude members identified. The number of people and positions on a prescribed fire will be presented in the prescribed burn plan.

Such plans are reviewed and approved. The plan is subject to amendment by the Project Leader who can assess the conditions and approve the number of people and positions needed to complete the burn safely under the current conditions. The primary intent is to have a program which provides a six person burning crew on most prescribed burns, and have them available for wildfire response during the primary fire season. Currently assistance for burning is provided from other stations. The situation fails to address many of the other duties of a station fire program. The future of the Long Lake Complex fire program depends on having people and equipment available to prepare burning plans, affect agreements with RFD's, prepare firebreaks, monitor litter and propose units as well as burn results, complete reports, maintain equipment, and conduct the burning and be available for wildfire response.

2. Equipment

The NUS equipment required to meet the enhanced Level 2 as listed in IX.A. includes the following:

NORMAL UNIT STRENGTH

- | | |
|--|---|
| <ul style="list-style-type: none"> - 4X4 ENGN, 500 gallon capacity <ul style="list-style-type: none"> - 1 state frequency radio - 1 refuge frequency radio - 250 ft. 1" hose - two electric hose reels - 1 Warren wench 150 ft. cable* - 1 weather kit - 1 First Aid kit - 1 tool kit - 1 fire unit extinguisher - 4 drip torches - 2/ 5 gallon fuel cans - 6 fire flappers - 2 McLeod fire tools - tow rope - matches - 4X4 SLIP, 200 gallon capacity <ul style="list-style-type: none"> - 1 ton 4X4 truck - 1 state frequency radio | <ul style="list-style-type: none"> - 6 hand held refuge frequency radios - 2 chargers - 1 16" Homelite chain saw <ul style="list-style-type: none"> - case* - PPE chaps* - 6 personal fire packs* <ul style="list-style-type: none"> - (water bottles, goggles, gloves, tent, hardhat, etc. * see attached firefighter equipment list) - 6 personal fire coats* - 6 pr. Fire approved boots* - 6 sleeping bags* - 6 rechargeable flashlights* <p>PROGRAM NEEDS TO MEET ENHANCED LEVEL 2</p> <ul style="list-style-type: none"> - 4X4, 300 gallon capacity* |
|--|---|

- 1 refuge frequency radio
 - 50 ft. 1 ½" hose
 - 1 electric hose reel
 - 1 primer pump
 - 1 Warren wench 150 ft. cable
 - 1 weather kit
 - 1 First Aid kit
 - 1 tool kit
 - 1 unit fire extinguisher
 - 3 drip torches
 - 1/ 5 gallon fuel can
 - 4 fire flappers
 - 2 McLeod fire tools
 - tow rope
 - matches
 - 16" chain saw *
- 4X4 -1 ½ ton pickup*
 - 52 unit - 300 gallon*
 - Foaming unit*
 - State frequency radio*
 - Refuge frequency radio*
 - 200 ft. 1" hose*
 - 1 Warren wench 150 ft. cable*
 - 1 weather kit*
 - 1 First Aid kit*
 - 1 tool kit*
 - 1 unit fire extinguisher*
 - 4 drip torches*
 - 2/ five gallon fuel cans*
 - 4 flappers*
 - 2 McLeod fire tools*
 - tow rope*
 - matches*
 - 16" chain saw*
 - gas powered fill pump*
 - 2 electric hose reels*
- PLOW, 3230 JD Tractor w front w assist
 - 14 ft. Tandem disc
 - 12 ft. Digger
 - 10 ft. Rotary mower
- 4X4 - 4 wheel 350 cc Polaris ATV*
 - bush hog 48" pull mower*
- gas powered water fill pump*
 - 200 ft 1 ½" hose*
- gas powered floato pump
 - 200 ft 1 ½ " hose
- Personal computer and desk*
 - Fire Crew Utility Vehicle*
 - Fire Storage Building*
 - 2 storage stalls*
 - minimum heat*
 - 12' extension for fire cache/NUS equipment*
- (* Represents Items Currently Needed)

I. InterAgency Contacts

Most fire contacts will be within the agency and are listed in the Regional Fire Dispatch Plan. In the normal day to day administration of the station fire management program, contacts with the Bismarck Weather Service, County Sheriff's Offices, State Radio Dispatch Center, State Fire Marshall, RFD's and District Chief, and others will be necessary. Incident needs will likely be coordinated through the federal dispatch center

located at J. Clark Salyer NWR and the ND/SD FMO. Contact numbers are listed in individual prescribed burning plans and Appendix P.

VIII. WILDFIRE PROGRAM

A. Fire Prevention

A majority of the wildfires occurring in the Complex since 1984 were human caused and thus could have been prevented (see previous section on fire history). Human caused fires have the potential to be the most damaging because they can occur at a time of the year when fewer initial attack resources are available and fuels are cured. The agricultural field burning season occurs in spring and fall, and has been the cause of at least 2 wildfires.

In general the public and visitors to the Complex are very aware of fire prevention. As a reminder the Complex will do the following:

- signing
- closures when necessary
- public contacts through press releases and verbal contacts
- enforcement of regulations and prosecution of violators
- employee training and awareness
- implementation of State regulations and restrictions
- contacts with Complex cooperators and neighbors

Another fire prevention measure is the annual mowing of unpaved refuge trails on Long Lake NWR to prevent vehicle use from starting fires.

As part of the station overall wildfire program, spring pre-growing season Robel readings of cover quality and litter accumulation will be established. The information will guide prescribed burning prioritization aimed at combined needs of fuels reduction and nesting cover management. Post burn monitoring will also become an integral part of the wildlife/ habitat/ wildfire potential reduction fire management program.

B. Fire Behavior Potential

Fuels range from NFFL Fuel Model 1 (Short grass) to NFFL Fuel Model 3 which is used to predict fire behavior in tall grasses and marsh vegetation. Normal fire behavior prediction models apply to these fuels. Fire danger ratings are listed on a statewide basis during the normal fire season. Another source of fire behavior predictions by season is the Palmer Drought Index which is available on the Internet. These sources

will be used to predict fire behavior in prescribed fire and wildfire situations.

C. Preparedness

1. General

The Collateral Duty FMO and the Complex Managers are responsible for coordinating Preparedness actions. Specific duties are assigned in the Step Up Plan. The fire season (wildfire and prescribed fire) will start APRIL 1 and run through OCTOBER 30. The wildfire season as calculated by FMIS analysis is 130 days, 4/1-6/9 and 8/9-10/7.

2. Impacts of Drought and other activities

As indicated previously, periods of drought can greatly impact fire behavior and resistance to suppression. For that reason the Rangeland Fire Danger Index, Palmer Drought Index, and the Keetch-Byram Drought Index will be monitored at a minimum on a weekly bases throughout the year. All are available on the Internet at <http://ndc.fws.gov>. The Refuge fire staff can also contact the North Dakota Interagency Dispatch Center (701-768-2552) during periods of high fire danger to track indices and anticipate possible fire activity. Preparedness actions have been identified in the Step-Up Plan to respond to unusual conditions associated with drought and other factors (Following section).

Large scale fire suppression activities occurring in various parts of the country can have an impact on local fire management activities. For example, resources may be limited to implement prescribed fire activities because the closest available resources may be assigned to fire suppression duties or Refuge personnel may be involved as well. Regional drought conditions may also tie-up local resources that would normally be able to assist with Refuge fire management activities. It may be necessary to go out of Region to get the resources needed to staff the Refuge engine during periods of extreme drought or high fire danger.

The Refuge is in the Northern Rockies Area. During National and Regional Planning Levels IV and V, it is necessary to receive approval from the Regional Fire Management Officer and the concurrence of the Northern Rockies Area Coordination Group to conduct prescribed burns during PL IV and the National Coordination Group during PL V.

D. Step-Up Plan

Staffing Class breakpoints were determined using a FIREFAMILY analysis of 10 year fire weather data from a fire weather station at Theodore Roosevelt National Park in Medora, ND (140 miles west of Long Lake Complex Headquarters).

Staffing Class	Burning Index Range
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Fuel Model N (tallgrass)

SC I	0-21
SC II	22-43
SC III	44-88
SC IV	89-109
SC V	110+

The low to moderate complexity of the grass fuels and low wildfire frequency at Long Lake Complex may not warrant the daily use of the National Fire Danger Rating System (NFDRS) and the Weather Information Management System (WIMS). The Rangeland Fire Index is calculated daily during fire season by the National Weather Service in Bismarck, North Dakota. Greenness factors of fuels are calculated by an Advanced Very High Resolution Radiometer (AVHRR) onboard NOAA weather satellites. Satellite calculated greenness factors are combined with forecasted windspeed and relative humidities. The data is accurate enough to calculate greenness factors and fire danger ratings on a county by county basis.

The Collateral Duty FMO and or Complex Managers will monitor current and predicted fire weather reports and take appropriate actions as listed in the following Fire Step Up Plan.

LONG LAKE NWR COMPLEX FIRE STEP UP PLAN

Preparedness Actions

Rangeland Fire Index

L M H VH EX

FIRE STAFF _____ Dress in nomex and boots, carry PPE on duty,

maintain radio contact with HQ _____ X X X X Maintain response time w/engine of:(minutes) 60 60 60 5 5 Remain with assigned engine or on patrol
X X

Tour of duty/schedule may be extended _____ X X

REFUGE STAFF FIREFIGHTERS

Carry PPE while on duty _____ X X X X

May be assigned to engine or patrol _____ X X

Tour of duty/schedule may be extended _____ X X

FIRE EQUIPMENT

Type 6 and 4 engines ready at LLNWR * _____ 1 1 1 1

FIRE PREVENTION ACTIVITIES

Restrict vehicles to paved/gravel roads _____ X X

Post fire danger signs at high public use areas _____ X X

MISC EMERGENCY Preparedness ACTIONS

Preposition FWS and interagency resources _____ X X

Notify RFMC and open emergency

Preparedness account _____ X X

Notify ND FMO (at JCS NWR) Dispatch of staffing class and status _____ X X

Step up plan does not apply when refuge resources are assigned to fires

Notes: * Ready status is unmanned, but filled with water and ready to respond.

(except in winter)

Resources assigned to fires may prevent some staffing actions-FMO and or Managers should use commonsense in determining whether to fill behind dispatched resources.

L=low, M=medium, H=high, VH=very high, EX=extreme

Once an emergency Pre-suppression account is established/available the Collateral Duty FMO or Managers may authorize overtime for Very High or Extreme step up actions that can not be met with regularly scheduled employees. Collateral duty firefighters may be assigned emergency Preparedness duties if needed. Backfill behind employees may be authorized.

E. Emergency Presuppression and Severity Funding

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

Emergency Presuppression and Severity funds will be requested in accordance with the guidance provided in the Service's Fire Management Planning Handbook. As a general guide, Severity funding will be requested if a severe drought is indicated by a Palmer Drought Index reading of -4.0 or less or a Keetch-Byram Drought Index of 600 or greater and a long-range forecasts calling for below average precipitation and/or above average temperatures. Drought Indices can be located at:
<http://www.boi.noaa.gov/fwxweb/fwoutlook.htm>.

F. Detection

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

There may be occasions when unqualified personnel discover a wildland fire. When this occurs the employee should report the fire and request assistance before taking action to suppress or

slow the spread of the fire. If the fire poses an imminent threat to human life, the employee may take appropriate action to protect that life before requesting assistance. The unqualified personnel will be relieved from direct on-line suppression duty or reassigned to non-fireline duty when qualified initial attack forces arrive.

G. Fire Suppression

1. General

Long Lake NWR Complex is a full suppression area. All suppression efforts will be directed towards safeguarding life and public and private property while protecting the Complex's natural and cultural resources from harm. Mutual aid resources will report to the IC (in person or by radio) and receive their assignment and will be the first priority for release.

2. Reporting

All fires occurring within or adjacent to the Complex will be reported to the appropriate District headquarters or the Collateral Duty FMO. The person receiving the report will be responsible for implementing the Fire Dispatch Plan.

3. Initial Attack

All fires on the Complex staffed by FWS employees will be supervised by a qualified Incident Commander (IC). The IC will be responsible for all aspects of the management of the fire. If a qualified IC is not available, one will be ordered. The IC will select the appropriate suppression strategies and tactics. Minimum impact tactics will be used whenever possible. Dozers, plows, discs, or graders will not be used inside the Complex boundaries for fire suppression without permission from the Complex Team Managers.

The Incident Commander is responsible for aspects of the management of the fire, including:

- G Providing a size-up of the fire to dispatch as soon as possible.
- G Using guidance found in the fire Management Plan or in the Delegation of Authority, determine the strategy and tactics to be used.

- G Determine the resources needed for the fire.
- G Brief assigned resources on the strategy and tactics to be used, expected fire behavior, historic weather and fire behavior patterns, impacts of drought, live fuel moisture, escape routes and safety zones, and radio frequencies to be used.
- G Advising dispatch of resource needs on the fire.
- G Managing all aspects of the incident until relieved or the fire is suppressed.

4. Escaped Fires/Extended Attack

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

- Completion of WFSA (Wildland Fire Situation Analysis) for Complex Team Managers.
- Assignment or ordering of appropriate resources.
- Completion of Delegation of Authority if needed.

I. Mop up Standards and Emergency Stabilization and Rehabilitation

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

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

- G All trash will be removed.
- G Firelines will be refilled and waterbars added if needed.
- G Hazardous trees and snags cut and the stumps cut flush.
- G Disked firelines should be compacted as soon as possible to preserve the living root stock of natives grasses.
- G Overturned sod resulting from plowing must be rolled back with a grader or by hand and compacted to preserve native grass root stock.

Other emergency stabilization and emergency rehabilitation

measures may be taken in accordance with Chapter 5 of the Fire Management Handbook. Briefly:

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

- G **Rehabilitation** is the use of appropriate rehabilitation techniques to improve natural resources as stipulated in approved refuge management plans and the repair or replacement of minor facilities damaged by the fire. Total "rehabilitation" of a burned area is not within the scope of the Emergency Rehabilitation funding. Emergency Rehabilitation funding can be use to begin the rehabilitation process if other funding is committed to continue the rehabilitation throughout the life of the project (beyond the initial 3 years of Emergency Rehabilitation funding). Major facilities are repaired or replaced through supplemental appropriations of other funding.

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

J. Records and Reports

The FMO will complete all situation reports as soon as practical. The IC or Collateral Duty FMO will complete DI-1202 fire reports within 3 days. The Collateral Duty FMO will ensure that all expenses and/or items lost on the fire are reported, that the timekeeper is advised of all fire time and premium pay to be charged to the fire, and that expended supplies are replaced.

Records of all fire activity will be kept in refuge files as well as submitted to the RFMC for tracking. Fire qualifications records for all staff will be kept in refuge files. The Inter-agency Fire Activity Master List of fire activity will be tracked and updated for personnel involved in fires.

IX. PRESCRIBED FIRE MANAGEMENT

Complex managers have recognized the importance of prescribed fire as a management tool since 1968. Accomplishments from the fire program have been limited due to a lack of 'critical mass' staffing which would allow the station to safely deliver fire outputs. There has been no lack of fire planning. Until 1998, there has never been more than three staff qualified to conduct prescribed burning, yet managers have annually identified the need for burning from 1000 - 3,000 acres. Managers have remained administratively current with fire program requirements despite the lack of focused fire personnel. A summary of planned burning and annual accomplishments appears as Appendix Q. One might infer from the data, the Complex has a substantial backlog of fire program needs and is under-staffed, under-funded, and under-equipped to address the identified need. Appendix Q shows that only 18.5 % (3532.1/19,041.5 acres) of the planned burning has been completed primarily due to these factors. In addition, the degree of burning accomplishments in all likelihood had a negative influence on the acreage and number of burns planned. To the extent of personnel and funding, the Complex uses prescribed fire as a tool in 2 management areas: resource management and hazard fuels reduction (both are dependent on funding).

Recent burn plans have suggested a minimum of six crew members to conduct most burns. In 1998, the Long Lake Complex qualified four permanent staff for prescribed burning duty. While some of the less complex burns can be completed by the Long Lake crew, assistance from others is required on many burns. The additional duties of firebreak preparation, preparing plans/budgets/reports and other administrative fire duties, monitoring burn units, and maintaining fire equipment taxes the station's limited personnel. To implement and administer a fire program that addresses the need, a minimum of one permanent fire position and three support temporary/seasonal fire fighters is needed as identified in the Matrix of Fire Capability/Need presented below.

A. Resource Management Prescribed Fire

Resource management prescribed fire is used to restore/create/maintain a diversity of plant communities in order to restore and perpetuate native wildlife species. Goals of resource management burns include:

- restoration of native prairie grass species
- reduction/control of non native grasses, especially Kentucky bluegrass
- control of woody species invasion of grasslands, especially western snowberry
- aid in control of noxious weeds particularly leafy spurge and wormwood sage
- control of dense cattail growth in shallow wetlands
- assist the Complex farming program by burning small grain stubble and burning

for site preparation of grass seeding projects
- maintain/rejuvenate quality nesting cover for waterfowl

Achieving many of the above goals requires repeated prescribed burns over a 12-15 year period with a 3-5 year burn frequency.

Program Objectives: Treat approximately 3,000 acres per year in order to accomplish resource management goals on 15-25 land management units. At the current level of funding the prescribed fire program cannot come close to treating all the units in need of fire management. This is primarily due to limited staffing. The Complex has the necessary equipment to field one prescribed burn crew on a single day but there is not adequate staff. Given more staff, the Complex could almost double the number of prescribed burns.

**MATRIX OF FIRE PROGRAM CAPABILITY/NEED
FOR LONG LAKE NWR COMPLEX**

<u>FIRE PROGRAM</u>	<u>EST RX BURNING</u>	<u>OBJECTIVE</u>	<u>PROGRAM</u>
<u>SUMMARY</u>	<u>ACCOMPLISHMENTS</u>	<u>ACCOMPLISHMENTS</u>	<u>COSTS</u>
Current capability 4 qualified staff -500 gal ENGN -200 gal SLIP	4 units/700 acres	16 % of RX program objectives achieved	current estimate -\$10k/yr equip m.
		Respond to 10% WF pre-supp & suppression needs	
ENHANCED Current capability (above) plus assistance provided by ARD fire crew	10 units/1200 acres	40% of RX program objectives achieved	estimate -\$10k/yr salary
		Respond to 15% WF pre-supp & suppression needs	-\$15k/yr equip m.
ENHANCED - LEVEL 1 add two seasonal	15 units/2000 acres	60% of RX program objectives achieved	estimate -\$25k/yr salary
		Respond to 40% WF pre-supp & suppression needs	-\$15k/yr equip m.
ENHANCED LEVEL 2 1 permanent fire position 3 seasonals Equipment additions ENGN - 500 gal 52 Unit - 200 gal	25 units/3000 acres	100% of RX program objectives achieved	estimate -\$50k/yr salary
		Respond to 75% WF pre-supp & suppression needs *	-\$100k one time equip cost -\$10k/yr equip m.

* We cannot meet all wildfire suppression needs because of the distribution and individual characteristics of units managed in the three county WMD. Enhanced level 2 will provide the personnel and equipment necessary to plan and implement a progressive fire program, and permit the evaluation of units to meet resource habitat objectives as well as reduce the wildfire potential on FWS managed lands.

B. Hazard Fuels Reduction Prescribed Fire

The Complex hazard fuel reduction program uses prescribed fire within or near Complex development zones, wildfire sensitive resources, and specific WPA and refuge boundary areas to reduce the risk from wildfire damage. WPA and boundary zones burn units are selected based on values at risk on adjacent land, probability for escape from FWS land, and fuels. Fuels in hazard fuel sites have 6-10 inches of accumulated litter and/or high densities of shrubs. The large volume of litter and shrub component causes complex control problems during suppression actions. High litter loadings allow wildfires to carry even during full green-up conditions. To the greatest extent possible, hazard fuel burns will only be used when they can compliment resource management objectives.

Goals of Hazard Fuel Burns include:

- reduce dead fuel loadings (litter) of 2-3 tons per acre by approximately 75% or better
- reduce woody shrub component by 50%

Hazard fuel prescribed fire program objectives are:

- treat approximately 2,000 acres per year
- burn units once every 5-8 years depending on fuel accumulations and resource management considerations

C. Planning

The managers are responsible for supervising the development of resource management objectives for individual units. They will select the appropriate management tool needed to meet the objectives. Prescribed fire is just one of a combination of tools available. If needed, the Zone FMO or regional prescribed fire specialist will be consulted for assistance in accomplishing the desired objectives. The burn plan will document objectives and the plan of action for achieving them. Burn plans can be written by any qualified burn boss.

Potential burn units will be selected and a draft list will be reviewed for sound biological practices by the Project Leader. A review of the previous years prescribed fire accomplishments, failures, and any monitoring results will also take place at this time. Burn plans will be submitted for review to the Zone FMO and approval by the Project Leader at least 60 days prior to the planned burn day.

Specific parcels of land managed by the station require adequate consideration of monitoring and management of fuel loads to reduce wildfire threats to private interests outside our ownership. Similarly, housing/farmsteads development adjacent to lands administered by the complex present smoke management considerations for prescribed fire planning and implementation. Prior to the conservation Reserve Program (CRP), most private lands lying outside FWS ownership boundaries presented low fuel loads and threat for wildfire. The idle grass of CRP has substantially increased the threat including the potential for wildfire incidence and the severity of each potential event. This has increased the complexity and coordination requirements for planning the management of fire, both prescribed and wildfire, in the District. It has also increased the non-fire aspects of the station fire program producing a need for fuel load monitoring and assessment for reducing wildfire potential.

All burn plans will address contingency planning for all prescribed burns. General contingency planning elements are listed in the following paragraph. More specific information regarding contingency planning may be included for a particular prescribed burn if the need exists.

A contingency section will be included in all prescribed burn plans and shall address the following essential elements:

- G Trigger points that are clearly defined.
- G Instructions for reporting an escaped fire or slop-over.
- G Who has the authority to activate the contingency plan.
- G The initial actions to be taken to suppress the wildland fire (Included in this section will be the organizational structure, strategies, tactics, additional resources, health and safety concerns).
- G Who is to be notified when the contingency actions are implemented.
- G The location of values or resources requiring protection and established priority for providing protection.
- G Containment opportunities outside of the burn unit .

Escaped fire contingency lines are natural or human made barriers to fire spread; such as water, roads, fields and heavily grazed pastures, that may be used as indirect holding lines in the event of an escape. Any residences or other private property within these identified lines will receive priority protection.

Contingency forces are dependent upon onsite resources, local RFD's, district FMO and staff, and North Dakota Dispatch Center. These resources will be contacted the morning of a burn to verify availability of the resources.

Determining when to implement the contingency plan or declare a prescribed fire a wildfire will vary with every situation. Therefore, clearly defined trigger points that indicate when the contingency plan will be implemented and under what circumstances the prescribed fire will be declared a wildfire will be identified in each prescribed burn plan. The following are examples of trigger points that may be used:

- G When three or more slope-overs occur within a 30 minute period or when an escape exceeds the ability of the holding forces to suppress it in a timely manner.
- G When private property, cultural resources, structures and other resource values are threatened.
- G When the fire behavior predictions exceed the prescription parameters (MANDITORY).

Mutual Aid Agreements are in place with local RFD's for suppression and protection of wildland and structural fires. If wildfire can not be contained by on site resources or it is a structural fire, the contingency plan will be implemented. District FMO and NDC will also be notified of situation and additional resources needed.

The Collateral Duty FMO and managers will be responsible for preparing all fire equipment used for prescribed burning prior to April 1. Prescribed burn units may require preparation including; mowlines, disc lines, black line, and public relations. Preparation for burns will be handled on an individual basis and will be identified in the prescribed burn plan for that unit. The Complex Managers will prioritize the units to be burned.

The normal prescribed burn season begins approximately April 1 depending on snowmelt. The season continues until late fall, approximately October 30. Most units are not burned between May 30 and August 1 in order to avoid burning nests. When a particular unit is burned depends on burn objectives. Some burning will occur during the winter depending on snow conditions. Winter burns are generally for cattail control in wetlands and for burning blacklines to be used as control lines for future burn units.

Each prescribed burn unit requires an open burning permit from the North Dakota Department of Environmental Health. Procedures for obtaining permits can be found in section III. M and Appendix H. of this plan. Long Lake Complex is within the Northern

Rockies Interagency Fire Coordination Area. Prescribed fires cannot be ignited when the Northern Rockies Area is in fire danger preparedness level V and/or the National Preparedness level is V without the approval of the Rocky Mountain Area Coordination Group and the Regional Fire Management Coordinator. When the North Dakota Rangeland Fire Danger Index is in the Very High or Extreme category, verbal permission must be obtained from the local rural fire protection district chief. Multiple units may be burned at the same time within the Complex. The maximum number of simultaneous burns will depend on the cumulative impacts of smoke on sensitive targets. The Zone FMO or other qualified Prescribed Fire Manager will be available to coordinate the management of simultaneous burns. It is not required that the Prescribed Fire Manager be on-site during the burns. Sufficient suppression forces must be available for each burn in the event of an escape.

D. Training

The Complex will at minimum meet policy requirements of the Service prescribed fire qualification system. The Project Leader will be responsible for ensuring Complex personnel maintain qualifications necessary to implement the growing fire program. The Complex will maintain a minimum of one staff member qualified at the prescribed burn boss two (RXB3) level. Additional training will be obtained for Complex resource managers in the area of fire effects and monitoring in prairie ecosystems in order to implement emerging Service ecosystem management strategies.

E. Complexity

All burns in the Complex fall within the low complexity category as determined by the FWS R-6 Complexity Analysis Guidelines. The average number of personnel required to conduct a burn on the Complex is 4-5. Most burns are structured with a burn boss, 3-4 prescribed fire crew members (RXCM), and two light engines.

F. Monitoring and Evaluation

Current monitoring and evaluation of prescribed burns is very limited due to funding and staffing limitations. Burn prescriptions and timing are based on past research (Higgins, Smith, Kruse, Kirsch, and others), some of which is site specific to the Complex. Pre burn evaluation is limited to photo points or general photos, qualitative evaluation of fuel conditions and green up conditions. Burn day evaluations document temperature, relative humidity, windspeed, fine fuel moisture, rate of spread, flame length, smoke dispersal, % litter reduction, and % scorch of woody species. Post burn evaluation is limited to photo points or general burn photos, and qualitative estimates of shrubs, and noxious weed abundance and cover, and native species response.

Fire monitoring protocols for the Region or Service will be adopted by the Complex when they are finalized. Species composition and % cover will be the primary information used to determine if burn objectives are being met and to monitor long term vegetation responses.

G. Prescribed Fire Impacts

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

2. Social and economic impacts are as follows. The Complex covers a three county area that contains one of the state's largest metropolitan areas(Bismarck). Small rural towns are scattered throughout the region. The main industry in the area is agriculture and most all other industry is also agriculture related.

The overall social and economic environment can be affected by how the uplands on the Complex are managed. Often the affect is local, but when all Complex land units are combined, the affect is more widespread. Habitat management is often accomplished by authorizing local farmers to hay or graze on Complex units. This is viewed as positive both socially and economically. Local farmers and ranchers prefer to hay or graze lands on the Complex rather than seeing them "go up in smoke".

The majority of neighbors accept the fact that the Federal government owns land for waterfowl production, and most have a general appreciation for the value of wildlife. However these neighbors expect the land to be managed for wildlife and not ignored. If a Complex land unit is ignored, allowing the habitat condition to decline in quality and noxious weeds to increase, opinions quickly become negative. However, if the land is managed for the best interest of wildlife and habitat conditions are maintained, these opinions become positive and wildlife benefits both on and off Complex managed lands. Prescribed fire is one of the tools necessary to manage Complex lands.

The majority of recreational uses on the Complex are centered around hunting and birdwatching. Many of the Complex's WPA's offer this regions best waterfowl hunting and birding. Hunters and birders come from all over the United States to visit the Complex. Annual visitation is estimated at 14,000 per year. Occasionally hunters comment negatively when they see black, burned areas in their hunting areas. Negative impact to the local economy could result if habitat becomes less productive and wildlife populations decrease. The number of hunters and birders traveling to the area could decrease, depriving the local economy of recreation dollars.

Escaped prescribed fires pose a threat to adjacent life and property, but proper planning and prescriptions, qualified personnel, and contingency planning will mitigate this threat. Temporary air quality impacts from smoke may occur, but are mitigated by the fuel type (light flashy fuels), small burn unit size, and consultation with state air quality personnel.

Negative public opinion for the prescribed fire program will be addressed through proactive public information and education efforts. See section XIV. for specific actions.

H. Reporting and Documentation

Individual prescribed burn plans will be the primary document used to record prescribed fire information. Burn plans document state air quality requirements, personnel, costs, fire behavior, weather, and burn critique information. Prescribed burns will also be documented on DI-1202 forms and submitted to the Zone FMO within 10 days.

X. WILDLAND FIRE USE FOR RESOURCE BENEFIT

The Complex has elected not to use the benefits or adverse impacts of wildland fire when determining an appropriate management response for the following reasons:

- rapid rates of spread in predominant grass fuels would create high probability of escape to private land
- conflicting land uses within the Complex; haying and grazing
- small size of FWS land units creates high probability of escape to private land

XI. AIR QUALITY

See previous section III. M.

XII. FIRE RESEARCH AND MONITORING

The Complex will continue to encourage fire related research projects on FWS lands where research operations will not conflict with unit management objectives. At present there are no specific issues which the Complex staff feel need research. Fire monitoring is discussed in previous sections of this plan, see section IX. F.

XIII. PUBLIC SAFETY

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

Fire fronts in grass fuels are fast moving and dangerous. However due to the small size of most Complex units, entrapment is not a big threat to sportsmen/visitors who may be in the area. Neighbors who initiate their own suppression actions lack proper training, equipment, and communications and may be at risk. The Complex staff will attempt to keep the fire scene (wildfire and prescribed fire) clear of people except for FWS firefighters and cooperating volunteer fire departments. Burn areas are usually closed to the public during prescribed fires.

Smoke from a wildfire or prescribed burn could impair visibility on roads and become a hazard. During wildfires the IC is responsible for requesting the local law enforcement agency having jurisdiction to manage traffic hazards from smoke. Smoke from prescribed fires is part of the burn prescription and is the responsibility of the burn boss. Actions to manage smoke include: use of road guards and pilot car, signing, altering ignition techniques and sequence, halting ignition, and suppressing the fire.

Wildfires which might escape from FWS lands and spread to inhabited private property are also a concern. The local law enforcement agency having jurisdiction will maintain order at the scene and enforce evacuation orders. Service personnel may assist with the evacuation process in cooperation with the law enforcement officer in charge. Additionally the Complex will continue where practical to use prescribed fire to manage hazard fuels in high risk areas.

XIV. PUBLIC INFORMATION AND EDUCATION

Informing the public is an important part of fire suppression, fire prevention, prescribed fire, and the FWS mission. During wildfires the IC is responsible for providing fire information to the press and the public. The IC may delegate this task as needed.

Informing the public is a vital element of the prescribed fire program. The following actions will be used to promote the prescribed fire program to the public:

- press releases
- attendance at local volunteer fire department meetings
- including the prescribed fire message in Complex interpretive publications and materials
- personal contact with bystanders during prescribed burns
- following prescribed burn plans and preventing escapes
- developing a quantitative fire effects monitoring program and sharing results with the public

XV. FIRE CRITIQUES AND PLAN REVIEW

The Fire Management Plan will be reviewed annually in March at the beginning of the fire season by the station FMO, or in the absence of one by the Project Leader, to ensure the fire program advances and evolves with the FWS and the Complex's mission.

Wildfires will be critiqued by the IC. The Regional Office will conduct formal fire critiques in the event of:

- significant injury/accident
- significant property or resource damage
- significant safety concerns are raised
- an extended attack is necessary

Prescribed fires will be critiqued by the burn boss and documented in the burn plan. The Regional Office will conduct a formal critique if:

- significant injury/accident
- an escape prescribed fire occurs
- significant safety concerns are voiced
- smoke management problems occur

XVI. CONSULTATION AND COORDINATION

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

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

The following were consulted in the development of this plan:

Phil Street, Region 6 Fire Management Coordinator

Carl Douhan, R6 Prescribed Fire Specialist

Brian Mc Mannus, ND FWS Zone FMO

Mike Granger, FMO CM Russell NWR

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