WILDLAND FIRE MANAGEMENT PLAN

SAN LUIS
NATIONAL WILDLIFE REFUGE COMPLEX

2001

SEPTEMBER 2001

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INTRODUCTION

The U.S. Department of the Interior (DOI) fire management policy requires that all National Wildlife Refuges with vegetation that can sustain fire must have a Fire Management Plan that details fire management guidelines for operational procedures and values to be protected/enhanced. The Fire Management Plan (FMP) for the San Luis National Wildlife Refuge Complex (NWRC) will provide guidance on preparedness, prescribed fire, wildland fire, and prevention. Values to be considered in the Fire Management Plan include protection of Refuge resources and neighboring private properties, effects of burning on Refuge habitats/biota, and firefighter safety. Refuge resources include properties, structures, cultural resources, trust species including endangered, threatened, and species of special concern, and their associated habitats. The Fire Management Plan will be reviewed periodically to ensure that the fire program is conducted in accordance and evolves with the U.S. Fish and Wildlife Service (Service) mission and the San Luis NWRC's goals and objectives.

The San Luis NWRC consists of three Refuges: San Luis, Merced, and San Joaquin River. This Fire Management Plan covers the three Refuges listed. The Complex is located in central California's San Joaquin Valley and is part of the south district of the Central Valley fire management zone. This valley lies between the coast range mountains to the west, and the Sierra Nevada range to the east. Presently the total acreage of the Complex is 41,215 acres located in Merced and Stanislaus Counties.

COMPLIANCE WITH SERVICE POLICY

Authority and guidance for implementing this plan are found in:

- Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C.594): authorizes the Secretary of the Interior to protect from fire, lands under the jurisdiction of the Department directly or in cooperation with other Federal agencies, states, or owners of timber.
- Economy Act of June 30, 1932: authorizes contracts for services with other Federal agencies.
- Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856, 1856a and b): authorizes reciprocal fire protection agreements with any fire organization for mutual aid with or without reimbursement and allows for emergency assistance in the vicinity of agency lands in suppressing fires when no agreement exists.
- Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121): authorizes Federal agencies to assist state and local governments during emergency or major disaster by direction of the President.
- National Wildlife Refuge System Administrative Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd et seq.: defines the National Wildlife Refuge System as including wildlife refuges, areas for the protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas and waterfowl production areas. It also establishes a conservation mission for the Refuge System, defines guiding principles and directs the Secretary of the Interior to ensure that biological integrity and environmental health of the system are maintained and that growth of the system supports the mission.
- Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C.2201): provides for reimbursement to state or local fire services for costs of firefighting on federal property.
- Wildfire Suppression Assistance Act of 1989. (Pub.L. 100-428, as amended by Pub.L 101-11, April 7, 1989).
- Departmental Manual (Interior), Part 910 DM, Chapter 1, Wildfire Suppression Management (March 29, 1990): defines Department of Interior Fire Management Policies.
- National Environmental Policy Act of 1969: regulations implementing the National Environmental Policy Act (NEPA) encourages the combination of environmental comments with other agency documents to reduce duplication and paperwork (40 CFR 1500.4(o) and 1506.4).
- Clean Air Act (42 United State Code (USO) 7401 et seq.): requires states to attain and maintain the national ambient air quality standards adopted to protect health and welfare. This encourages states to implement smoke management programs to mitigate the public health and welfare impacts of Wildland and prescribed fires managed for resource benefit.
- Endangered Species Act of 1973.
- Federal Fire Policy of 1995.

This plan meets NEPA / NHPA compliance and will be implemented in compliance with the Endangered Species Act of 1973, as amended, under the Section 7 programmatic review, and all necessary actions will be taken to identify and protect from adverse effects any rare, threatened, or endangered species (Appendix B). The authority for funding (normal fire year programming) and all emergency fire accounts is found in the following authorities:

Section 102 of the General Provisions of the Department of Interior's annual Appropriations Bill provides the authority under which appropriated monies can be expended or transferred to fund expenditures arising from the emergency prevention and suppression of wildland fire.

P.L. 101-121, Department of the Interior and Related Agencies Appropriation Act of 1990, established the funding mechanism for normal year expenditures of funds for fire management purposes.

31 US Code 665(E)(1)(B) provides the authority to exceed appropriations due to wildland fire management activities involving the safety of human life and protection of property.

Authorities for procurement and administrative activities necessary to support wildland fire suppression missions are contained in the Interagency Fire Business Management Handbook.

FIRE MANAGEMENT OBJECTIVES

The following considerations were used to develop the San Luis NWRC fire management goals and objectives, as outlined in the Refuge's Master and Annual Habitat Management Plans. Appendix A contains a list of terminology definitions.

The overall goals of the San Luis NWRC fire management program are:

- to maintain a suppression response capability appropriate to meet expected wildland fire complexity;
- to reduce human-caused fires;
- to ensure firefighter and public safety;
- to employ prescribed fire to allow a natural phenomenon (i.e., fire) to continue to be a vital ecological process on wildlands; and
- to use prescribed fire to reduce hazardous fuel loadings and as a management technique to improve habitat for native wildlife.

Specific fire management objectives are:

- Suppress all wildland fires using appropriate management strategies.
- Protect life and resources/property from wildland fires commensurate with the resource values at risk.
- Use prescribed fire, where appropriate, to reduce hazardous fuels, to restore and enhance wildlife habitat, to control invasive weeds, and to maintain cultural/historic resources.
- Use appropriate suppression tactics and strategies that minimize long-term impacts of wildfire suppression actions.
- Protect and/or enhance habitat for endangered/threatened species and species of special concern.
- Educate the public regarding the role of fire concerning natural resources within the Refuge.

These fire management goals and objectives have been developed under the following assumptions:

- Prescribed fire has positive effects on vegetation, wildlife habitat, and cultural resources when the appropriate burning conditions and techniques are employed.
- Uncontrolled wildland fire has the potential for negative impacts of many resources including public safety.
- Use of Minimum Impact Suppression Tactics (MIST) in the suppression and control of fire can minimize environmental damage.

DESCRIPTION OF REFUGE

This section provides background information on the individual Refuges covered under this plan, including: San Luis, Merced, and San Joaquin River National Wildlife Refuges.

SAN LUIS NATIONAL WILDLIFE REFUGE

San Luis National Wildlife Refuge (NWR) was established in 1966 by Executive Order No. 10355 and acquired with funds from the Migratory Bird Conservation Commission. The Refuge is located in the San Joaquin Valley of Central California and is situated 60 miles southeast of Modesto and six miles northeast of Los Banos. The Refuge comprises 26,609 acres located in Merced County (Figure 1).

The region is generally rural in nature with a low population density. Lands use surrounding the Refuge includes farming and private waterfowl hunting clubs (seasonal wetlands). The area is a major wintering area for migratory waterfowl of the Pacific Flyway.

Approximately 39 percent of the Refuge's acreage consists of wetlands such as seasonally flooded marsh, permanent and summer ponds, and riparian habitat, while the remainder consists of a variety of upland habitats. These are described in further detail in the Vegetation Section. Fuel and vegetation types characteristic of the Refuge include:

- Fuel Model 1: approximately 15,284 acres of uplands.
- Fuel Model 1(vernal pools and floodplain habitat): approximately 924 acres.
- Fuel Model 3: approximately 7,053 acres of wetlands.
- Fuel Model 9: approximately 3,348 acres of riparian woodland (105 miles).

At present, San Luis NWR does not have an approved Comprehensive Conservation Plan (planned for 2002). The primary objectives of the Refuge are to

- Provide feeding and resting habitat for migrating and wintering waterfowl and other waterbirds.
- Provide habitat and manage for endangered, threatened, and/or species of special concern.
- Preserve the natural diversity of the flora and fauna representative of the lower San Joaquin Valley and the natural processes which maintain that diversity.
- Provide high quality wildlife dependent recreation and environmental education programs.

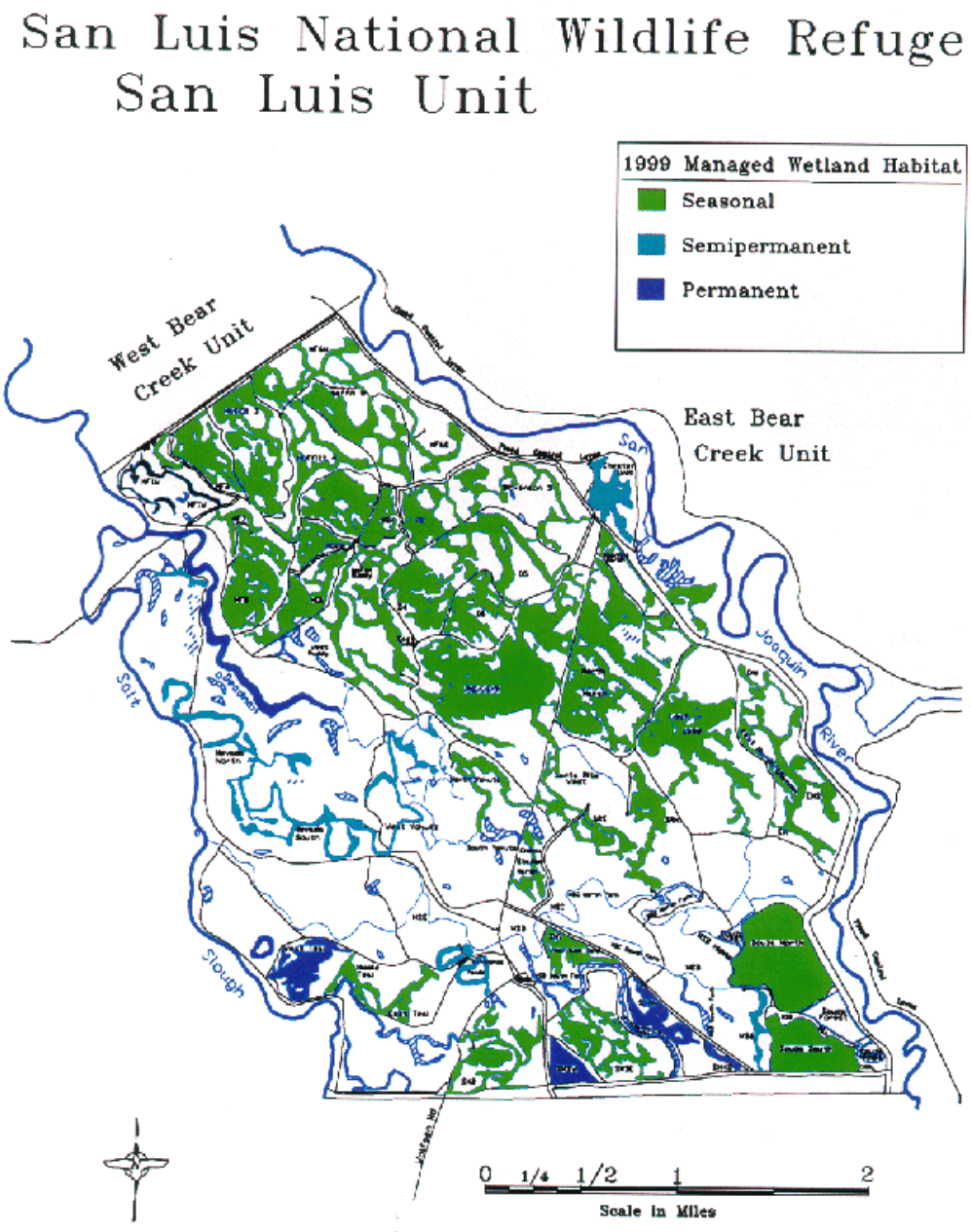
The San Luis NWR includes the San Luis, Kesterson, East Bear Creek and West Bear Units.

San Luis Unit

San Luis Unit is located within the floodplain of the lower San Joaquin River Valley (Figure 2). It comprises the middle third of the "San Luis Island" and is bordered on the east by the San Joaquin River and to the west by Salt Slough, an ancient San Joaquin River bed. The San Joaquin River formed the island by its meandering across the flat valley floor. Elevations vary between 93 to 73 feet above sea level, most of the variance is along the ancient river channels. The ridge systems are basically oriented east and west.

Figure 1: Vicinity Map

Figure 2: San Luis Unit



The lower San Joaquin Valley is classified as semi-arid with nine inches of rainfall per annum in Los Banos. Soils range from sand to tight, heavy clays and many gradations in between. Because of the deposition of materials by the river, these various soils are scattered throughout the Refuge. Most of the lower elevations contain at least some clay which aids in holding water. Sand strata can also be located just under the surface.

The habitat management objectives of the San Luis Unit are to maintain the marshlands at their optimal maximum potential for wintering waterfowl; to maintain the grasslands for endangered and threatened species, unique species, and native plant diversity; and preserve the riparian zones of this ecotype. Management within the tule elk enclosure is geared to produce enough forage to maintain the existing herd at a carrying capacity of 40-50 animals.

Kesterson Unit
The Kesterson Unit includes Freitas and Blue Goose Units, Refuge lands west of Highway165. Kesterson Unit was established in 1970. This portion of San Luis NWR consists of 11,029 acres and is located near Highways 165 and 140, approximately 18 miles north of Los Banos in Merced County (Figure 3). Kesterson Unit is within the historic floodplain of the San Joaquin River.

The flat grasslands typical of this area are disrupted by narrow meandering overflow channels of the San Joaquin River. The Unit is bisected by Mud Slough, a tributary of the San Joaquin River. The elevation of the Unit ranges from 60 to 75 feet above sea level.

East Bear Creek Unit
The 4,000-acre East Bear Creek Unit was established in 1993 when purchased in fee title as a cattle ranch from Joseph Gallo Farms. The unit is near the confluence of the San Joaquin River and Bear Creek, with the San Joaquin River on the west side and Bear Creek on the north (Figure 4). It is adjacent to the Refuge's West Bear Creek and San Luis Units in Merced County. The community of Stevinson is approximately four miles northwest of East Bear Creek Unit.

Approximately half of the 4,000 acres are overflow channels and riparian oxbows associated with the San Joaquin River. Many of the channels and oxbows are in a degraded condition because they have been cut-off from the San Joaquin River by a flood control levee. Approximately 2,000 acres is leveled irrigated pasture that is in the process of being restored to near-natural conditions, including restoration of former flood channels and the revegetation with native flora of flood channels, oxbows, and associated grassland uplands.

West Bear Creek Unit
The 3,892-acre West Bear Creek Unit was purchased in 1993 in fee title as a cattle ranch from Joseph Gallo Farms. The unit is located between the San Joaquin River and Salt Slough and State Highway 165 in western Merced County (Figure 5). It is bordered on the south by the San Luis Unit. The community of Stevinson is approximately three miles north.

Figure 3: Kesterson Unit

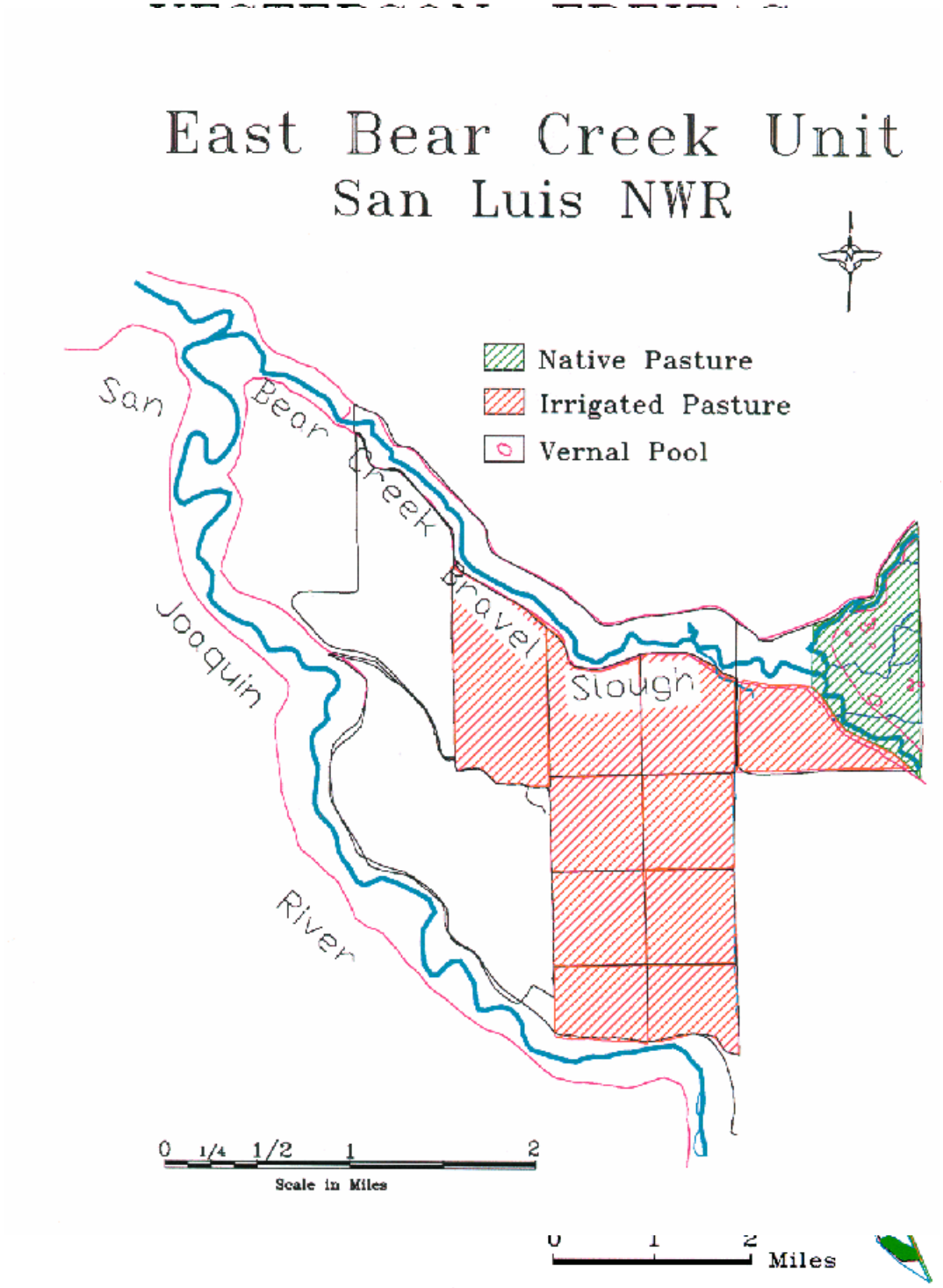
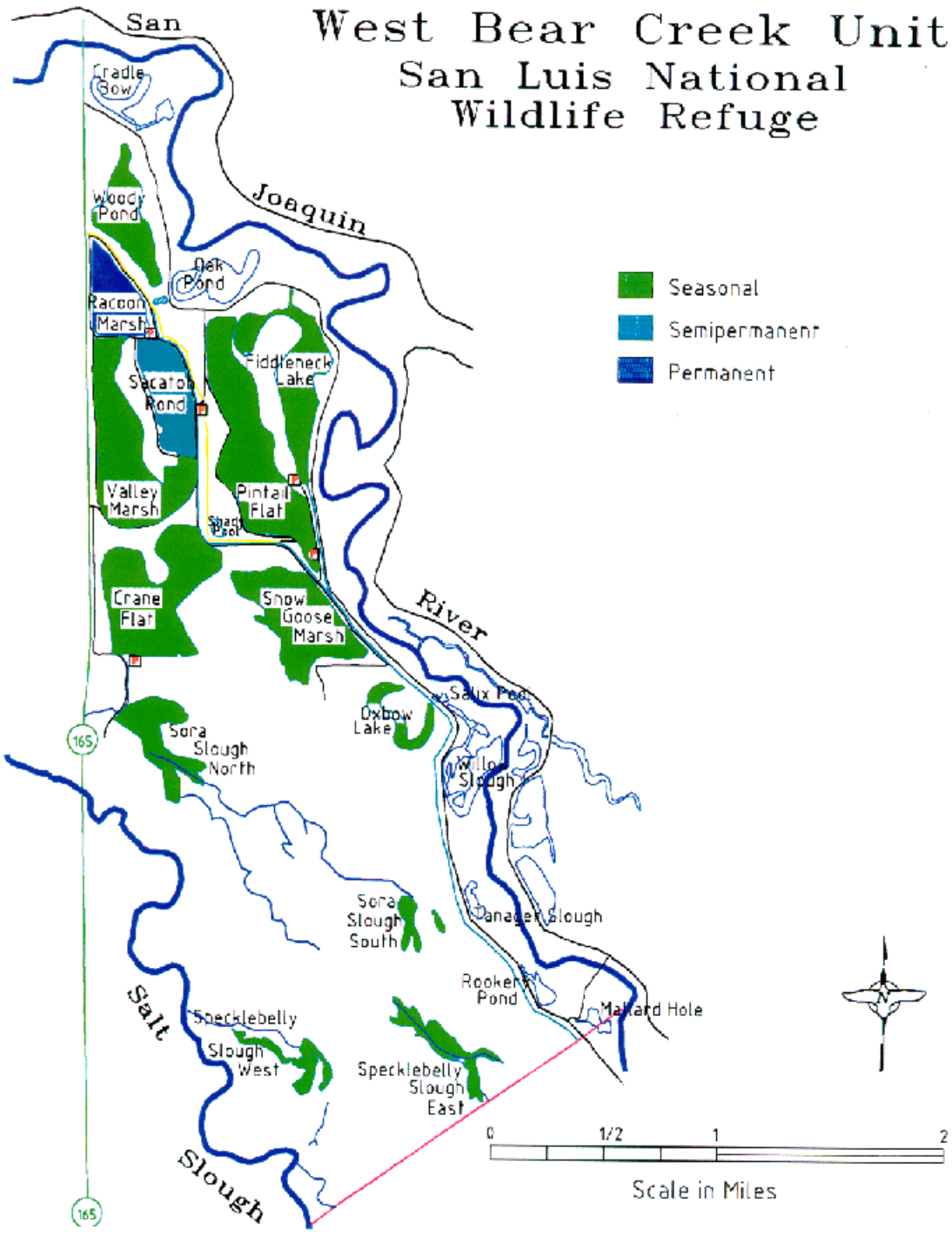


Figure 4: East Bear Creek Unit

Figure 5: West Bear Creek Unit



The Unit is surrounded by other Refuge units, a State Park, farms and a well traveled State Highway. Much of the unit has been recently restored into seasonal and riparian wetlands from its former agricultural condition when purchased. A 1.5 mile visitor tour route allows visitors to observe waterfowl and waterbirds on the Unit's west side near Highway 165. The southern portion of the Unit has 1,605 acres of natural grassland with numerous vernal pools scattered throughout. Some meandering overflow channels course through the Unit in a north-westerly direction, but are cut off from the San Joaquin River to the east by a flood control levee.

MERCED NATIONAL WILDLIFE REFUGE

Merced NWR was established in 1951 under authority of the Lea Act which authorized the Secretary of the Interior to purchase, rent, or lease land in suitable locations in California for the management and control of migratory waterfowl to alleviate crop depredation problems. The Refuge is located in the San Joaquin Valley of Central California, and is situated about 10 miles southwest of the City of Merced. The Refuge comprises 8,234 acres, including the 2,464 acre Arena Plains Unit and is wholly located in Merced County (Figure 6). The Merced NWR includes the Arena Plains Unit.

The region is generally rural in nature with a low population density. Use of lands surrounding the Refuge include farming (mostly alfalfa and cotton) and private waterfowl hunting clubs (seasonal wetlands). The area in a major wintering area for migratory waterfowl of the Pacific Flyway.

Approximately 29 percent of the Refuge's acreage consists of wetlands such as seasonally flooded marsh, permanent and summer ponds, and riparian habitat. The remainder consists of upland habitats. These are described in further detail in the Vegetation Section. Fuel and vegetation types characteristic of the Refuge are:

- Fuel Model 1: approximately 4,961 acres of uplands.
- Fuel Model 1(agricultural land): approximately 1,016 acres.
- Fuel Model 3: approximately 2,257 acres of wetlands.
- Fuel Model 9: approximately 100 acres of riparian woodland.

At present, Merced NWR does not have an approved Comprehensive Conservation Plan (planned for 2002). The primary objectives of the Refuge are to:

- Provide feeding and resting habitat for migrating and wintering waterfowl and other waterbirds.
- Provide habitat and manage for endangered, threatened, or species of special concern.
- Preserve the natural diversity of the flora and fauna representative of the San Joaquin Valley and the natural processes which maintain the diversity.
- Provide high quality wildlife dependent recreation and environmental education programs.
- Alleviate crop depredation.

Arena Plains Unit

The 2,464 acre Arena Plains Unit is a discontiguous parcel of Merced NWR (Figure 7). It was established in 1992 under the Migratory Bird Treaty Act, the Endangered Species Act and the North American Wetland Conservation Act. It contains the San Joaquin Valley's largest area of sand dunes, perched wetlands, and vernal pool habitat. The Unit is held in a near-custodial status with a minimum amount of management. Cattle grazing is employed to keep the vegetation short for a variety of trust species at the Refuge.

Figure 6: Merced NWR

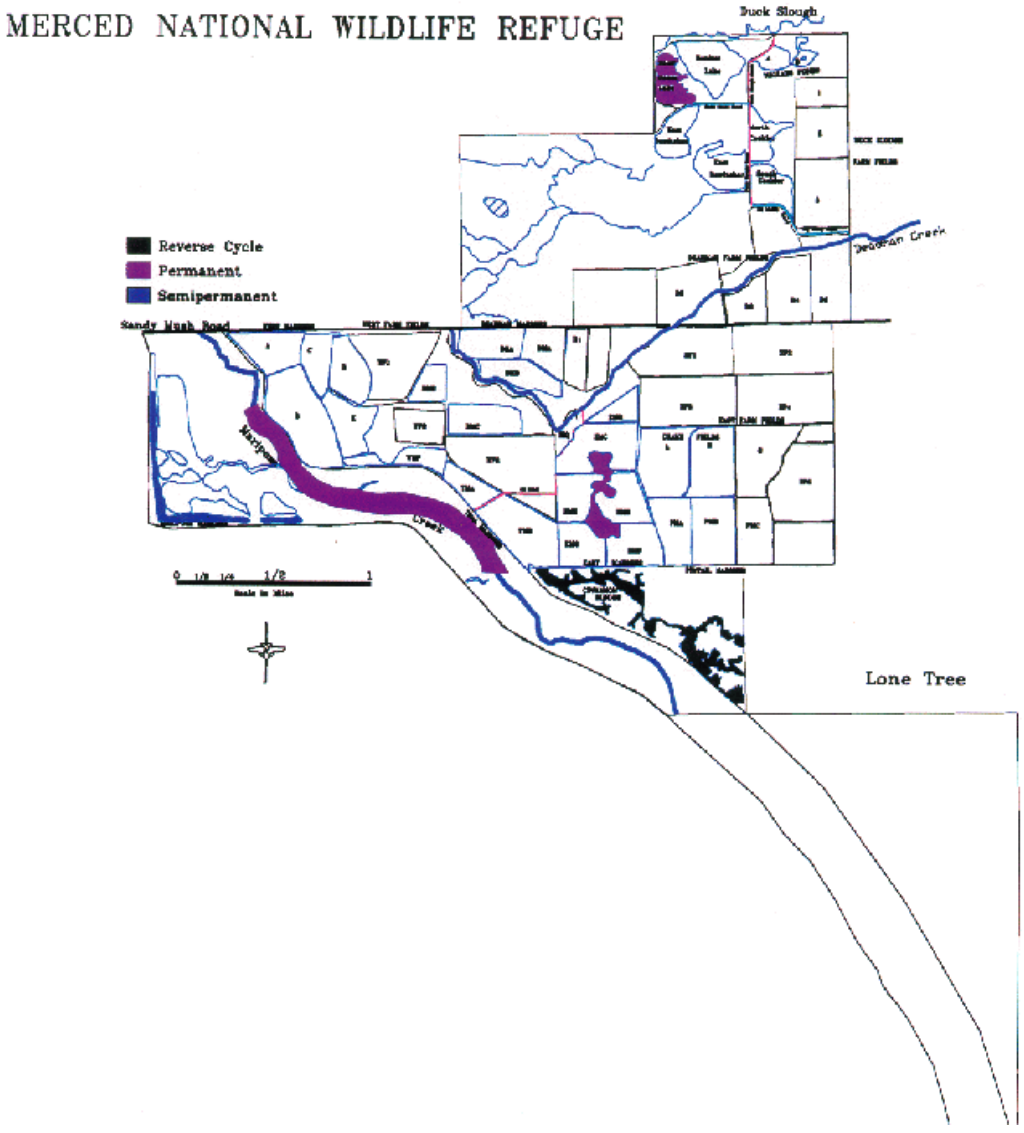
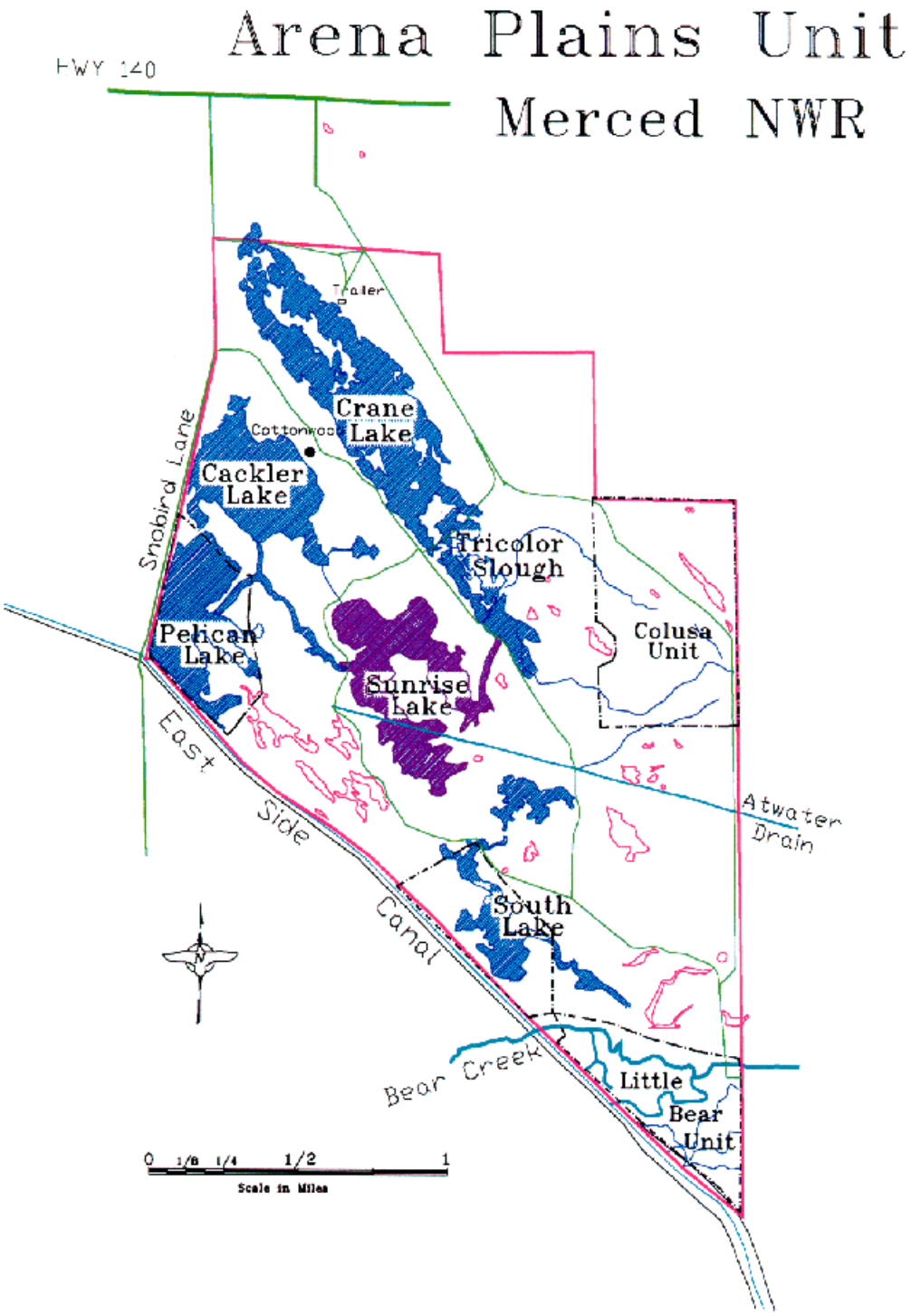


Figure 7: Arena Plains Unit

SAN JOAQUIN RIVER NATIONAL WILDLIFE REFUGE



San Joaquin River NWR was established in 1987 under authority of the Endangered Species Act of 1973 using Migratory Bird Conservation Act funds. The Refuge is located in the northern portion of the San

Joaquin Valley, approximately 10 miles west of Modesto (Figure 8). The Refuge comprises 6,000 acres with additional acquisitions expected during the next decade.

The region is generally rural with a low population density. Land use adjacent to the Refuge is primarily agricultural. The area is a major wintering area for migratory waterfowl and other waterbirds of the Pacific Flyway.

Approximately 62 percent of the Refuge's acreage consists of green pasture or other agricultural lands. The remainder consists of wetlands and riparian woodland. Fuel and vegetation types characteristic of the Refuge are:

- Fuel Model 1(agricultural land): approximately 3,720 acres.
- Fuel Model 3: approximately 600 acres of wetlands.
- Fuel Model 9: approximately 1,680 acres of riparian woodland.

The Refuge is nearing completion of a Comprehensive Conservation Plan (final expected 2002). The primary objectives of the Refuge are to:

- Provide feeding and resting habitat for migrating and wintering waterfowl and other waterbirds.
- Provide habitat and manage for endangered, threatened, or species of special concern.
- Preserve the natural diversity of the flora and fauna representative of the San Joaquin Valley and the natural processes which maintain the diversity.
- Provide high quality wildlife dependent recreation and environmental education programs.
- Alleviate crop depredation.

A 3,166 acre portion of this unit is subject to the terms and provisions of the Natural Resources Conservation Service's (NRCS) Wetland Reserve Program easements. These easement areas are west of the San Joaquin River, north of the Arambel Tract and south of Highway 132.

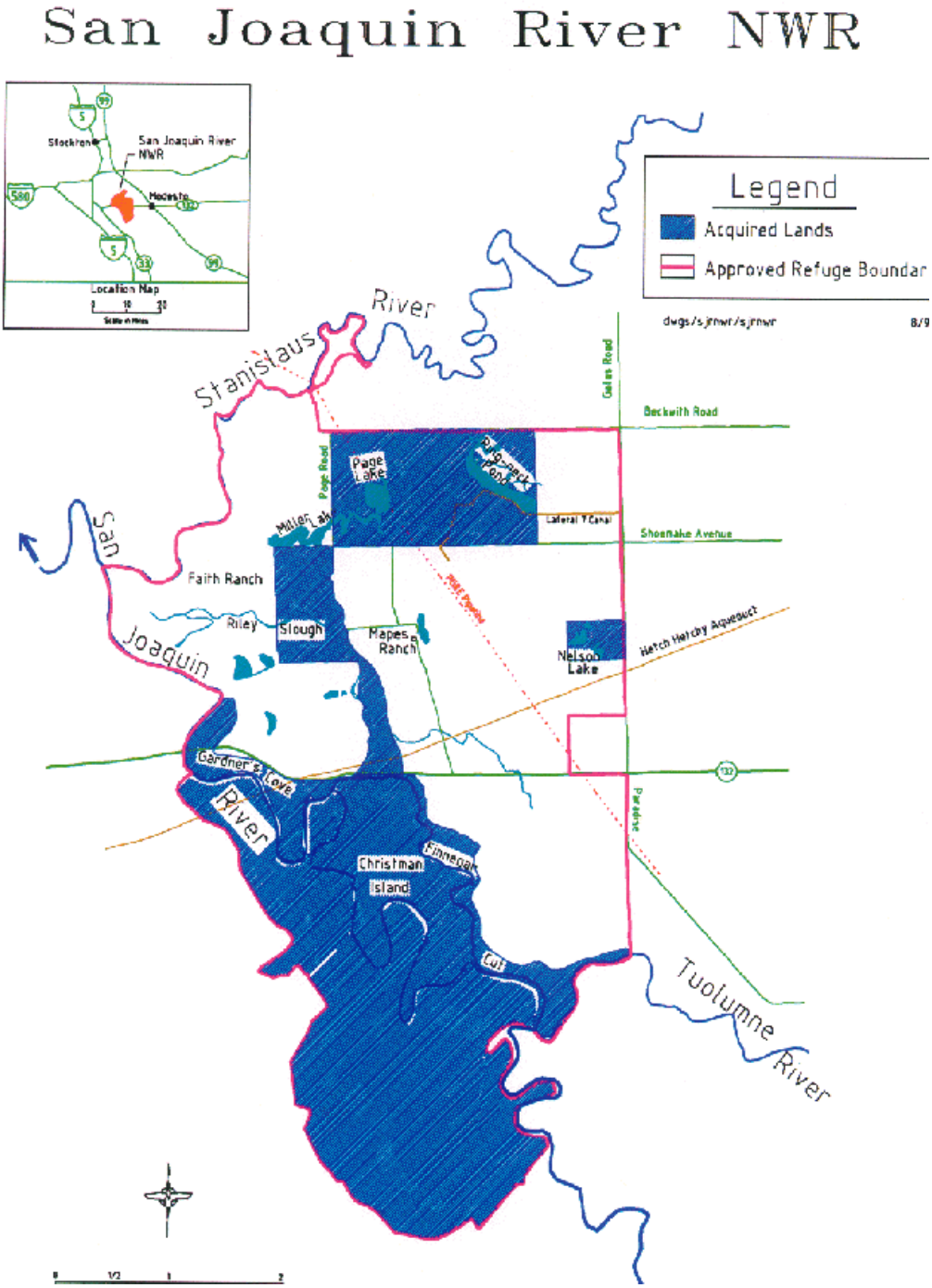
CULTURAL RESOURCES

Native Americans were first present in California approximately 12,000 years ago. The Yokut Indians occupied the San Joaquin Valley immediately prior to European settlement. Evidence exists of their presence in this region dating back at least 1,900 years.

Archeological sites in the general region are found along high ground adjacent to the San Joaquin River, it's sloughs, meander channels, and ponds. Sites are almost always found above 65 feet elevation. Archeological sites often have fractured stones, house pits, and buried middens of shellfish and other animal remains.

The San Luis Unit has 21 identified archeological sites at locations as described above. The Kesterson Unit has twelve recorded sites. The Merced NWR headquarters area contains at least ten human remains and is a known burial site for Native Americans.

Figure 8: San Joaquin River NWR



FISH AND WILDLIFE

The habitat provided by San Luis NWRC is critical to the welfare of a diverse array of bird, mammal, fish, herptofauna, and invertebrate species. Over 90 percent of the wetlands and 95 percent of the riparian habitat in the Central Valley of California has been lost. Nonetheless, over 60 percent of the waterfowl of the Pacific Flyway either winter in or migrate through the Central Valley. A large percentage of those birds use the Refuge Complex and surrounding state and private lands each winter. In addition, the Complex's importance to shorebirds and neotropical migratory landbirds has been recognized and resulted in the Complex and adjacent lands being designated as an International Shorebird Reserve by the Western Hemispheric Shorebird Reserve Network, a Flagship Project of the California Riparian Habitat Joint Venture, and an Important Bird Area by the National Audubon Society. A total of 222 bird, 33 mammalian, 35 fish, and 19 herptofauna species have been recorded on the Complex. A total of 47 species occur on the Complex which are designated as federal and/or state endangered, threatened, or species of special concern. Appendix I lists the wildlife species that have been documented at San Luis NWRC. An overview of wildlife use of the Complex follows.

Migratory Birds

Waterfowl

Waterfowl winter on the Complex between August and March. Peak waterfowl concentrations occur during November and December, when approximately 1 million ducks are present. Greatest goose use occurs in January-February with up to 100,000 -120,000 in the area.

Common wintering duck species at the Complex include northern pintail, mallard, American wigeon, green-winged teal, gadwall, northern shoveler, wood duck, ring-necked duck, canvasback, redhead and ruddy duck. Wintering goose species include lesser snow goose, Ross' goose, white-fronted goose, and Canada goose (mostly cackling and Aleutian subspecies). Lower, but still abundant, numbers of ducks are present during the spring and summer as breeding birds. These species include mallard, cinnamon teal, gadwall, wood duck and redheads. Most use by ducks occurs in managed wetlands, riparian corridors, vernal pools and seasonally inundated floodplains. Most habitat use by geese occurs in the managed wetlands, seasonally inundated floodplains, short-cropped uplands and agricultural fields.

Shorebirds

Greatest use of the Complex by shorebirds occurs during their autumn and spring migrations, with shorebird populations in the area peaking at 400,000 to 600,000 each April. Common species at the Complex include western and least sandpipers, dunlin, dowitcher, black-necked stilt, American avocet, black-bellied plovers, greater yellowlegs, long-billed curlew and killdeer. Most use occurs in seasonal marshes as they are being drawn down to mudflats, or are being irrigated for moist soil management. American avocet, black-necked stilt and killdeer are present through the spring and summer as breeding birds. Long-billed curlews are present in the short-cropped uplands during the spring and summer but are not known to breed in the area.

Cranes and Wading/Diving Birds

Sandhill cranes are present on the Complex as migrant and wintering birds from September to April. The Complex, primarily Merced NWR, serves as the home for the largest wintering population of lesser sandhill cranes in the Pacific Flyway. Numbers of cranes present on the Complex can peak at 15,000. Greater sandhill cranes are also present, especially at San Joaquin River NWR. These cranes use seasonal wetlands as roost sites and forage in short-cropped uplands and agricultural fields.

Many species of wading and diving birds are present at the Complex year-round. Some species, such as great blue heron, great egret, green heron, and double crested cormorant, have established permanent rookery sites throughout the Complex where they use riparian corridor trees for nesting and roosting and

forage in adjacent wetlands. Other species, such as American bittern, white-faced ibis, snowy egret, Virginia rail, sora, moorhen, American coot, pied-billed grebe, Western grebe, Clark's grebe and eared grebe are more dependent on wetland habitats for both breeding and foraging. These birds nest in emergent cattail/tule stands or floating cattail/tule mats in permanent or semi-permanent wetlands and use all types of wetlands for foraging. Black-crowned night herons use both riparian corridor trees and emergent cattail/tule stands for nesting and roosting. American white pelicans are present as non-breeders throughout most of the year, and non-breeding cattle egrets use the Complex at various times during the year.

Raptors

Different species of hawks, eagles and owls are present either as residents or on a seasonal basis. Red-tailed hawks, white-tailed kites, American kestrels, great horned owls, barn owls and western screech owls are common tree nesting species which are present most of the year. Swainson's hawks nest in trees throughout the Complex, gather in large groups in late summer, then migrate southward in early autumn. Northern harriers are a common species which nests in tall-grass uplands and forage throughout the wetlands and uplands. Burrowing owls and short-eared owls are uncommon, though present throughout the Complex, and nest in burrows and tall grass uplands respectively, and forage in grass dominated uplands. Other raptors such as bald eagle, golden eagle, red-shouldered hawk, rough-legged hawk, ferruginous hawk, Cooper's hawk, sharp shinned hawk, peregrine falcon and turkey vulture, occur regularly, but especially during autumn through spring when prey species such as waterfowl and shorebirds are most common.

Gulls/Terns

Ring-billed gulls and California gulls are present in low numbers as nonbreeders throughout much of the year. Bonaparte's gulls and Forster's terns often occur in large numbers during autumn and spring migration. Caspian terns occur infrequently in small numbers during spring and autumn migration periods. Black terns are rare to uncommon but have been documented as nesting on the Complex.

Landbirds

The Complex is used as nesting, migration, and/or wintering habitat for a wide array of neotropical migratory landbird species. Greatest species diversity occurs in riparian habitats, although some species are more closely associated with upland or wetland habitats. Common year-round residents associated with riparian and upland habitats include belted kingfisher, song sparrow, Bewick's wren, ash-throated flycatcher, bushtit, California towhee, downy woodpecker, Nuttall's woodpecker, northern flicker, California thrasher, scrub jay, yellow-billed magpie, mockingbird, loggerhead shrike, savannah sparrow, blue grosbeak, horned lark, western kingbird, black phoebe, western meadowlark, brown-headed cowbird and European starling. Common species more associated with wetland habitats include marsh wren, common yellowthroat, red-winged blackbird and yellow-headed blackbird. Tricolored blackbirds nest in large colonies in both wetland and upland sites, roost year-round in emergent cattail/tule stands, and forage in upland and agricultural habitats. Swallows (tree, rough-winged, cliff, and barn) are present in upland and riparian areas during the nesting season. Wintering species include ruby-crowned kinglet, American pipit, yellow-rumped warbler, golden-crowned sparrow, white-crowned sparrow, dark-eyed junco, and lesser and American goldfinches. Other commonly seen autumn and spring migrants include orange-crowned warblers, yellow warblers, Wilson's warblers, black-chinned hummingbirds, olive-sided flycatchers, black-headed grosbeaks, chipping sparrows and western tanagers.

Morning doves are present year round as both local nesting birds and as migrants from more northerly breeding populations. They primarily nest and roost in trees associated with riparian and upland areas, and forage in upland and agricultural habitats.

Resident Gamebirds
California quail use riparian areas and adjacent uplands, while ring-necked pheasants are more commonly associated with uplands and the margins of seasonal wetlands. Both species are local breeders.

Mammals
Many mammalian species are present as year-round residents on the Complex. Beaver, muskrat, mink, and river otter occur in wetlands and riparian corridors. Upland species include coyote black-tailed jackrabbit, desert cottontail, San Joaquin kit fox, raccoon, striped skunk, long-tailed weasel, California ground squirrel, Heerman's kangaroo rat, deer mouse, meadow and California voles, and Mexican free-tailed bat. Bobcat and black-tailed deer have been recorded but are rare.

Herptofauna
Snakes are common residents in upland and riparian areas, and include the common garter snake, western terrestrial garter snake, gopher snake, western yellowbelly racer and common kingsnake. Giant garter snakes have been documented in the local area and are assumed to be present in Complex canals and wetlands. Western pond turtles are present in canals and permanent wetlands. Other reptiles such as western fence lizard, alligator lizard, California legless lizard, Gilbert's skink, and California horned lizard are found in some upland habitats. A few species, such as giant garter snake and western pond turtle, are dependent on wetlands. California tiger salamanders are present in ground squirrel burrows as adults, and in vernal pools as eggs and larvae. Other amphibians include American bullfrog, western spadefoot and Pacific tree frog.

Fish
Fish resources are present at the Complex's waterways, permanent ponds and seasonal wetlands and are dominated by non-native warm-water species. Such species include gambusia (mosquitofish), common carp, goldfish, channel and white catfish, brown and black bullhead, largemeouth bass, striped bass, black and white crappie, bluegill and green sunfish. Native minnows and associates include Sacramento blackfish, Sacramento pikeminnow, red shiner, fathead minnow, inland silverside, tule perch and sculpin. Sacramento splittail can be present in flood years and may spawn in backwater sloughs. Chinook salmon, steelhead, and white sturgeon are present in the riverine corridors at San Joaquin River NWR.

Invertebrates
Invertebrate populations are greatest and most diverse in seasonal wetlands, and provide an important food base for many waterfowl, shorebird and other avian species. Common aquatic inverbrates include waterfleas, snails, clams, dragonflies, damselflies, waterboatmen, backswimmers, beetles, midges, crayfish and worms.

Vernal pools are inhabited by a unique group of invertebrate species, including some that have state and federal designated status as endangered, threatened and/or species of special concern. Invertebrate populations found in individual vernal pools are highly variable but can include several species of fairy shrimp, vernal tadpole shrimp, brine shrimp, clam shrimp and waterfleas.

THREATENED AND ENDANGERED SPECIES
San Luis NWRC contains a number of Federally listed threatened, endangered and candidate species including both plant and animal species (Appendix I) . The fire management program will be implemented in accordance with the Endangered Species Act of 1973 and will take appropriate action to identify and protect from adverse effects any rare, threatened or endangered species. The Service's Sacramento Field Office evaluated operations and maintenance activities of Central Valley NWRs,

including the use of prescribed burning for habitat management, in association with water supplies provided by the Central Valley Project Improvement Act. The resulting biological opinion stated that these fire management activities would not jeopardize continuing existence of any federally endangered or threatened species on the San Luis NWRC for the Complex. The Complex will act under this guidance until a Comprehensive Conservation Plan is prepared (scheduled to be initiated in 2002). Service policy requires that State threatened and endangered species and Federal candidate species also be incorporated into all planning activities.

VEGETATION

Much of the San Joaquin Valley has been invaded by non-native plant species that the original extent, composition and patterns of native vegetation may never be known with certainty. Most native vegetation was eliminated before significant botanical collections could be made, primarily by the overgrazing of livestock. The popular concept that perennial bunchgrasses were historically abundant in communities now composed largely of exotic annuals and that all native uplands were dominated by perennial species has been recently refuted. The current viewpoint is that perennial grasses may have been ***one*** of the important components in a complex mosaic of diverse plant communities which comprised pre-European Californian grassland vegetation. There are strong indications that xerophytic shrub species and a number of annual plant species may have been equally important components historically in a landscape where the particular species composition would depend most on climate, soils and other edaphic site conditions. Early journal accounts by explorers and settlers indicate fluctuating wetlands interspersed with dry alluvial fans in the San Joaquin Valley, where vegetation was represented by an abundance of flowering native forbs in the spring and a lack of vegetative cover during the dry summer/ autumn months. Observations from the 1800's documented a sparse, open vegetative condition as characteristic for most of the San Joaquin Valley.

The current vegetation types which are present on the Complex can be categorized as:

- Valley Grassland communities - strongly dominated by introduced annual grasses and often heavily infested with invasive weeds;
- Alkali Grassland communities - dominated by saltgrass and alkali sacaton with some associated creeping wildrye and iodine bush; and
- Alkali Sink communities - dominated by frankenia, seep-weed, iodine bush and saltbush.

Numerous vernal pools are located within the uplands of both the San Luis and Merced NWRs. These vernal pools are essentially islands of rare native plants and spectacular, spring-blooming wildflower species within large grasslands primarily dominated by introduced annuals. Some of the most unique flora found in California is associated with these vernal pools. Of 44 plant species found to be endemic to the Central Valley, 26 of these species are found in or associated with vernal pools. One of the most remarkable aspects of vernal pool vegetation is its variability over its range of occurrence. Plant community structure and species occurrence of vernal pools vary in relation to site specific climate and soil characteristics. Topographic characteristics also explain the concentric zonation of plant species surrounding vernal pools. The integrity of the landscape's hydrology is critical to maintaining these islands of native flora.

The only aeolian sand dunes left today on the Merced River Fan are located on the Arena Plains Unit of the Merced NWR. Rare sand dune plant communities are dominant on the sandy soils at this Unit. Most notable of the sand dune species are:

summer & big pod lupine	*Lupinus formosus* & *pachylobus*
basket desert evening primrose	*Oenothera deltoides*

wild rhubarb	*Rumex hymenosepalus*
Kellogg's & Heermann's tarplant	*Hemizonia kelloggii & Holocarpha heermannii*
Parry's mallow	*Ermalche parryi*
Mojave sand verbena	*Abronia spp.*
California & Mojave sun cup	*Camissonia bisorta & campestris*
white Chinese-houses	*Collinsia bartsiifolia*

These sand dune communities warrant special consideration to ensure their persistence and to maintain their very selective habitat conditions. Prescribed fire, in combination with grazing, may be one of the few effective practices available to reverse the continuing loss of sand dune habitats due to the thick cover of thatch produced by annual grasses.

PHYSICAL RESOURCES

Refuges comprising the Complex are located in the San Joaquin Valley in Merced, Stanislaus and San Joaquin Counties. Topography of the San Joaquin Valley is generally flat with a gradual slope from the southeast to northwest. Elevations at the Complex range from 100' to 25' above sea level.

Physical conditions, especially geology in the watersheds are different on lands east or west of the San Joaquin River. Refuge lands on both sides of the river consist primarily of recent alluvial flood plains and basin lands. Soil types are often mixed alluvium mapped as soil associations. Published soil surveys for east and western Stanislaus County use the San Joaquin River as a major boundary delineation.

The Complex lies in the northern and central portion of the San Joaquin Valley along many natural and human-made waterways. All the Refuges comprising the Complex are divided into separate management units, most of which can be managed through a series of canals, levees and water control structures. Water management objectives are determined annually by the Complex Manager, Water Management Staff, and Biologists.

San Luis NWR currently relies on a firm water supply which is made available by the Bureau of Reclamation from the Central Valley Project. Merced NWR receives its water supply through a Federal Energy Regulatory Commission agreement; the water is delivered by the Merced Irrigation District.

CLIMATE

The climate throughout the Complex is classified as Mediterranean, with cool, wet winters and hot, dry summers. Rainfall is fairly well distributed throughout the winter, occurring in steady but gentle storms of two or three day duration. The average precipitation is 9.5 inches per annum. The mean annual temperature is 62.1EF with extremes of 114E F and 14E F. South winds are associated with storms in the winter. West winds bring cooling trends in the summer. North winds are usually dry following winter storms, and hot and dry in the summer, creating the most hazardous wildland fire conditions during the summer.

STRUCTURES AND FACILITIES

All three Refuges have structures within the boundaries. These structures range from office buildings to shops to government quarters to historic structures. A complete list of structures on the Complex is included in Appendix J.

The Refuges are bordered by private agricultural lands of mostly irrigated cropland and private waterfowl-hunting clubs. Protection of structures, both public and private, as well as public safety is a

Complex priority. A main strategy of the fire management program is to prevent the spread of wildland fire to/or from adjacent private lands.

WILDLAND FIRE MANAGEMENT SITUATION

HISTORIC ROLE OF FIRE

Fire season is generally from June through early November (as declared by California Department of Forestry). Occasional fires have occurred from December through May. Wildland fires at the Complex have ranged from less than 1 acre to 1,055 acres, and prescribed fire units typically range between 30 to 700 acres. Most fires on the Complex have lasted no longer than one burning period with containment usually being completed within a few hours of ignition. Lightning fires were a periodic natural occurrence in the San Joaquin Valley grasslands but are considered to be sporadic enough in frequency that no obvious fire-dependent plant community relationships have evolved.

Pre-settlement Fire History

Burning by humans (either settlement burning or fires set by Native Americans) came late in the evolution of grassland species and probably exerted minor influences on the grasslands of the San Joaquin Valley. A long history of grazing by native fauna has probably had the greatest influence on the evolution of San Joaquin Valley grassland species. Vast herds of pronghorn antelope, mule deer and tule elk existed in the Valley. At the same time, large populations of jackrabbits, ground squirrels, kangeroo rats, and pocket gophers were also present. These wildlife species represented the major disturbance agent for grassland communities. Today, the loss of the native ungulates and the sharp decline in the populations of jackrabbits, ground squirrels, kangeroo rats and pocket gophers makes the use of other vegetation management tools such as fire essential.

Post-settlement Fire History

The recent fire history from 1980 is compiled from entries into the Shared Applications Computer System (SACS). Most wildland fires that occur each year are along roadways adjacent to Refuge boundaries. Damage from these fires may have potential negative effects on resident or nesting wildlife, threatened and endangered species, and habitat depending on the time of year. Generally, damage is temporary and after one or two years, areas return to their original condition. San Luis NWRC wildland fire history is listed in Appendix K. There is little recorded history of wildland fire activity at San Joaquin River NWR. There was a 75-acre wildland fire at Christman Island (San Joaquin River NWR) in 1993 which required rehabilitation funding.

Prescribed Fire History

Prescribed fire has been used since 1980 as part of the habitat management program throughout the Complex. Fire is employed due to its ability to produce desired habitat conditions to meet the specific needs of wildlife or reduce non-native plant species. Prescribed fire recent history is listed in Appendix K.

RESPONSIBILITIES

Principal members of the San Luis NWRC fire management organization are the Refuge Managers, Refuge Fire Management Officer, Prescribed Fire Specialist, Supervisory Firefighter, Lead Firefighter, Firefighters, Seasonal and Collateral Duty Firefighters and Fire Program Clerk. Fire assignments are made on the basis of individual qualifications and position requirements. A listing of fire management team members by name, position and qualifications can be found in Appendix G.

Complex Manager (Project Leader)

- Responsible for the overall management, coordination, and implementation of the Complex including the fire program.
- Ensure that Department, Service, and Complex policies are maintained and followed.

- Ensure sufficient collateral duty firefighters meeting Service standards are available for initial attack.
- Supervise the resource management activities of the Complex, working with Refuge Biologists in setting goals and objectives and selecting methods/actions to achieve them including prescribed fire.
- Review and approve prescribed burn plans for San Luis NWRC.
- Ensures Prescribed Burn Plans for easement-lands for San Joaquin River NWR are submitted to Natural Resources Conservation Service (NRCS).
- Ensures effective cooperative relations between Complex, cooperating fire organizations, and adjoining landowners.

Assistant Refuge Managers

- Identifies prescribed burn units and resource management objectives to Fire Management Officer (FMO) and Prescribed Fire Specialist (PFS), notifies FMO/PFS of prescribed fire project and fire suppression constraints, and ensures that Complex collateral fire duty personnel and equipment resources are available to accomplish prescribed fire and fire suppression objectives.
- Acts as Resource Advisor during fire suppression operations.
- May represent Complex Manager in their absence.
- Participates in all fire management activities, as qualified.

Fire Management Officer

- Responsible for coordination and supervision of the fire management program at the Complex.
- Prepares and manages the Complex's fire budget.
- Supervises the Complex's fire staff.
- Responsible for planning, coordinating, and directing all Preparedness activities including:
    - Fire training
    - Physical fitness testing and Interagency Fire Qualification System and data entry.
    - Fire cache and equipment inventory accountability, maintenance and operation.
    - Coordinates with cooperative agencies. Revises agreements as necessary.
    - Insures the step-up preparedness plan is followed.
    - Prepares annual Fire Base budget request, tracks use of funding.
    - Informs Refuge staff of fire situation and potential.
- Responsible for coordinating and directing all suppression activities including:
    - Dispatching
    - Fire command
    - Ensures fire management and safety policies are observed
    - Advises Complex Managers of the status of fire suppression and operations
- Maintains liaison with Regional Fire Management Coordinator and Cooperators.
- Prepares a Complex fire prevention plan, and coordinates fire prevention duties with other employees.
- Coordinates Complex fire training needs.
- Annually updates the Fire Management Operations Plan, maintains fire records, and reviews completed DI-1202's for accuracy.
- Administers the suppression evaluation process on wildland fires.
- Performs public outreach, as needed, regarding the Complex's fire management program.

Prescribed Fire Specialist

- Responsible for managing prescribed fire activities including:
    - Coordinates annual prescribed fire program to meet management objectives.
    - Prepares or approves individual prescribed fire plans.
    - Serves as or designates Prescribed Fire Burn Boss.
    - Provides daily validation that prescribed fires are under prescription and meet all other Service policy requirements.
- Assists Complex Biologists with fire research and fire effects monitoring.
- Fire weather station operation, data entry and maintenance/analysis of fire weather data.
- National Fire Danger Rating System (NFDRS) use.
- Coordinates involvement with San Joaquin Valley Air Pollution Control District and Interagency Air and Smoke Council.
- Responsible for all aspects of smoke management.
- Performs public outreach, as needed, regarding the Complex's fire management program.

Fire Program Clerk

- Assists Fire Management Officer and Prescribed Fire Specialist with administrative functions including:
    - Administering the payroll.
    - Purchasing, which includes micro-purchasing, and Federal Finance System (FFS) purchase procedures.
    - Arranging training and travel for the fire staff.
    - Tracking the Complex's fire budget.
    - Entering data for physical fitness testing and Interagency Fire Qualification System.
    - Assisting with annual Fire Base budget requests.
    - Maintaining fire records and updating plans.
    - Maintaining individual fire training schedules.
    - Serving as primary administrative contact for local cooperators.

Supervisory Firefighter (Fire Operations)

- Supervises the Complex Engine Crews.
- Assists the Fire Management Officer with planning, coordinating and directing all preparedness activities.
- Assist with coordinating and directing all suppression activities.
- Ensures fire training is conducted, completed and recorded.

Lead Firefighter (Fire Operations)

- Leads Engine Crew on and off Complex assignments.
    - Assists the Supervisory Firefighter with planning, coordinating and directing all preparedness activities.
    - Assist with coordinating and directing suppression activities.
    - Responsible for prescribed fire activities including:
        - Ignition or holding leaders.
        - Monitors fire effects and other parameters as required.

Seasonal Firefighters (Fire Operations and Prescribed Fire Crew)

- Maintain assigned fire equipment in ready state and use all safety gear assigned.
    - Participate on fire assignments as firefighters (ignition, holding, and engine operation).
    - Assists with burn unit preparation.

Collateral Duty Firefighters

- Maintain assigned fire equipment in ready state and use all safety gear assigned.
    - Participate on fire assignments as firefighters (ignition, holding, and engine operation).
    - Assists with burn unit preparation.

Incident Commander

Incident Commanders (of any level) use strategies and tactics as directed by the Complex Manager and WFSA where applicable to implement selected objectives on a particular incident. A specific Limited Delegation of Authority (Appendix C) will be provided to each Incident Commander prior to assuming responsibility for an incident. Major duties of the Incident Commander are given in NWCG Fireline Handbook, including:

- Brief subordinates, direct their actions and provide work tools.
- Ensure that safety standards identified in the Fire Orders, the Watch Out Situations, and agency policies are followed at all times.
- Personally scout and communicate with others to be knowledgeable of fire conditions, fire weather, tactical progress, safety concerns and hazards, condition of personnel, and needs for additional resources.
- Order resources to implement the management objectives for the fire.
- Inform appropriate dispatch of current situation and expected needs.
- Coordinate mobilization and demobilization with dispatch and the Collateral FMO.
- Perform administrative duties; i.e., approving work hours, completing fire reports for command period, maintaining property accountability, providing or obtaining medical treatment, and evaluating performance of subordinates.
- Assure aviation safety is maintained to the highest standards.

INTERAGENCY OPERATIONS

Interagency contacts are established at the Federal, State, and local levels to provide the most efficient level of fire management operations. Agreements and Memorandum of Understandings (MOUs) should be established to foster guidelines for assistance from local cooperators. The MOU allows the responding agency to assume command of the incident until a representative of the Complex arrives to establish a unified command or assume responsibility for the incident if qualified. Depending on the time of year, Complex, state or local resources may perform initial attack for the Refuges. A number of agreements

have been formalized to provide greater fire management protection and flexibility for the Complex. These agreements include:

- An Interagency Agreement for Cooperative Fire Protection and Prescribed Fire exists between the Sierra National Forest and the Complex (Appendix H.1).

- An Interagency Agreement for Cooperative Use of Prescribed Fire in California exists between the USDA Forest Service, National Park Service, Bureau of Land Management, Fish and Wildlife Service and California Department of Forestry and Fire Protection (Appendix H.2)

- The Complex Dispatch Plan (Appendix F) contains the guidelines for a reported fire and the proper dispatching to effect a quick and orderly initial attack by the closest resources.

With the exception of San Joaquin River NWR, all Refuges are closest to the resources of the Merced County Fire Department. The California Department of Forestry and Fire Protection (CDF) is under contract to Merced County to provide staffing for its fire protection services. A draft Cooperative Fire Protection Agreement between the same and Merced County Fire Department (Appendix H.6) provides the framework for both agencies working together during wildland fire operations. West Stanislaus County Fire Protection District provides the closest resources to San Joaquin River NWR. A draft MOU between the San Joaquin River NWR and West Stanislaus County Fire Protection District provides guidance for agencies cooperating on wildland fire issues (Appendix H.5).

A typical "first alarm assignment" for a vegetation fire occurring on or threatening San Luis and Merced NWRs will always include two Type 2 wildland/urban interface engines and a Chief Officer qualified at the Type 3 Incident Commander level from Merced County Fire Department. Additional resources are available upon request from the IC which could include resources from the California Department of Forestry (including aircraft).

West Stanislaus County Fire Protection District provides the closest resources to San Joaquin River NWR. A typical "first alarm assignment" for a vegetation fire occurring on or threatening Refuge lands will include one Type 3X wildland engine, a water tender and a Chief Officer qualified at the Type 4 Incident Commander level. Additional resources are available upon request.

Personnel with both the Merced County Fire Department and West Stanislaus County Fire Protection District must meet wildland fire training requirements and criteria set by the California Office of the State Fire Marshal. These training standards either meet and/or exceed those of the National Wildfire Coordinating Group (NWCG).

An MOU exists which allows San Luis NWR fire personnel to use their radio frequencies during cooperative fire operations. On Complex wildland fires where Service personnel are responding along with Merced County units, ORANGE TAC will be the assigned tactical frequency (Appendix O).

On all Refuges within the Complex, dialing 9-1-1 will provide the caller with direct tie-in to the fire department closest to the Refuge.

PROTECTION OF SENSITIVE RESOURCES

To protect the Complex resources, mechanical line construction (dozers, discing) on soils not previously disturbed shall be avoided. However in situations where life or private property are threatened, the decision to allow mechanical fireline construction will be supported by the Complex Manager. The

Complex Manager or their designate will be consulted and advised of the situation prior to making that decision.

A Resource Advisor will be assigned to an incident anytime a wildland fire occurs on the Complex. In addition the Complex Manager or their designate will also be assigned as the Agency Representative if outside firefighting resources are involved.

The Regional Archaeologist and/or his/her staff will work with fire staff, project leaders, and incident commanders to ensure that cultural resources are protected from fire and fire management activities. The "Request For Cultural Resource Compliance" form (Appendix Q) will be used to inform the Regional Archaeologist of impending activities, thereby meeting the regulations and directions governing the protection of cultural resources as outlined in Departmental Manual Part 519, National Historic Preservation Act (NHPA) of 1966, Code of Federal Regulations (36CFR800), the Archaeological Resources Protection Act of 1979, as amended, and the Archaeological and Historic Preservation Act of 1974. The NHPA Section 106 clearance will be followed for any fire management activity that may affect historic properties (cultural resources eligible to the National Register of Historic Places).

Impacts to archaeological resources by fire resources vary. The four basic sources of damage to archeological resources are (1) fire intensity, (2) duration of heat, (3) heat penetration into soil, and (4) suppression actions. Of the four, the most significant threat is from equipment during line construction for prescribed fires or wildland fire holding actions (Anderson 1983).

The following actions will be taken to protect archaeological and cultural resources:

Wildland Fires

- Minimum impact fire suppression tactics will be used to the fullest extent possible.
- Resource Advisors will inform Fire Suppression personnel of any areas with cultural resources. The Resource advisor should contact the Regional Archaeologist and/or his/her staff for more detailed information.
- Foam use will be minimized in areas known to harbor surface artifacts.
- Mechanized equipment should not be used in areas of known cultural significance.
- The location of any sites discovered as the result of fire management activities will be reported to the Regional Archaeologist.
- Rehabilitation plans will address cultural resources impacts and will be submitted to the Regional Archaeologist using the RCRC.

Prescribed Fires

- The Complex Fire staff will submit a completed RCRC to the Regional Archaeologist and/or his/her staff as soon as the burn area is identified (i.e., as soon as feasible).
- Upon receipt of the RCRC, the Regional Archaeologist and/or his/her staff will be responsible for consulting with the FMO and evaluating the potential for adverse impacts to cultural resources.
- When necessary, the Regional Archaeologist and/or his/her staff will coordinate with the State Historic Preservation Officer (SHPO). The SHPO has 30 days to respond. The Refuge will consider all SHPO recommendations.
- Mechanized equipment should not be used in areas of know cultural significance.
- The location of any sites discovered as the result of fire management activities will be reported to the Regional Archaeologist.

WILDLAND FIRE ACTIVITIES

Fire program management describes the operational procedures necessary to implement fire management activities at the San Luis NWRC. Program management includes: fire prevention, preparedness, emergency preparedness, fire behavior predictions, step-up staffing plan, fire detection, fire suppression, minimum impact suppression, minimum impact rehabilitation and documentation.

All fires not classified as prescribed fires are wildland fires and will be appropriately suppressed in a prompt, safe, aggressive and cost-effective manner to produce fast, efficient action with minimum damage to natural resources and habitat using appropriate management strategies. All fire operations will be coordinated out of the San Luis NWR. A well established mutual-aid program will be employed for a suppression operations on all Refuges.

FIRE MANAGEMENT STRATEGIES

The following strategies will be employed to meet the fire management objectives:

- Suppress all wildland fires in a safe and cost effective manner consistent with resources and values at risk.
- Minimum impact suppression tactics will be used.
- Conduct all fire management programs in a manner consistent with applicable laws, policies and regulations.
- Maintain an Initial Attack organization capable of suppressing wildland fires within the Complex during the fire season. Initial Attack equipment and personnel shall maintain a maximum response time of one hour for the San Luis and Merced NWRs during the fire season, and two hour for the San Joaquin River NWR during the fire season.
- Establish and maintain Memorandum of Understandings with local, state, and federal fire protection agencies to promote cooperative prevention, suppression, and prescribed fire activities. Provide assistance to local and federal cooperators under the “closest forces” concept in accordance with Service policy.
- Prepare and implement an effective fire prevention plan to minimize wildland fires, particularly those that may be started on Refuge by personnel performing their daily work during the fire season.

All maintenance building facilities will be considered critical protection areas. Should a wildland fire threaten any of the shop facilities at San Luis NWR, Merced NWR or San Joaquin River NWR, the IC should be alerted and a structure protection group will be requested. In all cases, the primary concerns of fire suppression personnel shall be public safety (including fire suppression personnel), and if needed, all the individuals not involved in the suppression effort shall be evacuated.

The elk pasture enclosure at San Luis NWR will be considered a critical protection area. This 761-acre fenced area contains over 35 elk which need to be protected. Due to the confined nature of the animals, they are unable to escape the fenced-in area. Additional suppression resources need to be requested in the event a wildland fire either starts at or threatens this enclosure.

PREPAREDNESS

Preparedness is the work accomplished prior to fire occurrence to ensure that the appropriate response, as directed by the Fire Management Plan, can be carried out. Preparedness activities include: budget planning, equipment acquisition, equipment maintenance, dispatch (initial attack, extended, and expanded), equipment inventory, personnel qualifications and training. The preparedness objective is to have a well trained and equipped fire management organization to manage all fire situations at the

Complex. Preparedness efforts are to be accomplished during time frames outside the normal fire season dates. Fire prepardness planning and implementation is accomplished on an annual basis. This ensures that all engines, fire cache, PPE, and training are identified and ready by the start of fire season.

Historical Weather

The largest number of fires occur in the summer season, which generally starts in June and continues through November (CDF determines the start and end of fire season). However, there is a potential for prescribed and wildland fires to occur year-round. No historical data for the Complex is available from a Refuge NFDRS weather station. A station for the Complex is established but has not gathered enough data for an analysis. Fire weather data needs to be collected for at least 3 years to obtain a proper analysis. To best estimate the NFDRS indices the Kettleman Hills, CA station (BLM 044602) will be employed until the San Luis NWR station has enough data. Analysis data is provided in Appendix M. Data from the Kettleman Hills RAWS indicate that the average fire season begins in early-June and extends into October (Fuel Model A). The 90^{th} percentile BI is 46, the 97^{th} percentile BI is 57.

According to California Department of Forestry records, the worst average day fire weather for the Los Banos area would have temperatures of 90º+ F, relative humidity of 6% and winds of 30+ mph.

Fire Prevention

A program of internal and external education regarding potential fire danger may be implemented at the Complex. Visitor contacts, bulletin board materials, handouts, and interpretive programs may be employed to increase visitor and community awareness of fire hazards and danger. Trained employees also need to educate the public regarding the beneficial effects of prescribed fires on natural resources as opposed to unwanted human-caused fires.

During periods of extreme or prolonged fire danger emergency restrictions regarding Refuge operations, or area closures may become necessary. Such restrictions, when imposed, will usually be consistent with those implemented by cooperators. Closures will be authorized by the Complex Manager.

Staffing Priority Levels

Daily staffing levels will coincide with the Mariposa-Madera-Merced Units (Merced County Fire Department) daily fire danger calculations of the spread component. These break points will be used until the weather station at the San Luis NWR has the necessary database to run a historical analysis and becomes the primary NFDRS station. The data from the San Luis NWR will be downloaded to WIMS via GOES and will be the responsibility of the Fire Management Officer to maintain and operate.

The step-up plan (Appendix N) is reviewed annually, and is used to provide adequate staffing commensurate with fire danger. Elements of the plan include: implementation and staffing levels, crew and equipment placement, and funding (additional firefighters [emergency hire/casual] may be hired temporarily to supplement the existing fire crew). The Fire Staff will monitor current and predicted fire weather reports and preparedness levels for daily staffing.

National and State Preparedness Levels are designed to increase the readiness and response to wildland fire incidents. The levels range from I to V with V being the most severe. These levels are changed depending on fire activity, weather, or lack of adequate fire personnel. Each level has a set of guidelines as to crew activities and movement that should correspond to the Complex Step-up Planning. In the event that the State and National Preparedness Levels are different, the refuges will follow the guidelines based on the higher of the two levels. The following are the guidelines for each of the levels:

Level I: Normal Staffing and activities to include prescribed fires.
Level II: Normal Staffing and activities to include prescribed fires.
Level III: Normal Staffing and activities to include prescribed fires, monitor conditions and prepare for step-up plan activation.
Level IV: Activate the Complex step-up plan and prescribed fire activity must be approved by the Regional Fire Management Coordinator (RFMC).
Level V: Activate the Complex step-up plan and suspend prescribed fire activity.

Training

Departmental policy requires that all personnel engaged in suppression and prescribed fire duties meet the standards set by the National Wildfire Coordinating Group (NWCG). San Luis NWRC will conform strictly to the requirements of the wildland fire management qualification and certification system and USFWS guidelines.

Individual training needs will be identified in a training plan and will use Interagency training opportunities. Service policy sets training, qualification, and fitness standards for all fire positions. All fire personnel (full-time fire or collateral duty) will be provided with the training (classroom and on-the-job) required to meet Service fire position qualification standards for the positions they are expected to perform. All firefighters will be required to participate in an annual refresher to remain qualified. Refreshers will focus on local needs, fire shelter deployment, LCES, fire orders, and watch-out situations. On-the-job training is encouraged and will be conducted at the field level. Whenever appropriate, the use of fire qualification task books will be used to document fire experience of trainees. The FMO will coordinate fire training needs with those of other nearby refuges, cooperating agencies, and the RO.

Personnel should be hired and prepared for the start of the fire season at the Complex by June. All fire qualified employees are required to take the mandatory fitness and training requirements prior to June or within two weeks of entering duty. Employees not meeting minimum fitness and training requirements may assist in support capacities, but will not be permitted on the fireline. Personnel will only be assigned positions where they have met the qualifications.

Engines are the primary initial attack resource on the Complex because of the predominance of areas with fine fuels and good vehicle access. All primary engines will be equipped with suppression tools, firing devices, and water handling accessories. To ensure engine readiness all annual maintenance should be completed in the off season or at the latest by June. The Complex supports the development of individual Incident Command System (ICS) overhead personnel from among qualified and experienced Complex staff for assignment to overhead teams at the local, regional, and national level.

Supplies and Equipment
All dedicated fire equipment and supplies will located at the Blue Goose Fire Cache at the Kesterson Unit of San Luis NWR. The Supervisory Firefighter will be the cache manager. All equipment should be in a ready state and inventoried prior to the start of the fire season or June. The cache will be equipped for 10 firefighters. Equipment includes: hand tools, hose, fittings, personnel protective equipment, firing devices and ATVs.

All firefighters will be issued required personal protective equipment which includes: nomex pants and shirts, gloves, helmet and goggles, field harness with fire shelter, overnight pack, sleeping bag, headlamp and personal first aid kit.

Additional equipment and supplies are available through cooperators and the interagency cache system. Requests for additional personnel and equipment are made through the Sierra National Forest dispatch center.

DETECTION
There is currently no fire detection system other than Complex staff on site or visitors during normal work days. The Complex relies on neighbors, visitors, staff and cooperators to detect and report fires.

Many fires are reported to 9-1-1 and the local county dispatch offices initiate suppression response. For San Luis and Merced NWRs, fires reported to 9-1-1 are dispatched through Mariposa-Madera-Merced Ranger Unit/CDF to local Merced County Fire Department stations. Merced County Fire Department Emergency Communications Center will notify Sierra National Forest dispatch of wildland fires occurring on the Refuge and Sierra National Forest will notify the FMO or Refuge Duty Officer.

For San Joaquin River NWR fires are also reported to 9-1-1 by the public. Fire dispatch from 9-1-1 calls is provided by Stanislaus County Emergency Communications Center in Modesto and will dispatch West Stanislaus County Fire Protection District in Patterson to wildland fires at San Joaquin River NWR. The Complex is notified by the West Stanislaus County Fire Protection District.

The FMO or Refuge Duty Officer will be contacted directly by Complex employees if they detect any wildland fire on or threatening a Refuge. The FMO or Duty Officer will contact Sierra National Forest dispatch which will in turn contacts either Merced County Fire Department or West Stanislaus County Fire Protection District for notification purposes.

The Fire Management Plan does not discriminate between human-caused and lightning caused fire. All wildland fires will be suppressed. For serious human-caused fires, including those involving loss of life, a qualified arson investigator will be requested.

The Complex Fire Dispatch Plan (Appendix F) will be reviewed and updated annually. Copies will be kept at all Refuges, check stations and with local cooperators.

COMMUNICATIONS
A daily resource summary will be provided to Sierra National Forest (SNF) dispatch during fire season to maintain a list of available resources, thereby decreasing response time.
The Complex fire radios will be programmed with SNF and Merced County Fire Department/CDF local frequencies (Appendix O) to maintain communications with the local response area. Documentation permitting the use of Merced County Fire /CDF local frequencies is on file at the Complex headquarters.

Cell phones are the primary communications link. Most Complex staff are issued cell phones. Fire staff cell phones include the FMO, PFS, Supervisory Firefighter and one per engine. A complete cell phone list is included in Appendix F. Radios will be issued to the overhead staff and at least one radio issued for each crew during fire operations. The primary operational channel for the Complex will be the TAC2 CREW (168.200 Mhz).

Merced County Fire Department employs the ORANGE TAC (154.340 Mhz) as a tactical frequency when responding to fires near or within Refuge boundaries. Command frequency for Merced County Fire Department is 154.400 Mhz (rx) and 159.045 Mhz (tx). All Complex fire resources have access to these frequencies. On Refuge fires which require a assistance of Merced County Fire Department, Fish and Wildlife fire operations will employ ORANGE TAC to communicate with county forces.

PRE-ATTACK PLAN

Pre-attack planning data will be reviewed annually by the Complex fire staff. Pre-attack plans will be placed in each Engine, Fire Management Office, Blue Goose Fire Cache and at Complex Headquarters. Basic requirements of the Pre-attack Plan are Refuge maps, ownership maps, communication frequencies, and the Complex Dispatch Plan.

FIRE MANAGEMENT UNITS

Each of the Refuges will be a separate Fire Management Unit (FMU). Although the Refuges are separated by distance, suppression strategies, management restrictions, fuels, fire environment, and values at risk are similar throughout the Complex.

Due to staff limitations, relatively small land management parcels, long response times, valuable resources, and values at risk on neighboring lands, this plan does not recommend wildland fire managed for resource benefit as an option for any of the units. All wildland fires will be suppressed using the appropriate suppression response.

San Luis NWR- (Includes San Luis, Kesterson, East Bear Creek, and West Bear Creek Units)

Wildland fires at San Luis NWR will receive mutual aid assistance from Merced County Fire Department/CDF. Appendix R lists the standard fire response. This FMU includes the elk pasture, uplands, wetlands and riparian woodlands.

Merced NWR- (Includes Arena Plains Unit)

Wildland fires at Merced NWR will receive mutual aid assistance from Merced County Fire Department/CDF. Appendix R lists the standard fire response. This FMU includes uplands, wetlands, agricultural lands and riparian woodlands.

San Joaquin River NWR

Wildland fires at San Joaquin River NWR will receive initial attack response by West Stanislaus County Fire Protection District. This FMU includes uplands, agricultural lands and riparian woodlands.

Fire Effects by Vegetation Type

Sensitive vegetation may be impacted by fire that occurs at the wrong time of year, and growing plants may be killed by fire, which may or may not be a desired result. Fire itself could adversely affect the ecology of Refuge grasslands and marshes by promoting pure stands of invader species such as yellow star thistle or reducing dense cover and woody plants for a season. This would happen if conditions favored invader species as a hot fire during the growing season which may destroy native bunchgrass. Uplands burned during the later summer or early autumn (August thru October) will promote noxious

weeds such as yellow star thistle the following spring. Burning of uplands during the early summer (June) will reduce the yellow star thistle seed bank and will promote native perennial bunchgrass rejuvenation. In mid August, before flood-up, a wildland fire through dried wetlands would be of high consequence by burning up valuable waterfowl food plants and endangering neighboring cash crops on agricultural lands.

Uplands
Preliminary data indicate that when properly applied, prescribed fire stimulates native grassland species production by reducing thatch and select non-native plants.

Wetlands
Marshes benefit through fire by opening up overly dense stands of robust emergent vegetation. Second order effects are documented through the yearly bird use data on many marsh units of the Complex.

Riparian Woodland
Burning in riparian habitat would have an overall negative impact. Fire within riparian corridors eliminates forbs and shrubs that make up the mid- and understory vegetation layers, and depending on fire intensity and season, kills varying amounts of mature trees. Avian studies in riparian habitats have documented that most nesting occurs in the mid- and understory vegetation layers. In addition, riparian areas that are more open in aspect, such as areas in which only parts of the midstory is burned off, are more subject to nest parasitism by brown-headed cowbirds. Although some bird species would benefit from increased number of snags, loss of live trees would result in an overall reduction in foraging and nesting habitat. Forbs and shrubs would begin to recover within 1-2 years. Mature willows and cottonwoods would require 10-15 years, and valley oaks 50 years before becoming mature.

Agricultural Land
Most of these units are fallow fields currently infested with non-native and non-palatable weeds species. Effects from fire are similar to uplands. Those lands that are producing valuable crops are burned-off annually to prepare the site for next years plantings.

Fire Effects on Wildlife
Generally, the direct impacts of fire on wildlife include disturbance, displacement, or injury/ mortality of individuals or groups of individuals, particularly slow moving and/or sedentary species and the eggs/young of ground nesting birds. Indirect impacts are more variable, depending on the species. The temporary alteration of habitat may reduce forage supplies and suitability of use for some species while increasing forage supply availability and suitability for use by other species. In general, the long term results of fire on wildlife of upland habitats are positive due to the benefits of increased habitat quality and diversity. Fire within riparian corridors, although creating snags for cavity nesting species, would have an overall negative impact on species associated with that type of habitat for many years.

Fuel Types and Fire Behavior
The following behaviors are based on the average conditions found on the Complex in a normal fire season or mid-July averages for the 1400 hour weather. These averages include “maximum temp of 98 degrees F; 25% RH; mid-flame wind speed of 6 mph; and 4% average 1 hr (<1/4" diameter) dead fuel moisture. The slope is 0% to 2% and the rate of spread is for a head fire. The outputs are from BEHAVE - Fire Behavior Prediction Models based on the conditions above and for the major fuel models found within the Refuge Complex:

$ Fuel Model 1 - Uplands, Vernal Pools, and Agricultural Land:
< Rate of Spread - 275 chains/hr (3.5 mph)

< Flame Length - 7.7 feet
$ Fuel Model 3 - Wetlands and Agricultural Land:
< Rate of Spread - 259 chains/hr (3.0 mph)
< Flame Length - 20.4 feet
$ Fuel Model 9 - Riparian Woodland:
< Rate of Spread - 22 chains/hr (0.2 mph)
< Flame Length - 4.8 feet

SUPPRESSION TACTICS

Wildland fires will be suppressed in a prompt, safe, aggressive and cost-effective manner to produce fast, efficient action with minimum damage to resources. All wildland fires will be suppressed. Wildland fires will not be managed for resource benefit. However, suppression strategies will take resource values into account.

Wildland fires can often be contained using natural or manmade firebreaks (e.g. roads, levees, canals, etc) as most Refuge roads and canals are maintained by mowing, grading, spraying, etc. Every effort will be made by the Incident Commander to use these fire breaks. This is especially critical around the elk pasture at San Luis NWR, West Bear Creek Unit and Kesterson Unit.

Mechanical line construction (dozers, discing, grading, etc) on soils not previously disturbed shall be avoided. However in situations where human life or private property are immediately endangered or if in the best judgement of the Incident Commander that mechanical line construction will prevent damages to resources that cannot be mitigated, the decision to allow fire mechanical line construction will be supported by the Complex Manager. The Complex Manager or their designate will be notified of the situation as soon as possible. The FMO may be the Complex Manager designate and Incident Commander simultaneously.

Personnel and equipment must be efficiently organized to suppress fire effectively and safely. To this end, the FMO assumes the command function on major or multiple fire situations, setting priorities for the use of available resources and establishing a suppression organization.

There will be only one Incident Commander responsible through the FMO to the Complex Manager. The Incident Commander will designate all overhead positions on fires requiring extended attack. Reference should be made to a Delegation of Authority (Appendix C).

Elk Pasture

In the 761-acre elk pasture at San Luis NWR, heavy grass fuel loading exists due to the past lack of fuels treatment. Wildland fires occurring within or coming into the elk pasture will be immediately suppressed.

1. Suppression Specifications
   a. Objective - Keep burned area acreage to a minimum. Prevent elk from being overrun by wildland fire. Firefighter safety is paramount when working around frightened elk.
b. Fire Behavior - Using Fuel Models 1 and 3 as a fire prediction basis.
2. Suppression Strategy

a. Direct attack with engines will be the most effective way of suppressing a wildland fire. Support with helicopter bucket drops can also supplement the ground resources. If the wildland fire cannot be successfully contained by direct attack then indirect attack strategies must be employed. If firebreaks must be constructed, those areas previously disturbed will be plowed, disced or graded wherever possible. Due to the undisturbed nature of most of the grassland soils, soil disturbance should be severely restricted. Fire breaks will be roads, sloughs, mowed, disced and/or graded strips.

b. Direct Attack Methods - Mobile (running) attack with engines. Burn out along fires edge as needed.

c. Indirect Attack Methods - Engines to create wetline from roads and natural barriers. Burnout as needed to consume fuels in the path of the fire.

Wetlands

Fire will move through rank stands of wetland vegetation if fuel is allowed to accumulate and standing water is minimal. In most wetlands on the Complex vegetation stand density is too robust to walk through. If vegetation is too dense for direct attack, the fire will be allowed to burn to a natural barrier. If vegetation is sparse enough, then direct attack methods will be employed.

1. Suppression Specifications
   a. Objective - Unless firefighter safety is compromised or the fire threatens private lands and/structures, fires will be suppressed using natural and manmade barriers (e.g., roads, wet sloughs, etc.). If there is a threat to firefighter safety or private lands and/or structures, then direct attack methods will be employed. Indirect attack methods are preferred, however.

b. Fire Behavior - Using Fuel Model 3 as a fire prediction basis. Expect flame lengths 15-20 feet tall, moderate rate of spread and extreme fireline intensity. Stable wind conditions and ample fire breaks are essential to control fires in this fuel type.

2. Suppression Strategy
   a. Indirect attack methods are preferred as fireline intensity and flame length will preclude direct attack. If wetland vegetation is sparse, fireline intensity and flame length is low where direct attack methods can be used. If indirect or direct mechanical fireline construction is needed then disc only within wetland bottoms or edges. Line construction in uplands will be avoided. Complex Manager or Designee will be consulted prior to proceeding with any mechanical fireline construction.

b. Indirect Attack Methods - Fire will be contained either using natural or manmade barriers or by creating a firebreak of at least 20 feet (double disced) wide. Burning out from natural barriers or constructed fire lines will be conducted. The nearest secondary line will be located as a fallback position. Ring (circular) fire the perimeter, if natural barriers and weather allow, to facilitate burning out of fuels.

c. Direct Attack Methods - In sparse wetland vegetation only, lay hoselay to encircle fires edge. Utilize disc to support the hoselay.

Uplands

Uplands are threatened by wildland fire more than other Complex vegetation types due to their proximity to roads. Fires coming onto Refuge lands will most likely start in these fuels. Rapid and effective initial attack is the key to preventing these fires from burning into more critical areas and minimizing wildfire size.

1. Suppression Specifications
    a. Objective - Keep burned acreage to a minimum. Prevent fire from reaching wetlands. Prevent fire from reaching riparian woodlands as mop up in this vegetation type can be time consuming and labor intensive. Prevent fire from reaching newly planted native grass and riparian planting areas.
b. Fire Behavior - Using Fuel Model 1 as fire prediction basis. Quick initial response is essential to control fires in this fuel type.
2. Suppression Strategy

a. Direct attack is preferred, and engines will be the most effective way of suppressing a wildland fire in uplands. Support with helicopter bucket drops and retardant can also supplement the ground resources particularly in the case of larger wildland fires. If the wildland fire cannot be successfully contained by direct attack, then indirect attack strategies must be employed. Indirect attack will use areas *previously disturbed* such as plowed, disced or graded firebreaks. Due to the undisturbed nature of most of the grassland soils, soil disturbance should be minimized. Firebreaks will include gravel roads, sloughs, mowed and/or disced strips. Mechanical fireline construction will be permitted to prevent fire from burning onto private land or if human life is threatened. Complex Manager or Designee will be consulted prior to proceeding with any mechanical fireline construction.

b. Direct Attack Methods - Mobile (running) attack with engines. Burnout along fires edge as needed will be employed.

c. Indirect Attack Methods - Engines to create wetline from roads and natural barriers. Burnout will also be used as needed to consume fuels in the path of the fire.

Suppression Conditions

The Complex Manager will ensure that a qualified Incident Commander is assigned for each fire occurring on the Refuge. If a qualified IC is not available, one will be requested and a unified command will be established with a representative from the Complex. The IC will be responsible for all aspects of the fire's management.

There are many occasions that require the Refuge establish a Unified Incident Command structure with Merced County Fire Department or West Stanislaus Country Fire Protection District. These incidents are those which occur either on the boundary between private land and Refuge property or when a wildland fire starts on Refuge lands and threatens to burn onto private land or vice-versa. In these situations, the Initial Attack Incident Commander will notify the agency responsible for that area's fire protection and determine whether there is a need to establish a Unified Incident Command structure with the other agency.

Initial attack of wildland fires at all Refuges may be conducted by the Complex fire staff. Because of the geographic location of all the Refuges (Figure 1), many of the fires on the Complex are reported to 9-1-1 and the local county dispatchers initiate suppression actions. For San Luis and Merced NWR's, fires reported to 9-1-1 are dispatched through Mariposa-Madera-Merced Ranger Unit/CDF in Mariposa to local Merced County Fire Department stations and reported to Complex fire personnel. Complex fire staff and /or CDF will report the fire to SNF Dispatch in Clovis.

Wildland fires on San Joaquin River NWR are also reported to 9-1-1 by the public. Local fire departments are dispatched through West Stanislaus County Fire Protection District in Patterson and initiate suppression actions.

Per Merced County Fire Department's Computer Automated Dispatch Plan all "first alarm assignments" for vegetation fires within the county will yield two Type 2 wildland/urban interface engines and a Chief Officer at the Type 3 level (Appendix R).

The IC will notify the Complex Manager whenever it appears that a fire will exceed initial attack efforts, threaten Service/private lands, or when fire complexity will exceed the capabilities of command or operations. The Complex Manager or their designate may be responsible for coordinating with the IC all extended attack actions including:

- completion and daily review of a WFSA (wildland fire situation analysis).
- complete/ review the Delegation of Authority, as needed.

Wildland Fire Situation Analysis
For fires that cannot be contained in one burning period, a WFSA must be prepared. In the case of a wildland fire, the Complex Manager and staff, in conjunction with the FMO and Incident Commander, will prepare the WFSA. Approval of the WFSA resides with the Complex Manager. Sample WFSA is located in Appendix P.

The purpose of the WFSA is to allow for a consideration of alternatives by which a fire may be controlled. Damages from the fire, suppression costs, safety, probability of success, and the probable character of suppression actions are all important considerations.

Public safety will require coordination between all Complex staff and the IC. Notices should be posted to warn visitors, trails may be closed, traffic control will be necessary where smoke crosses roads, etc. Where wildland fires cross roads, the burned area adjacent to the road should be mopped up and dangerous snags felled. Every attempt will be made to use natural and constructed barriers, including changing fuel complexes, in the control of wildland fire. Rehabilitation efforts will concentrate on the damages done by suppression activities rather than on the burned area itself.

Aircraft Operations
As in all fire management activities, safety is a primary consideration. Qualified aviation personnel will be assigned to all flight operations. Aircraft may be used in all phases of fire management operations. All aircraft must be Office of Aircraft Services (OAS) or Forest Service approved. An OAS Aviation Policy Department Manual will be provided by OAS.

Helicopters may be used for reconnaissance, aerial ignition, bucket drops, and transportation of personnel and equipment. Parking lots are readily available for use as helispots in most cases. Clearing for new helispots should be avoided whenever possible. Helispots will not be located within vernal pools due to the risk of contaminating the pools during helicopter refueling. Temporary helispots will be rehabilitated following the fire.

REHABILITATION AND RESTORATION

When suppression action is taken, rehabilitation is appropriate. The most effective rehabilitation measure is the prevention of impacts through careful planning and the use of minimum impact suppression techniques.

All wildland fire sites will be evaluated for rehabilitation needs as soon as possible after the fire is declared out. Fire suppression impacts are considered emergency rehabilitation under Service policy and projects are to be funded through the fire suppression account. Per Service policy, only damage to improvements caused by suppression efforts can be repaired with suppression funds. Rehabilitation will be directed toward minimizing or eliminating the effects of the suppression effort and reducing the potential hazards caused by the fire. These actions may include:

- Backfill control lines, scarify, and seed.
- Install water bars and construct drain dips on control lines to prevent erosion.
- Install check dams to reduce erosion potential in drainages.
- Restore natural ground contours.
- Remove all flagging, equipment, and litter.
- Completely restore camping areas and improved helispots.
- Consider and plan more extensive rehabilitation or revegetation to restore sensitive impacted areas.

If revegetation or seeding is necessary, only native plant species will be used.

If emergency stabilization measures are needed to protect life, property, and significant natural and cultural resources as well as long-term rehabilitation (control of noxious weeds, etc.) then the Refuge may request appropriate funding through the Burned Area Emergency Stabilization and Rehabilitation (ESR) fund.

A final plan will be submitted to Region for approval and establishment of an account. Rehabilitation should be initiated prior to complete demobilization or as soon as practical.

REQUIRED REPORTING

The fire staff will complete all situation reports as soon as practical. The IC will complete the DI-1202 Fire Report and Crew Time Reports for all personnel assigned to the fire, and return these documents to the Fire Program Clerk for entry into the DOI Computer (SACS). The 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.

FIRE INVESTIGATION

Fire management personnel will attempt to locate and protect the probable point of origin and record pertinent information required to determine fire cause. They will be alert for possible evidence, protect the scene and report findings to the fireline supervisor.

Prompt and efficient investigation of all suspicious fires may be carried out. However, fire management personnel should not question suspects or pursue the fire investigation unless they are currently have a law enforcement commission.

PRESCRIBED FIRE ACTIVITIES

PRESCRIBED BURN PROGRAM OBJECTIVES

San Luis NWRC has used prescribed burning as part of its overall management of its natural resources. Prescribed fire has been an integral part of the resource management on the Complex since 1980. The prescribed fire activity is established and coordinated as part of the annual work plan between assistant refuge managers, biological staff and water management staff. The planning allows for an average annual target of 5-10% (1300-2600 acres) of the Complex's total acreage to be treated annually. The use of prescribed fire to remove excess vegetation in wetlands and uplands reduces the accumulation of dead fuels and creates an open water and emergent vegetation mosaic that provides for less intense fires and provides quality habitat for many waterfowl, waterbirds and other species. The prescribed fire program goals are improvement and maintenance of resource/habitat management and to allow a natural phenomena (i.e., fire) to continue to be a vital ecological process on wildlands without the danger inherent in wildfires.

Wetlands

Prescribed fire in marshes prior to mowing or discing removes accumulated vegetation, adds another environmental stress to the unwanted vegetation's rhizomes/root system, and provides nutrients/minerals for desirable moist soil plants in enhancing wetland habitat conditions for wildlife. The use of prescribed fire in seasonal marshes typically sets back the succession of the wetland to reduce the amount of perennial hydrophytes in favor of annual hydrophytes.

Cattle grazing is in some cases incompatible with moist soil management on the Refuge Complex and livestock grazing is prohibited in the elk pasture due to a potential risk of disease transmission to the elk. Prescribed fire is critical for use as a vegetation management tool in these settings since other methods are restricted. Fire is a better management technique than grazing in wetland areas since it:

1. Reduces woody, non-palatable, less nutritious, decadent plants more effectively than grazing.
2. Enhances nutrient recycling which increases plant productivity and can improve water quality.
3. Improves forage by promoting higher carbohydrate and protein contents in new growth. Winter and early spring burns produce earlier plant growth than spring season due to the black ash absorbing more heat than the surrounding area.
4. Can be employed in areas where it is difficult to control or accomplish grazing during the best time periods.
5. Removes accumulated vegetation, adds another environmental stress to the unwanted vegetation's rhizomes/root systems, and provides nutrients and mineral soil for desirable moist soil plants.

Uplands

Prescribed fire in the uplands removes accumulated fuels and enhances plant species composition and habitat quality. Burning results in a reduction of thatch, decreased competition from introduced annual grasses, and controls invasive weeds by preventing seed production thereby stimulating native grasses and forbs. The subsequent changes in plant species composition and habitat structure lead to greater biodiversity and often lead to higher quality habitat for wildlife. The quality of habitat for ground nesting and burrow dwelling animals improves. A decrease in accumulated fuels from the uplands reduces the wildland fire potential and the intensity level of any fire.

Prescribed fire is critical in uplands as non-native weed invasion has increased with a high build-up of dried biomass. Fire assists in removing accumulated fuels, thus reducing wildland fire potential and

stimulates the native flora. The use of prescribed fire is also important as a technique for reducing non-native grass species and controlling select noxious vegetation.

Agricultural Lands
Prescribed fire in abandoned or fallow agricultural land removes accumulated weed species, prepares the site for future replanting efforts, and changes plant species composition by decreasing non-native weeds from colonizing these areas. Prescribed burning used in actively managed agricultural lands prepares the site for the next years rotational plantings.

PRESCRIBED FIRE STRATEGIES
Specific fire management needs for the Complex will be determined annually. Specific burn objectives, fire frequency rotation, firing methodology, and prescriptions will vary from year to year. Burn plans will be updated to reflect any variations.

Prescribed fire will be used, where appropriate, to reduce hazard fuel accumulation, restore native plant communities, control invasive weed species, enhance wildlife habitat, and to maintain cultural/historic scenes. All prescribed fire activity will comply with applicable Federal, state, and local laws and regulations including those involving air quality.

Prescribed fires involve the use of fire as a tool to achieve natural resource management objectives. Prescribed fire may also be conducted when determined to be necessary for accomplishment of natural resource research projects. Actions included in the prescribed burn program include: the selection, prioritization and scheduling of prescribed burns to be carried out during the year; preparation of prescribed burn plans; burn prescriptions; implementing burn operations; documentation and reporting of all prescribed fires; and burn critiques.

All prescribed fire projects will have a burn plan approved by the Complex Manager. Each burn plan will be prepared using a systematic decision-making process. It will contain both measurable objectives and predetermined prescriptions and will be based on an approved environmental compliance document. Appropriate NEPA documentation (Appendix B) exists for this Fire Management Plan. Therefore, additional NEPA documentation will be necessary only for prescribed fire projects not meeting the criteria outlined in this Plan.

Prescribed Fire Burn Plans must include components such as a Go/ No-Go Checklist, contingency actions to be taken in the event the prescription is exceeded, and the need for alerting neighbors and appropriate public officials to the timing and the planing of the burn. A burn plan format meeting all Service requirements is provided in Appendix L.

The time of year of the burn must be considered in each prescribed burn. The typical prescribed fire season begins in early June to target seed maturity in noxious weeds. These prescribed burns need to be conduced prior to these weeds setting seed. Burning for noxious weed control after mid-July is ineffective in meeting the objectives of preventing seed dispersal. From July through August prescribed burning is conducted to reduce marsh vegetation in seasonal wetlands so they may be rehabilitated prior to fall flood up. September through November burning is conducted in selected areas to promote green up of certain grass species to be used as forage for waterfowl and Sandhill cranes. Throughout the summer months fallow agricultural fields are burned at San Joaquin River NWR to prepare the site for habitat restoration efforts beginning in the autumn.

Alkali sacaton, a native bunchgrass, responds well to a moderate fire in the autumn and winter when heat penetration into the crown is low and nutrients are stored in the roots. For goose and crane areas, the burn should be timed so the new growth is available when the birds arrive. This new growth usually has a higher carbohydrate and protein content and is more succulent. The fire removes tough, less nutritious, decadent plants and opens up the area to create a safe feeding and loafing area without dense cover which can hide predators. Spring and summer burns produce a good seedbed for invader species such as alkali mallow, sunflowers, aster, and thistle. Autumn and winter burns reduce, but do not eliminate, these invaders.

PRESCRIBED FIRE PLANNING

The climate and air quality of the San Joaquin Valley, diverse vegetation, and habitat management objectives allow for prescribed burning to be conducted at any time of the year at the Complex. However, most burning activity occurs from June through November.

Annual Activities

Prescribed fire planning begins with the Complex's annual work plan meetings held during February. Refuge Managers, Biologists, other staff and FMO/PFS discuss the coming year's project workload and discuss prescribed burn needs. The fire staff then determines if prescribed fire can be employed to meet the treatment objectives asked by the biological and other staff. If the FMO/PFS feels the treatment objectives can be met, prescribed burn planning begins. The first step will be for the requesting staff to complete a Central Valley Eco-Region Prescribed Fire Request Form (Appendix S). This form needs to be completed at least two months prior to an expected burn day. Providing the information on the form to the FMO/PFS allows for the review of the smoke management plan by the San Joaquin Valley Air Pollution Control District, interagency coordination to be completed and adequate preparation of the site prior to burn implementation.

Annual permits for agricultural burning must be obtained by January 1 of each year through the Air Pollution Control District. The fee structure is currently being revised at this time. Permits for all San Luis NWRC units are obtained through

San Joaquin Valley Air Pollution Control District
4230 Kiernan Avenue, Suite 130
Modesto, CA 95356
800-349-9401

A separate permit must be obtained for San Joaquin River NWR as it is situated in the Northern District of the Air Pollution Control District.

The PFS and Fire Program Clerk will be responsible for completing an annual fire summary report by the end of the calendar year for the previous fiscal year. The report will contain the number of fires by type, acres burned by fuel type, cost summary, personnel employed, and fire effects.

Prescribed Burn Plan

Individual prescribed burn plans will be the primary document used to record prescribed fire information. Burn plans document air quality requirements, personnel, costs, fire behavior, weather, fire summary and burn critique information. Prescribed burns will also be documented on DI-1202 forms and entered into the DOI Shared Application Computer System (SACS).

A Prescribed Burn Boss will conduct a field reconnaissance of the proposed burn location with the FMO, PFS, Biologist, and/or Assistant Refuge Manager to discuss objectives, special concerns, and gather all necessary information to prepare the burn plan. After completing the reconnaissance, the FMO/PFS will designate a qualified Burn Boss to write the prescribed burn plan.

All prescribed fires will have prescribed burn plans. The prescribed burn plan is a site specific action plan describing the purpose, objectives, prescription, and operational procedures needed to prepare and safely conduct the burn. The treatment area, objectives, constraints, and alternatives will be clearly outlined. No burn will be ignited unless all prescriptions of the plan are met. Fires not within these parameters will be suppressed. Prescribed Burn Plans will follow the format contained in Appendix L. Each burn plan will be reviewed by the Complex Manager, Biologist, FMO, PFS, and Burn Boss. The Complex Manager must also approve the burn plan.

Prescribed Fire Techniques

Elk Pasture

In this 761-acre area of San Luis NWR, uplands will be burned in small, manageable units (3-200 acres) to periodically remove undesirable, decadent vegetation and stimulate new grass production to provide improved forage for elk. The removal of accumulated fine fuels will also reduce the wildland fire potential.

1. Treatment Specifications
    a. Objective - To improve native plant species' vigor and productivity; to remove decadent plants, accumulated litter, etc.; to protect from wildland fires; to enhance habitat for tule elk, goose and crane use; and to set back non-native invader species.

b. Fire Behavior - Using Fuel Models 1 and 3 as a fire prediction basis, a 40 ft/min rate of spread with 3 foot flame lengths is optimum for most fires to accomplish our objective.

c. Environmental Conditions - Moisture of extinction for fuel model 1 is 12%. Air quality is determined by the San Joaquin Valley Air Pollution Control District.

2. Treatment Strategy

a. Because of the undisturbed nature of most of the grassland soils on San Luis, soil disturbance will be severely restricted. Only those areas previously disturbed will be plowed, disced, or graded. Fire breaks employed to assist in precluding fire escape will be roads, sloughs, or mowed strips. Sloughs will be flooded depending on season. A wet line will be applied on roads and strips mowed prior to burning. Burns will be accomplished in early autumn and early spring when desired species are dormant.

b. Ignition Techniques - hand ignition.

c. Ignition Methods - Drip torch, ATV drip torch and incendiary ammunition.

d. Firing Sequence - Initially create blackline on downwind fireline. Bring fire up flanks to keep continuous blackline. As fire burns out into a unit, run strip-head fires (20-30 yards apart) as needed to complete burn in timely manner.

3. Pre-burn monitoring will be accomplished by photo points, transects, and/or ocular reconnaissance of species composition and vigor.

Wetlands

Fire will reduce rank vegetation to allow discing, seeding, and/or other rehabilitation. A choked-up, non-productive marsh can be opened up to enhance waterfowl food production. Units will be burned in 50-250 acre blocks. This size limitation is due to the excessive amount of particulate matter being emitted when burning cattail and bulrush.

1. Treatment Specifications
   a. Objective - Remove rank vegetation from marshes to produce soil, water, and vegetation benefits to improve habitat for waterfowl by creating open areas for feeding and access to loafing areas.
   b. Fire Behavior - Using Fuel Model 3 as a fire behavior basis optimum burn conditions, a slow, backing fire with 2-3 foot flame lengths and/or higher intensity ring (circular) firing with 10-15 foot flame lengths should be used to consume the vegetation. Stable wind conditions and ample firebreaks are essential to control fire in this fuel type.
   c. Environmental Conditions - Moisture of extinction for fuel model 3 is 23%. Air quality is determined by the San Joaquin Valley Air Pollution Control District.
2. Treatment Strategy
   a. Pre-burn Preparation - Area will be drawndown (de-watered) as soon as possible in the early summer. If vegetation is dense enough, burn the area without crushing vegetation; if not; mechanically treat to assist in drying out fuel (i.e., mow or disc). Firebreak of at least 20 feet, down to bare mineral soil, double disced around burn unit. Crush standing marsh vegetation at least 10 feet in on burn side to reduce flame height at the edge of the firebreaks.
   b. Ignition Technique - Backing fire to create secure flanks. Ring (circular) fires the perimeter and create center fire concurrently.
   c. Ignition Methods - Drip torch, Terra -Torch, helicopter with Plastic Sphere Dispenser
   d. Firing Pattern - Begin backfire along firebreak. As fire progresses in the marsh, continue flanking fires along the firebreaks. Fire incendiary devices into the middle to create center fire. If there are dry slough channels void of flammable vegetation, personnel could be light along the sides of channels to create center fire. Also consider center firing employing helicopter with Plastic Sphere Dispenser.
3. Pre-burn Monitoring will be accomplished by photo points, transects, and/or ocular reconnaissance of species composition and vigor.

Uplands

Burning will be used to control invasive weeds, to restore native grassland to enhance wildlife habitat quality (particularly to optimize winter forage habitat for sandhill cranes and arctic nesting geese). On many of the units, livestock grazing following the burn will be used as an integral part of achieving either the control of invasive weeds or the ability to maintain desired vegetative conditions. Units scheduled for the effective control of invasive weeds and the production of optimal crane/ goose forage habitat will require early summer burns. Units scheduled as site preparation for native grassland/ riparian restoration, fuels reduction to protect and enhance wildlife habitat, livestock grazing areas to maximize weed control, and field preparation for crop production will require autumn burns. There are no acreage limitations when planning a burn in this fuel type.

1. Treatment Specifications
    a. Objective - To improve native plant species vigor and productivity; to remove accumulated litter, etc.; to protect from wildland fires; to enhance habitat for wildlife (especially cranes and geese); and to control invasive weeds.

b. Fire Behavior - Using Fuel Model 1 and 3 as fire prediction basis, a 40 ft/min rate of spread with 3 foot flame lengths is optimum for most fires to accomplish the natural resource objectives.

c. Environmental Conditions - Moisture of extinction for fuel model 1 is 12%. Air quality is determined by the San Joaquin Valley Air Pollution Control District.

2. Treatment Strategy

a. Because of the undisturbed nature of most of the upland soils on San Luis NWR, soil disturbance will be severely restricted. Those areas previously disturbed may be plowed, disced, or graded. Any undisturbed soils may not be disced, plowed or graded without approval of the Complex Manager. Firebreaks will be roads, sloughs, disced or mowed strips. The sloughs will be flooded if time permits depending upon the season. A wet line will be laid on the roads and strips mowed prior to burning.

b. Ignition Techniques - Backfire with flanking strip-head fires to keep fire from quartering into corners.

c. Ignition Methods - Drip torch, ATV drip torch, incendiary ammunition; helicopter with Plastic Sphere Dispenser.

    d. Firing Sequence -Create blackline on downwind fireline. Bring fire up flanks to keep continue blackline and keep fire edges straight. Strip-head fires to as needed to complete interior ignition.

3. Pre-burn and Post-burn Monitoring will be accomplished using photo points, transect/ plot data collection, and/or ocular reconnaissance of species composition and vigor.

Agricultural Land

Burning will be used to prepare fallow agricultural land for restoration efforts particularly at San Joaquin River NWR. On many of the units scheduled to be burned, either chemical or livestock grazing, will be used as an integral part of achieving desired site conditions for habitat restoration. Units will be scheduled for burning in the autumn. On lands under easement by NRCS at San Joaquin River NWR, the Complex Manager will seek approval from NRCS when the Complex plans to burn more than 25% of acreage.

1. Treatment Specifications

    a. Objective - To prepare site for riparian and/or native upland restoration activities; to remove accumulated litter, etc; to control invasive and undesired weed species.

    b. Fire Behavior - Optimum burn conditions and the prescribed parameters envelope are shown on fire behavior prediction sheets for fuel model 1 and 3. A 40 ft/min rate of spread with 3 foot flame lengths is optimum for most fires to accomplish our objectives.

    c. Environmental Conditions - Moisture of extinction for fuel model 3 is 23%. Air quality is determined by San Joaquin Valley Air Pollution Control District.

    2. Treatment Strategy

a. Pre-burn Preparation - Vegetation in area may be crushed by heavy equipment. Vegetation can be burned standing, but more complete consumption will be achieved if crushed. Firelines at least 20 feet wide, double disced around burn unit.

b. Ignition Technique - Backing fire with flanking head fires. Strip-head fires, if area is large enough to warrant this technique to finish fire in a safe, cost-effective manner.

c. Ignition Methods - Drip torch, Terra-Torch, ATV drip torch.

d. Firing Pattern - Begin with backing fire along firebreak. As fire progresses in the field, continue flanking fires along the firebreaks. Strip-head fires may be employed across the face of the fire as needed to complete the burn in a timely manner.

3. Pre-burn Monitoring will be accomplished by using photo points, transects, and/or ocular reconnaissance of species composition and vigor.

The FMO/PFS will assign a burn boss of the appropriate level to implement the burn. The burn boss will follow all guidelines and procedures that are contained in the Prescribed Fire Plan.

The Complex will meet or exceed standard and qualification requirements as outlined in the USFWS Fire Management Handbook and Interagency prescribed fire qualification (NWCG publication 310-1). The Complex Manager shall delegate to the FMO responsibility for ensuring that Complex personnel maintain the fire qualifications necessary to implement the growing fire program.

When all prescription criteria are within the acceptable range, the Prescribed Burn Boss will select an ignition date based on current and predicted weather forecasts. A thorough briefing will be given by the Prescribed Burn Boss and specific assignments and placement of personnel will be discussed. An updated spot weather forecast will be obtained on the day of ignition and all prescription elements will be rechecked to determine if all elements are still within the approved ranges. If all prescription elements are met, a test fire will be ignited to determine on-site fire behavior conditions as affected by current weather. If conditions are not satisfactory, the test fire will be suppressed and the burn will be rescheduled. If conditions are satisfactory the burn will continue as planned.

A qualified Incident Commander Type III will be available within a one hour response in the event of an escaped prescribed burn. If the prescribed burn escapes the predetermined burn area, all further ignition will be halted except as needed for suppression efforts. Suppression efforts will be initiated, as discussed in the pre-burn briefing. The FMO will be notified immediately of any control actions on a prescribed burn. If the burn exceeds the initial suppression efforts, the burn will be declared a wildland fire and suppressed using guidelines established in this plan. A WFSA will be completed and additional personnel and resources ordered as determined by the Incident Commander. If the fire continues to burn out of control, additional resources will be called from the local cooperating agencies via the servicing dispatch. A management overhead team may be requested to assume command of the fire.

Monitoring and Evaluation

Monitoring of prescribed fires is intended to provide information for quantifying and predicting fire behavior and its ecological effects on Refuge resources while building a historical record. Monitoring measures the parameters common to all fires: fuels, topography, weather and fire behavior. In addition, ecological changes such as species composition and structural changes will be monitored after a burn. This information will be used to modify the prescribed burn program as necessary.

All wildland fires will be appropriately suppressed. However, monitoring wildland fires may be appropriate and potentially valuable in mapping and documenting the growth of the fire, measuring on-site weather and fuel loading to provide the fire staff with present and expected fire behavior and effects. During prescribed burns, monitoring can serve as a precursor to invoking suppression action by determining if the fire is in prescription, assessing its overall potential, and determining the effects of the prescribed burn.

Monitoring can assist managers in documenting success in achieving overall resource objectives and limiting occurrence of undesired effects. Fire monitoring will be used to evaluate the degree to which

specific burn objectives are accomplished. Wetland burns will be evaluated by documenting the response of desirable plant species (swamp timothy, smartweed, millet) used by waterfowl and by the reduction of cattail and roundstem bulrush. Upland burns will be evaluated by the species composition changes and response of native grasses and forbs. Data on fire intensity and fire coverage over the area to be burned will be collected on all prescribed fires implemented.

Monitoring and evaluation are part of the prescribed fire process. Monitoring is completed in 3 steps: pre-burn, burn day, and post-burn.

- < Pre-burn evaluations use photo points or general photos, gross visual species composition and vigor and, if requested, plots.
- < Burn day evaluations document temperature, relative humidity, windspeed, fine fuel moisture, rate of spread, flame length, smoke dispersal, objectives, and % scorch of woody species.
- < Post burn evaluations use photo points or general burn photos, and qualitative estimates of bird use by species as well as native species response and effectiveness in achieving objectives.

During prescribed burning, monitoring should include mapping, weather, site and fuel measurements and direct observation of fire characteristics such as flame length, rate of spread and fire intensity. Operational monitoring provides a check to insure that the fire remains in prescription and serves as a basis for evaluation and comparison of management actions in response to measured, changing fire conditions, and changes such as fuel conditions and species composition.

All fires may be monitored regardless of size. The FMO will establish specific fire information guidelines for each fire to update intelligence about the fire.

Required Reports

All prescribed burn forms will be completed as outlined by the Prescribed Burn Plan. All records will be archived in the Complex fire records for future use and reference.

The Prescribed Burn Boss will prepare a final report on the prescribed burn. Information will include a narrative of the burn operation, a determination of whether objectives were met, weather and fire behavior data, map of the burn area, photographs of the burn, number of work hours and final cost of the burn.

Prescribed Burn Critique
Prescribed fires will be critiqued by the burn boss and documented in the burn plan. The FMO and Complex Manager will conduct a formal critique if:

< significant injury/accident occurs.
< an escape occurs.
< significant safety concerns are raised.
< smoke management problems occurs.

AIR QUALITY / SMOKE MANAGEMENT GUIDELINES

Visibility and clean air are critical natural resource values. The protection of these resources must be given full consideration in fire management planning and operations. In addition, smoke management can have serious health and safety effects which must be considered during the planning and approval process.

Smoke management is a concern in the Central Valley of California. The Complex is situated in an U.S. Environmental Protection Agency (EPA) "Serious Non-Attainment Area". When air quality is poor, a "No-Burn Day" is declared by the San Joaquin Valley Air Pollution Control District in Fresno. Everyday, wildlife habitat improvement burns are restricted to the hours of 10 a.m. to 5 p.m. and all fires are to be extinguished by sunset. All Complex prescribed burns should be completed between 10 a.m. and 5 p.m. to help reduce air pollution. Early morning and late afternoon fires tend to produce more smoke that persists longer (due to more stable atmospheric condition). If smoke on public roads is anticipated, the California Highway Patrol should be notified. Prior to a large burn (especially marsh/tule burns where a lot of black smoke will be produced), a public notice should be placed in local newspapers to avoid unnecessary public concern.

All prescribed burns must comply with the State of California Air Quality Regulations for Burning (CCR Title 17, Sub-chapter 2. "Smoke Management Guidelines for Agricultural and Prescribed Burning") and local implementation plans. All burn projects are required to have an annual permit from the San Joaquin Valley Air Pollution Control District (Appendix T). Projects must be submitted for review of the smoke management plan portion of the burn plan to the District at least 30 days in advance of the proposed burn date.

An MOU currently exists between the San Joaquin Valley Air Pollution Control District and Land Management and Fire Protection Agencies (including San Luis NWRC). This MOU allows for greater flexibility to conduct prescribed burns but also requires additional smoke management documentation (Appendix H.3).

The management of smoke will be incorporated into the planning of prescribed fires, and, to the extent possible, in the suppression of wildland fires. Sensitive areas will be identified and precautions will be taken to safeguard visitors and Complex neighbors. When burning is done adjacent to roads and highways, close attention will kept on wind conditions to prevent a driving hazard. There will be no hesitation to postpone a burn when the wind conditions may exacerbate smoke impacts.

FIRE RESEARCH

The effects of fire upon the Complex's plant and animal communities need to be better understood and elucidated. Through applied research and careful application of fire, data collected can provide managers with a better understanding of the natural ecological effects of fire, and the information needed to refine prescriptions to meet resource objectives.

Fire behavior will be collected on all fires occurring on Refuge lands. Monitoring will comply with accepted scientific methods. This data, along with information gathered through research studies, will be used to improve the effectiveness of the fire management program.

PUBLIC SAFETY

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

The greatest threat to public safety from Complex wildland fires or escaped prescribed burns is entrapment by extremely fast moving fire fronts, fingers and/or spot fires. Of particular concern are sportsmen, visitors or special use permitees who may be present in the area of the fire, and neighbors who initiate their own suppression actions without proper training, equipment, or communications. Complex staff will attempt to keep the fire scene clear of people except for Service firefighters and any resources requested from cooperators.

Another concern is fires that escape from Complex lands and spread to inhabited private property. The IC is responsible for warning and evacuating the public from potentially dangerous wildland fires.

PUBLIC INFORMATION AND EDUCATION

Educating the public on the value of fire as a natural process is important to increasing public understanding and support for the Complex's fire management program. The Complex will use the most appropriate and effective means to explain the overall fire management program. This may include supplemental handouts, signing, personal contacts, auto tour routes and/or media releases. When deemed necessary, interpretive presentations will address the fire management program and explain the role of fire in the environment.

The public information program will be developed as follows:

- Concepts of the prescribed burn program will be incorporated, as appropriate, in publications, brochures and handouts.
- During periods when prescribed burns are ignited, handouts will be prepared and distributed to all visitors entering Refuge units.
- The fire management program may be incorporated into visitor contacts. Particular attention will be given when fires are conspicuous from roads or visitor use areas.
- News releases will be distributed to the media as appropriate.
- The public information outlets of neighboring and cooperating agencies and the regional office will be provided with all fire management information.
- The fire management program will be discussed in informal talks with all employees , volunteers, residents and neighbors.

Prior to the lighting of any planned ignition on a prescribed burn, information will be made available to visitors, local residents, and/or the press about what is scheduled to happen and why. On-site information will be provided to alleviate visitor concern about the apparent destruction of resources by fire or the impairment of views due to temporary smoke. This information will include prescribed burn objectives and control techniques, current fire location and behavior, effects caused by the fire, impacts on private and public facilities and services, and restrictions and closures.

As outlined in the prevention section, emergency closures or restrictions may become necessary during periods of extreme or extended fire danger.

FIRE CRITIQUES AND ANNUAL PLAN REVIEW

FIRE CRITIQUES

Fire reviews will be documented and filed with the final fire report. The FMO will retain a copy for the Complex files.

ANNUAL FIRE SUMMARY REPORT

The FMO will be responsible for completing an annual fire summary report. The report will contain the number of fires by type, acres burned by fuel type, cost summary (prescribed burns and wildland fires), personnel employed, and fire effects.

ANNUAL FIRE MANAGEMENT PLAN REVIEW

The Fire Management Plan will be reviewed annually. Necessary updates or changes will be accomplished prior to the next fire season. Any additions, deletions, or changes will be reviewed by the Complex Manager to determine if such alterations warrant a re-approval of the plan.

CONSULTATION AND COORDINATION

The following agencies, organizations and/or individuals were consulted in preparing this plan.

Margaret Ainslie, Prescribed Fire Specialist, San Luis NWRC, Los Banos, CA

Roddy Baumann, Prescribed Fire Specialist, Pacific Region, USFWS, Portland, OR.

Brian Day, Assistant Refuge Manager, Merced NWR, Los Banos, CA.

Mike Durfee, Prescribed Fire Specialist, Wallkill River NWR, Sussex, NJ.

Scott Frazer, Refuge Operations Specialist, San Luis NWRC, Los Banos, CA.

Tracey Germino, Office Automation Clerk, San Luis NWRC, Los Banos, CA.

Richard Hadley, Assistant Refuge Supervisor, Californa/ Nevada Operations, USFWS, Sacramento, CA.

Karen Harvey, Wildlife Biologist, San Luis NWRC, Los Banos, CA.

Tim Keldsen, Wildlife Biologist, San Luis NWRC, Los Banos, CA.

Amanda McAdams, Fire Planner, Pacific Region, USFWS, Portland, OR.

Robert W. Parris, Deputy Refuge Manager, San Luis NWRC, Los Banos, CA

Chris Schoneman, Assistant Refuge Manager, San Luis NWR, Los Banos, CA.

Dennis Woolington, Supervisory Wildlife Biologist, San Luis NWRC, Los Banos, CA.

APPENDICES

APPENDIX A: DEFINITIONS

Agency Administrator. The appropriate level manager having organizational responsibility for management of an administrative unit. May include Director, State Director, District Manager or Field Manager (BLM); Director, Regional Director, Complex Manager or Project Leader (FWS); Director, Regional Director, Park Superintendent, or Unit Manager (NPS), or Director, Office of Trust Responsibility, Area Director, or Superintendent (BIA).

Appropriate Management Action. Specific actions taken to implement a management strategy.

Appropriate Management Response. Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Appropriate Management Strategy. A plan or direction selected by an agency administrator which guide wildland fire management actions intended to meet protection and fire use objectives.

Appropriate Suppression. Selecting and implementing a prudent suppression option to avoid unacceptable impacts and provide for cost-effective action.

Bureau. Bureaus, offices or services of the Department.

Class of Fire (as to size of wildland fires):
Class A - 3 acre or less.
Class B - more than 3 but less than 10 acres.
Class C - 10 acres to 100 acres.
Class D - 100 to 300 acres.
Class E - 300 to 1,000 acres.
Class F - 1,000 to 5,000 acres.
Class G - 5,000 acres or more.

Emergency Fire Rehabilitation/Burned Area Emergency Rehabilitation (EFR/BAER). Emergency actions taken during or after wildland fire to stabilize and prevent unacceptable resource degradation or to minimize threats to life or property resulting from the fire. The scope of EFR/BAER projects are unplanned and unpredictable requiring funding on short notice.

Energy Release Component (ERC) A number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire. It is generated by the National Fire Danger Rating System, a computer model of fire weather and its effect on fuels. The ERC incorporates thousand hour dead fuel moistures and live fuel moistures; day to day variations are caused by changes in the moisture content of the various fuel classes. The ERC is derived from predictions of (1) the rate of heat release per unit area during flaming combustion and (2) the duration of flaming.

Extended attack. A fire on which initial attack forces are reinforced by additional forces.
Fire Suppression Activity Damage. The damage to lands, resources and facilities directly attributable to the fire suppression effort or activities, including: dozer lines, camps and staging areas, facilities (fences, buildings, bridges, etc.), handlines, and roads.

Fire effects. Any consequences to the vegetation or the environment resulting from fire, whether neutral, detrimental, or beneficial.

Fire intensity. The amount of heat produced by a fire. Usually compared by reference to the length of the flames.

Fire management. All activities related to the prudent management of people and equipment to prevent or suppress wildland fire and to use fire under prescribed conditions to achieve land and resource management objectives.

Fire Management Plan. A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans.

Fire prescription. A written direction for the use of fire to treat a specific piece of land, including limits and conditions of temperature, humidity, wind direction and speed, fuel moisture, soil moisture, etc., under which a fire will be allowed to burn, generally expressed as acceptable range of the various fire-related indices, and the limit of the area to be burned.

Fuels. Materials that are burned in a fire; primarily grass, surface litter, duff, logs, stumps, brush, foliage, and live trees.

Fuel loadings. Amount of burnable fuel on a site, usually given as tons/acre.

Hazard fuels. Those vegetative fuels which, when ignited, threaten public safety, structures and facilities, cultural resources, natural resources, natural processes, or to permit the spread of wildland fires across administrative boundaries except as authorized by agreement.

Initial Attack. An aggressive suppression action consistent with firefighter and public safety and values to be protected.

Maintenance burn. A fire set by agency personnel to remove debris; i.e., leaves from drainage ditches or cuttings from tree pruning. Such a fire does not have a resource management objective.

Natural fire. A fire of natural origin, caused by lightning or volcanic activity.

NFDRS Fuel Model. One of 20 mathematical models used by the National Fire Danger Rating System to predict fire danger. The models were developed by the US Forest Service and are general in nature rather than site specific.

NFFL Fuel Model. One of 13 mathematical models used to predict fire behavior within the conditions of their validity. The models were developed by US Forest Service personnel at the Northern Forest Fire Laboratory, Missoula, Montana.

Prescription. Measurable criteria which guide selection of appropriate management response and actions. Prescription criteria may include safety, public health, environmental, geographic, administrative, social, or legal considerations.

Prescribed Fire. A fire ignited by agency personnel in accord with an approved plan and under prescribed conditions, designed to achieve measurable resource management objectives. Such a fire is designed to produce the intensities and rates of spread needed to achieve one or more planned benefits to natural resources as defined in objectives. Its purpose is to employ fire scientifically to realize maximize net benefits at minimum impact and acceptable cost. A written, approved prescribed fire plan must exist and NEPA requirements must be met prior to ignition. NEPA requirements can be met at the land use or fire management planning level.

Preparedness. Actions taken seasonally in preparation to suppress wildland fires, consisting of hiring and training personnel, making ready vehicles, equipment, and facilities, acquiring supplies, and updating agreements and contracts.

Prevention Activities directed at reducing the number or the intensity of fires that occur, primarily by reducing the risk of human-caused fires.

Rehabilitation (1) Actions to limit the adverse effects of suppression on soils, watershed, or other values, or (2) actions to mitigate adverse effects of a wildland fire on the vegetation-soil Complex, watershed, and other damages.

Suppression. A management action intended to protect identified values from a fire, extinguish a fire, or alter a fire's direction of spread.

Unplanned ignition. A natural fire that is permitted to burn under specific conditions, in certain locations, to achieve defined resource objectives.

Wildfire. An unwanted wildland fire.

Wildland Fire. Any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Situation Analysis (WFSA). A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economical, political, and resource management objectives as selection criteria.

Wildland/urban interface fire A wildland fire that threatens or involves structures.

APPENDIX B: COMPLIANCE

1. Environmental Assessment/FONSI - San Luis NWR 1992
   Prescribed Burn Program.

2. Environmental Assessment/FONSI - Merced NWR 1992
   Prescribed Burn Program.

3. Environmental Assessment/FONSI - Kesterson NWR 1995
   Prescribed Burn Program.

4. Environmental Action Statement - San Joaquin River NWR 2001
   Prescribed Burn Program.

5. Section 7 - Consultation and Conference Opinion (MP-700, ENV-400),
   San Luis NWR Complex and Grassland Resource District, Merced and Fresno
   Counties.

Appendix B.1: Environmental Assessment/FONSI - San Luis NWR 1992 Prescribed Burn Program

Appendix B.2: Environmental Assessment/FONSI - Merced NWR 1992 Prescribed Burn Program

Appendix B.3: Environmental Assessment/FONSI - Kesterson NWR 1995 Prescribed Burn Program

Appendix B.4a: Environmental Action Statement - San Joaquin River NWR 2001 Prescribed Burn Program

UNITED STATES FISH AND WILDLIFE SERVICE

ENVIRONMENTAL ACTION STATEMENT

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act of 1969 (NEPA), and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and determined that the action of:

prescribed burning on San Joaquin River NWR.

Check One:

___X__ Is a categorical exclusion as provided by 516 DM 2, Appendix 1 and 516 DM 6, Appendix 1. No further NEPA documentation will be made.

_____ Is found not to have significant environmental effects as determined by the attached environmental assessment and finding of no significant impact.

_____ Is found to have significant effects and, therefore, further consideration of this action will require a notice intent to be published in the Federal Register announcing the decision to prepare an environmental impact statement.

_____ Is not approved because of unacceptable environmental damage, or violation of Fish and Wildlife Service mandates, regulations, or procedures.

_____Is an emergency action within the context of 40 CFR 1506.11. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to NEPA review.

Proposed Action and Alternatives:

Use of prescribed fire to reduce fuels, restore the natural processes and vitality of ecosystems, improve wildlife habitat, remove or reduce non-native species and noxious weeds, and/or conduct research.

Categorical Exclusion(s):

516 DM 6, Appendix 1.4 B (4): “The use of prescribed burning for habitat improvement purposes, when conducted in accordance with departmental and Service procedures”; and, (5): “Fire management activities, including prevention and restoration measures, when conducted in accordance with departmental and Service procedures”.

Permits/Approvals:

The *Wildland Fire Management Plan - San Luis National Wildlife Refuge Complex* must be approved by the station Fire Management Officer, Refuge Manager, Regional Fire Management Coordinator, and California/Nevada Operations Manager. All prescribed fire projects require a burn plan approved by the Refuge Manager. Annual permits for agricultural burning must be obtained from the San Joaquin Valley Air Pollution Control District; with a separate permit obtained for the San Joaquin River NWR, as it is situated in the Northern District of the Air Pollution Control District.

Public Involvement/Interagency Coordination:

West Stanislaus Fire Protection District is notified prior to any prescribed burning. See above, under Permits/Approvals, regarding agricultural burning permits.

Supporting Documents:

Wildland Fire Management Plan - San Luis National Wildlife Refuge Complex

Signature Approval:

/s/Kim Forrest 18 July 01
Project Leader Date

Appendix B.4b: NEPA Compliance - San Joaquin River NWR Fire Management Plan

Appendix B.5: Section 7 - Consultation and Conference Opinion

APPENDIX C: DELEGATION OF AUTHORITY

Name of Incident Commander is assigned as Incident Commander of the ***Name of Incident***, San Luis National Wildlife Refuge Complex for the US Fish and Wildlife, effective ***Time and Date.***

The Incident Commander has full authority and responsibility for managing the fire suppression activities within the framework of the law and Fish and Wildlife Service policy and direction as provided by this office. Refuge Habitat Management Guidelines and/or other appropriate documents will be provided by the Resource Advisor.

Names of Resources Advisors and contact Information are assigned as Resource Advisors. They or the Refuge Manager will be consulted in situations where natural resource decisions or trade offs are involved unless life safety issues require immediate attention and those actions will be documented.

Specific direction and fire suppression priorities for the ***Name of Incident*** are as follows, and are in priority order:

1. Provide for firefighter and public safety.

2. Use of minimal impact techniques should be employed to reduce habitat damage. Use natural barriers and roads if possible for burnout operations.

3. Use of dozers or tractors requires approval of the Refuge Manager of their designate (resource advisors) prior to implementation.

Include other Standards or conditions as needed.

Turn Back Standards

1. All ***Name of Incident*** contracts, agreements, bills, medical problems, equipment repairs, and fire cache re-supply shall be closed out prior to team being released.

2. Road or levee damage during suppression efforts will be repaired prior to the teams departure.

3.Fire perimeter mopped-up ***Specify*** and all lines checked for heat and integrity.

4. Rehabilitation Plan will be completed in Coordination with the Refuge Biologists and resource Advisors.

5. Fire perimeter mapped by GPS and loaded into the Refuges GIS Database.

6. Tort claims reviewed by Refuge Manager or their designee.

The Deputy Refuge Manager or Fire Management Officer will represent the Refuge Manager on any occasion where Refuge Manager is not immediately available.

Refuge Manager, _____ San Luis National Wildlife Refuge Complex, ***Date and Time***.

APPENDIX D: EQUIPMENT INVENTORY

San Luis National Wildlife Refuge Complex - Equipment List

Engines

Engines:	Type:	Year:	Make/ Model:	Pump Type:	Foam: Y/N	Condition/Remarks:
E-3151	6	1993	Ford F350	BB-4	Y	Good; swing engine; 11K GVW
E-3152	6	2000	Ford F450	Diahatsu Diesel	Y	Good; 300 gallons; 4 x 4
E-3150	4	2001	Freightliner FL70	Kubota Diesel	Y	Good; 500 gallons; 4 x 4
WT-3197	2	1999	Freightliner FL70	350 GPM PTO	Y	Good; 1500 gallons; CAFS
E-615	6	1991	Dodge	BB-4	Y	Poor; 250 gallons; 11K GVW

Trucks, ATV's, and Misc Vehicles

Vehicle:	Year:	Make/Model:	Condition/Remarks:
P/U (FMO)	2001	Ford F150	4 x 4; crew cab
P/U (PFS)	2002	Chevrolet 2500	4 x 4; extended cab; diesel
P/U (Sup FF)	1999	Ford F250	4 x 4; extended cab; diesel
Crew Carrier	2001	Ford F450	4 x 4; 6-person; diesel
ATV	2000	Arctic Cat 300	Good

Flatbed	1983	International	Fair; military surplus

Portable Pumps and Chain Saws

Equipment Type:	Make/Model:	Year:	Condition/Remarks:
Pump (Portable)	Wajax/Mark 3	1994	Good
Pump (Portable) (3)	Wajax/Mark 26	1981	Good
Pump (Portable)	Waterous/Floatable	1995	Good
Pump (Portable)	Shindawa/GP25	1997	Good
Chainsaw (2)	Husqvarna/272	1998	Good
Chainsaw	Husqvarna/391	1997	Good
Chainsaw (2)	Stihl/066	2001	Good
Folding Tank		1996	Good; 1500 gallons
Pumpkin		1999	Good; 500 gallons

Weather Station

RAWS	FTS-11	1994	Currently inoperative; needs GOES update; not transmitting to WIMS

Facility

Fire Cache Building	Metal Butler Style	1999	85' x 35'; 5 roll-up bay doors; crew room
Bunk House	To Be Determined	2002	Funded FY01; Proposed

APPENDIX E: INTERAGENCY CONTACTS

San Luis National Wildlife Refuge Complex - Interagency Contacts

FEDERAL AGENCIES:
U.S. Forest Service - Sierra National Forest
2311 North Clovis Avenue
Fresno, CA 93727
(559) 291-1877
(559) 348-1515 After Hours

LOCAL AGENCIES (by Refuge):
San Luis NWR/Merced NWR -
Merced County Fire Department
735 J Street
Merced, CA 95340
(209) 385-7344

California Dept. of Forestry
Madera-Mariposa-Merced Unit
5366 Highway 49 N.
Mariposa, CA 95388
(209) 966-3622

San Joaquin River NWR -
West Stanislaus County Fire Protection District
P.O. Box 585
Patterson, CA 95363
(209) 892-5621

Other Contacts:
Zone Assistant Fire Management Officer -
Perry Grissom
Sacramento NWRC
752 County Road 99W
Willows, CA 95988
Wk: (530) 934-2801

DOI Coordinator-Les Matarazzi
Southern California Operations
2524 Mulberry Street
Riverside, CA 92501
(909) 320-6145

Regional Fire Management Coordinator -
Pam Ensley or Andy Anderson
Eastside Federal Complex
911 NE 11th St
Portland, OR 97232 - 4181
(503) 231-6174 or (503) 231-6175

APPENDIX F: FIRE DISPATCH PLAN

SAN LUIS NWR COMPLEX
2001 FIRE DISPATCH PLAN

1. Report of a Detected Fire
   a. When a wildfire or smoke is reported on any station, the employee should obtain all necessary information. Begin phone log to record radio messages. Information to obtain from reporting party:
      i. Name, address and phone number or location of reporter
         Location of fire
         Size of fire
         Current suppression action (i.e. running, smoldering, creeping)
         IMPORTANT: **Best access or route to fire**
         Approximate weather at fire site (i.e. wind strength and direction)
      ii. Notify FMO , Fire Crew Supervisor **AND** Refuge Manager
      iii. Notify Refuge Law Enforcement Officer, if available
   b. Check map to determine whose jurisdiction and responsibility the fire falls under. Be aware whether the day has been declared an "agricultural burn day." You may have spotted a controlled burn.
      i. If the fire is well **OUTSIDE** the boundary of the Refuge property and is not threatening Refuge lands:

         CONTACT: Merced County Fire by calling 911

      ii. If the fire is **WITHIN** the boundary of the Refuge property OR if the fire is outside Refuge property but is threatening Refuge lands:

      Contact: FMO or Fire Crew Supervisor AND Refuge Manager whose Refuge the fire is burning on or is threatening.

      NOTIFY Merced County Fire Department by dialing 911. Inform them we are attempting to determine if there is a fire on the Refuge and "we are checking it out at this time." Describe the most direct route thru Refuge to gain access to the fire.

      If the fire is within or threatening **SAN JOAQUIN RIVER NWR** immediately dial 911 and ask for the Stanislaus County 911 dispatcher. Inform the dispatcher of the fire and have them respond to West Stanislaus County Fire Protection District. Notify **Scott Frazer** or **Dennis Woolington.**

PHONE NUMBERS

SAN LUIS NWR COMPLEX HEADQUARTERS (209) 826-3508

(contact in order listed below)

Roger Wong, Refuge Fire Management Officer	home	209-827-4390
	weekends	510-832-5648
	cell	209-704-4508
Shawn Murphy, Fire Crew Supervisor	home	601-245-1155
Jon Teutrine	home	209-631-5606
Terry Nickerson	home	510-601-5530
Joshua Olson	(available thru J. Teutrine)	
Jeremy Knapp	home	209-826.4241
Engine 3150 (Summer Only)*	cell	209-704-4520
Engine 3152 (Summer Only)*	cell	209-704-4519
Blue Goose Fire Cache		209-827-9060
Chris Schoneman, San Luis Refuge Manager	home	209-827-8488
	cell	209-704-4503
Brian Day, Merced Refuge Manager	home	209-385-3293
	cell	209-704-4511
Scott Frazer, Refuge Operations Specialist	home	209-826-5200
	cell	209-704-4515
Anthony Merrill, Law Enforcement	cell	209-704-4512
	pager	888-416-9403
Frank Hayes, Maintenance Staff	home	209-826-5795
Marvin Merrill, Maintenance Staff	home	209-826-1753
John Fulton, Outdoor Rec Planner	home	209-826-1101
Roy Shearer, Equipment Operator	home	209-826-2277
Kim Forrest, Project Leader	home	209-827-0636
	cell	209-704-4500

*The above listed cell phones will be carried on the engines when they are in service. When the engines are out of service the same cell phones will be located at the Arena Plains trailer.

Additional Refuge Personnel

Tracey Germino, Dispatcher	209-826-0903
Mary Crist, Dispatcher.	209-827-4878
Sue Lackey, Dispatcher.	209-827-4745
Karen Harvey.	209-827-0939
Loren Rupport	209-854-6452
Tim Keldsen.	209-827-1544

Regional Fire Personnel

Pam Ensley, Regional Fire Coordinator.	503-231-6175
Andy Anderson, Regional Fire Management Officer.	503-231-6174
Sierra National Forest Dispatch, (Fresno).	559-291-1877
After duty hrs.	559-348-1515

Merced County Fire Numbers

El Nido Fire Station (Merced NWR)	209-722-8452
Los Banos Fire Station.	209-826-2895
Stevinson Fire Station (Kesterson Unit, West Bear Creek).	209-634-7086
Madera -Mariposa-Merced ECC.	209-966-3622

West Stanislaus County Fire Number (SJR NWR)

West Stanislaus County Fire Protection District.	209-892-5621

Fire fighting equipment available

Blue Goose Work Center.	E-3150 2001 Freightliner 4X4 (diesel)
	E-3151 1993 Ford 4X4 (diesel)
	E-3152 2000 Ford 4x4 (diesel)
	WT-3197 1999 Freightliner (diesel)

Burn Permit Approval

San Joaquin Valley Air Pollution Control District 800-349-9401

Permit Number 4479RN **San Luis NWR ONLY**
Permit Number C0017 **San Joaquin River NWR ONLY**

6/22/01

U.S. Fish & Wildlife Service
Cellular Phone Numbers (704 prefix)

Name	Cell Number (209) 704-
Bakeman, Sharon	4518
Day, Brian	4511
Denten, Ed	4514
Eastman, Lee	4501
Enos, Mike	4502
Forrest, Kim	4500
Frazer, Scott	4515
Fulton, John	4506
Harvey, Karen	4513
Jordan, Brandon	4504
Keldsen, Tim	4516
Merrill, Anthony	4512
Merrill, Marvin	652-7964
Milar, Shawn	4517
Milsaps, Derek	4505
Murphy, Shawn (Eng. 3150)	4520
Parris, Bob	4521
Ruport, Loren	4507
Schoneman, Chris	4503
Teutrine, Jonathan (Eng. 3152)	4519
Wong, Roger	4508
Woolington, Dennis	4509

APPENDIX G: CURRENT POSITIONS AND QUALIFICATIONS

San Luis National Wildlife Refuge Complex - Fire Staff

Position and Location:	**Grade:**	**Name:**	**Qualifications:**
Refuge Fire Management Officer	GS 11	Roger Wong	RXB2, ICT4, DIVS, SITL
Prescribed Fire Specialist	GS 9	Peggy Ainslee	RXB2, ICT4, CRWB, PSDO
Fire Program Clerk	GS 5/6/7		
Supervisory Firefighter (Station Foreman)	GS 7/8		
Lead Firefighter (Engine Foreman)	GS 6	Shawn Murphy	RXI2, ICT4, ENGB, CRWB
Lead Firefighter (Engine Foreman)	GS 6		
Firefighter (Squad Leader)	GS 5	Jonathan Teutrine	ENGB, ICT5
Firefighter (Squad Leader)	GS 5		
Firefighter (seasonal)	GS 3/4		
Firefighter (seasonal)	GS 3/4		

Burn Crew-Regional (PER REGIONAL OFFICE 2004 PROPOSED STAFFING PLAN)

Position and Location:	**Grade:**	**Name:**	**Qualifications:**
Supervisory Firefighter (Rx Burn Crew Leader)	GS 7/8		

Lead Firefighter (Rx Squad Leader)	GS 6		
Firefighter	GS 5		
Firefighter	GS 5		
Firefighter	GS 3/4		
Firefighter	GS 3/4		

APPENDIX H: COOPERATIVE AGREEMENTS

1. Interagency Agreement for Cooperative Fire Protection and Prescribed Fire between Sierra NF and San Luis NWRC.

2. Interagency Agreement for Cooperative Use of Prescribed Fire in California.

3. MOU Between San Joaquin Valley Air Pollution Control Distict and San Luis NWR.

4. Sample MOU Between US FWS and Fire Protection District.

5. MOU Between San Joaquin River NWR and West Stanislaus County Fire Protection District.

6. Cooperative Fire Protection Agreement Between Merced County Fire Department and San Luis and Merced NWR.

Appendix H.1: Interagency Agreement - Sierra NF and San Luis NWRC

Appendix H.2: Interagency Agreement of Prescribed Fire

Appendix H.3: MOU Between San Joaquin Valley Air Pollution Control District and San Luis NWR

Appendix H.4: Sample MOU Between US FWS and Fire Protection District
Document Number: _____

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
U.S. FISH AND WILDLIFE SERVICE
AND THE
***(DISTRICT NAME)* FIRE PROTECTION DISTRICT**

I. INTRODUCTION

The U.S. Fish and Wildlife Service (hereinafter referred to as the Service), an agency of the Federal Government is primarily responsible for the welfare and protection of lands, structures and wildlife within the boundaries of ***(NAME OF REFUGE)*** National Wildlife Refuge (hereinafter referred to as the Refuge). Because wildfires sometime threaten to damage those resources, and local fire districts have historically provided fire protection assistance to the Refuges, the Service desires to enter an agreement with the ***(NAME OF DISTRICT OR DEPARTMENT)*** Fire Protection District (hereinafter referred to as the District) which will formalize responsibilities of both parties and provide for remuneration to the District for fire suppression services rendered.

II. AUTHORITY

The Service enters into agreement under the authority of the "Protection Act of September 20, 1922", (42 Stat.857; 16 USC 594), the "Reciprocal Fire Protection Act of May 27, 1955"60 Stat.66, 67; 42 USC 1856, 1856a and b" and 31 USC 6305 (Cooperative Agreements).

III. PURPOSE

The purpose of this agreement is to provide fire protection services to those portions of ***(REFUGE NAME)*** National Wildlife Refuge within the boundaries of the ***(NAME OF DISTRICT OR DEPARTMENT)*** Fire Protection District and to remunerate the District for costs incurred in providing fire suppression services to those lands.

IV. TERMS OF AGREEMENT

This agreement shall become effective upon being executed by both parties and shall remain in effect through December 31, ***(YEAR)***. This agreement terminates and supersedes any previous agreements between the District and the Service.

V. SPECIFIC OBLIGATIONS OF THE PARTIES

A. The Service shall:

1. Delegate authority to the District as necessary to put the Fire Chief or his delegate in Unified command of the fire fighting effort.
2. Provide manpower and/or equipment, as available, to assist the District in fighting fires on or adjacent to Service lands when so requested by the District.
3. Provide funds (as indicated in Section VII, herein) for fire suppression services.

B. The District shall:

1. Provide, as available, manpower and equipment necessary to suppress wildland and structural fires on Service lands within the District's jurisdiction.

2. Respond as quickly as possible when asked to suppress any such fire on Service lands.

VI. PROJECT OFFICERS

A. The Service's project officer shall be:

Refuge Manager -

B. The District's project officer shall be:

Fire Chief - Fire Protection District

VII. FUNDING

A. The Service agrees to pay the District for actual fire suppression costs incurred by the District while suppressing fires on Refuge lands. Reimbursement to be claimed by the District (as determined by the District and approved by the Service) shall include:

1. Salaries and wages for District personnel used to suppress a fire. Reimbursement for the salary or wage of any employee shall be computed on the direct daily or hourly wage of that employee, including both actual overtime payments and related employee benefit costs.
2. The actual cost to the District for use of personnel from other agencies, and for paid "pickup" labor used to suppress a fire.
3. The actual cost to the District for food services, transportation, and sleeping accommodations for personnel engaged in suppressing a fire.
4. The actual equipment operation costs expended by the District to suppress a fire. These costs shall be calculated using an hourly or mileage based rate for each class of equipment or vehicle.
5. The total cost to the District for equipment rented to suppress a fire.
6. Replacement or repair costs to the District for equipment and tools damaged, destroyed or lost as a result of a fire. However, any such claim shall be reduced by any salvage value and be based on the depreciated value of such equipment and tools prior to the fire, as determined by the District. Furthermore, the District shall eliminate from said claims any costs directly attributable to the negligence of District personnel operating the equipment or tool.
7. Costs will include direct expenditures, as well as fair and reasonable indirect or administrative costs not to exceed 20% of direct costs.
8. Fire Cost Reimbursement Tables for manpower and equipment are attached as Appendix A, and the District will update these costs annually.

B. Reimbursement to the District for fires which burn onto the Refuge from adjacent property shall be based on the percentage of the total acres burned that were actually within the Refuge.

C. Reimbursement to the District for fire suppression on lands in accordance with this agreement may not exceed $50,000 per response or $150,000 per fiscal year without further approval of the Refuge Manager .

D. The Service will make Reimbursement through issuance of a purchase order to the District within 60 days of receiving the District's invoice for suppression costs. Each payment will be made to the District at the address listed above.

E. All invoices prepared by the District should include the date and name of the incident and be submitted to the Refuge Manager at the address listed above.

VIII. SPECIAL PROVISIONS

A. This agreement shall not affect the rights of any party to recover suppression costs and/or damages sustained as a result of the negligent or willful act of any person causing a fire.

B. No party shall be liable to any other for loss, damage, personal injury or death occurring in consequence of the performance of this agreement, except as provided herein.

C. Both parties may work jointly on fire trespass investigations. Fire law enforcement reports may be prepared independently.

D. Copies of fire reports shall be mutually provided to the other agency as soon as possible.

IX. AMENDMENTS

Amendment to this agreement may be proposed by either party and shall become effective upon being reduced to a written document executed by both parties.

X. TERMINATION

This agreement may be terminated in whole or in part when all parties agree that the continuation of the agreement would not produce satisfactory results. The parties shall agree upon the termination conditions including the effective date and, in the case of partial terminations, the portion to be terminated. The parties shall not incur new obligations after the effective date of termination, and shall cancel as many outstanding obligations as possible. The Service shall allow full credit to the other parties for the Federal share of non-cancelable obligations properly incurred by the other parties prior to termination.

U.S. Fish and Wildlife Service - San Luis National Wildlife Refuge Complex

_____ _____

Signature **Date**

_____

Title

Rural Fire Protection District

_____ _____

Signature **Date**

_____

Title

Appendix H.5: MOU Between San Joaquin River NWR and West Stanislaus Co. Fire Protection District

DRAFT – DRAFT – DRAFT – DRAFT – DRAFT – DRAFT – DRAFT– DRAFT – DRAFT – DRAFT –

Document Number: _____

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
U.S. FISH AND WILDLIFE SERVICE
AND THE
WEST STANISLAUS COUNTY FIRE PROTECTION DISTRICT

I. INTRODUCTION

The U.S. Fish and Wildlife Service (hereinafter referred to as the Service), an agency of the Federal Government is primarily responsible for the welfare and protection of lands, structures and wildlife within the boundaries of San Joaquin River National Wildlife Refuge (hereinafter referred to as the Service). Because wildfires sometime threaten to damage those resources, and local fire districts have historically provided fire protection assistance to the Refuges, the Service desires to enter an agreement with the West Stanislaus County Fire Protection District (hereinafter referred to as the District) which will formalize responsibilities of both parties and provide for remuneration to the District for fire suppression services rendered.

II. AUTHORITY

The Service enters into agreement under the authority of the "Protection Act of September 20, 1922", (42 Stat.857; 16 USC 594), the "Reciprocal Fire Protection Act of May 27, 1955"60 Stat.66, 67; 42 USC 1856, 1856a and b" and 31 USC 6305 (Cooperative Agreements).

III. PURPOSE

The purpose of this agreement is to provide fire protection services to those portions of San Joaquin River National Wildlife Refuge within the boundaries of the West Stanislaus County Fire Protection District and to remunerate the District for costs incurred in providing fire suppression services to those lands.

IV. TERMS OF AGREEMENT

This agreement shall become effective upon being executed by both parties and shall remain in effect through December 31, 2003. This agreement terminates and supersedes any previous agreements between the District and the Service.

V. SPECIFIC OBLIGATIONS OF THE PARTIES

A. The Service shall:

1. Delegate authority to the District as necessary to put the Fire Chief or his delegate in Unified command of the fire fighting suppression effort.
2. Provide manpower and/or equipment, as available, to assist the District in fighting fires on or adjacent to Service lands when so requested by the District.
3. Provide funds (as indicated in Section VII, herein) for fire suppression services.

B. The District shall:

1. Provide, as available, manpower and equipment necessary to suppress wildland and structural fires on Service lands within the District's jurisdiction.
2. Respond as quickly as possible when asked to suppress any such fire on Service lands.

VI. PROJECT OFFICERS

A. The Service's project officer shall be:

Kim A. Forrest, Complex Manager - San Luis National Wildlife Refuge Complex

B. The District's project officer shall be:

Richard Gaiser, Fire Chief - West Stanislaus County Fire Protection District

VII. FUNDING

A. The Service agrees to pay the District for actual fire suppression costs incurred by the District while suppressing fires on Refuge lands. Reimbursement to be claimed by the District (as determined by the District and approved by the Service) shall include:

1. Salaries and wages for District personnel used to suppress a fire. Reimbursement for the salary or wage of any employee shall be computed on the direct daily or hourly wage of that employee, including both actual overtime payments and related employee benefit costs.
2. The actual cost to the District for use of personnel from other agencies, and for paid "pickup" labor used to suppress a fire.
3. The actual cost to the District for food services, transportation, and sleeping accommodations for personnel engaged in suppressing a fire.
4. The actual equipment operation costs expended by the District to suppress a fire. These costs shall be calculated using an hourly or mileage based rate for each class of equipment or vehicle.
5. The total cost to the District for equipment rented to suppress a fire.
6. Replacement or repair costs to the District for equipment and tools damaged, destroyed or lost as a result of a fire. However, any such claim shall be reduced by any salvage value and be based on the depreciated value of such equipment and tools prior to the fire, as determined by the District. Furthermore, the District shall eliminate from said claims any costs directly attributable to the negligence of District personnel operating the equipment or tool.
7. Costs will include direct expenditures, as well as fair and reasonable indirect or administrative costs not to exceed 20% of direct costs.
8. Fire Cost Reimbursement Tables for manpower and equipment are attached as Appendix A, and the District will update these costs annually.

B. Reimbursement to the District for fires which burn onto the Refuge from adjacent property shall be based on the percentage of the total acres burned that were actually within the Refuge.

C. Reimbursement to the District for fire suppression on lands in accordance with this agreement may not exceed $50,000 per response or $150,000 per fiscal year without further approval of the Refuge Manager.

D. The Service will make Reimbursement through issuance of a purchase order to the District within 60 days of receiving the District's invoice for suppression costs. Each payment will be made to the District at the address listed above.

E. All invoices prepared by the District should include the date and name of the incident and be submitted to the Refuge Manager at the address listed above.

VIII. SPECIAL PROVISIONS

A. This agreement shall not affect the rights of any party to recover suppression costs and/or damages sustained as a result of the negligent or willful act of any person causing a fire.

B. No party shall be liable to any other for loss, damage, personal injury or death occurring in consequence of the performance of this agreement, except as provided herein.

C. Both parties may work jointly on fire trespass investigations. Fire law enforcement reports may be prepared independently.

D. Copies of fire reports shall be mutually provided to the other agency as soon as possible.

IX. AMENDMENTS

Amendment to this agreement may be proposed by either party and shall become effective upon being reduced to a written document executed by both parties.

X. TERMINATION

This agreement may be terminated in whole or in part when all parties agree that the continuation of the agreement would not produce satisfactory results. The parties shall agree upon the termination conditions including the effective date and, in the case of partial terminations, the portion to be terminated. The parties shall not incur new obligations after the effective date of termination, and shall cancel as many outstanding obligations as possible. The Service shall allow full credit to the other parties for the Federal share of non-cancelable obligations properly incurred by the other parties prior to termination.

U.S. Fish and Wildlife Service - San Luis National Wildlife Refuge Complex

_____ _____

Signature **Date**

_____

Title

West Stanislaus County Fire Protection District

_____ _____

Signature **Date**

_____

Title

Appendix H.6: Cooperative Fire Protection Agreement-Merced Co. Fire Dept. and San Luis/Merced NWR

DRAFT – DRAFT – DRAFT – DRAFT – DRAFT – DRAFT – DRAFT – DRAFT– DRAFT

COOPERATIVE FIRE PROTECTION AGREEMENT
Between
MERCED COUNTY FIRE DEPARTMENT
And

US FISH AND WILDLIFE SERVICE
San Luis National and Merced National Wildlife Refuges

This agreement, entered into between the US FWS, San Luis and Merced National Wildlife Refuges, herinafter referred to as the FWS, and Merced County Fire Department, herinafter referred to as County, under the provisions of the Reciprocal Fire Protection Act of May 27, 1955 (42USC 1856), Granger-Thye Act of April 24, 1950 (16 USC 572), and Cooperative Funds of Act of June 30, 1914 (16 USC 498).

I. PURPOSE

The purpose of this Agreement is to provide fire aid and coordination between the parties in order to more efficiently and effectively detect, prevent, and suppress fires within the jurisdictions of the respective parties. Assistance will only be provided when the resources are available and can be committed without severely impacting either party's ability to protect it's own jurisdiction.

Emergency services requested other than for fire require negotiation under separate authority.

II. STATEMENT OF MUTUAL BENEFITS AND INTERESTS

The FWS and County have responsibilities for prevention and suppression on lands administered by each agency, on private lands, and on other lands for which both parties have assumed fire protection responsibilities through authorized agreements.

As both parties maintain prevention, detection and suppression forces to protect areas each is responsible for, it is mutually advantageous and in the public interest for the parties to this Agreement to coordinate and assist in each other's efforts in prevention, detection, and suppression of Welland fires in and adjacent to their areas of responsibilities.

Now therefore, in consideration of the above premises, the parties agree as follows:

III. DEFINITION OF TERMS

A. Annual Operating Plan. Parties will meet annually, prior to the initiation of fire season to prepare an Operating Plan. This plan will include protection area maps for all parties, current rates for use of equipment, list of principal personnel, dispatching procedures, and any other items identified in this agreement as necessary for efficient implementation.

B. Boundary Line Fires. Fires that burn on adjoining lands of both parties or threaten to burn across fire protection boundaries. These include those situations where the actual location of the fire protection boundary is uncertain.

C. Cooperative Fire Protection. Specific fire protection services furnished by one party to the other on a reimbursable basis pursuant to the Annual Operating Plan.

D. Direct Costs. Costs directly related to the suppression effort. These costs do not include dispatch or other administrative costs.

E. Fire Prevention. Activities directed at reducing the number of person-caused fires, including public education, law enforcement, dissemination of information, and the reduction of hazards.

F. Jurisdictional Agency. Agency which has overall land and resource management and/or protection responsibility as provided by Federal or State law.

G. Overhead Costs. Costs not directly chargeable to suppression efforts, but which are part of the overall cost of operation. FWS overhead costs are chargeable at the current 15% overhead assessment rate.

H. Prescribed Fire. The planned or permitted use of fire to accomplish specific land management objectives.

I. Protecting Agency. The agency providing fire management services to a given area pursuant to this Agreement.

J. Reciprocal Fire Protection (Mutual Aid). Automatic initial attack response by suppression resources as specified in the Operating Plan for specific pre-planned initial attack response areas and provided at no cost to the Protecting Agency for the first 24 hours from time of initial report. Aid is limited to those resources or move-up and cover assignments that have been determined to be appropriate in the Annual Operating Plan.

K. Reimbursable Work. Reinforcements exceeding reciprocal fire protection services furnished by either party, at the request of the other, or fire protection furnished as a chargeable cooperative fire protection service.

L. Supporting Agency. An agency directly contributing suppression support or service resources to the agency possessing direct fire protection responsibility for the area upon which an incident is located.

M. Suppression. All work of confining and extinguishing a fire beginning with its discovery.

IV. FIRE PROTECTION

A. The FWS shall make initial attack on wildfires on those County protected lands identified on the Annual Operating Plan. The FWS will not commit it's employees to fight internal structure fires due to lack of training, specialized equipment, and agency direction; but they will provide support of these efforts as they are able.

B. The County shall make initial attack on wildfires on those FWS protected lands identified on the Annual Operating Plan.

C. Both parties agree:

1. The parties will prepare an Annual Operating Plan to identify reciprocal initial attack areas.

2. The Protecting Agency shall not be required to reimburse the Supporting Agency for its costs when a fire is controlled by the Supporting Agency's planned initial attack force within the first 24 hour period.

3. The Protecting Agency shall reimburse the Supporting agency for all reimbursable work (See Definition K) performed in the first 24 hours.

4. Wildfires resulting from prescribed fires which escaped and which were ignited by or at the direction or under the supervision of one of the parties to this Agreement shall be the responsibility of that party. All suppression costs shall be borne by the responsible party.

V. GENERAL PROVISIONS

A. Supporting Agency(ies) will provide resources as current conditions permit.

B. Payments for reimbursable services under this Agreement shall be made annually. Each party shall furnish the other with an itemized statement of the reimbursable expenses incurred for the other party.

When one party performs work or otherwise incurs expenses for which the other party is responsible, the officers-in-charge shall reach agreement on specific work to be performed, Total costs of such work, including overhead costs, are reimbursed.

C. The parties signatory to this Agreement hereby waive all claims between and against each other, arising in the performance fo this Agreement, for compensation for loss or damage to each other's property, and personal injury, including death, of employees, agents and contractors, except that this waiver shall not apply to intentional torts or acts of violence against such persons or property.

D. Either party may terminate this Agreement providing 60 days written notice to the other. Unless terminated by written notice this Agreement shall remain in force for 5 years from date os execution.

E. Each agency shall be responsible for the training of their respective fire suppression personnel.

F. Modification within the scope of this Agreement shall be made by mutual consent of the parties, by the issuance of a written modification, signed and dated by both parties, prior to any changes being performed.

G. Either party, through any authorized representative, may have access to and the right to examine all books, papers, or documents related to this Agreement.

H. Parties shall comply with all Federal statutes relating to nondiscrimination and all applicable requirements of all other Federal laws, executive orders, regulations and policies. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (42 USC 2000d), which prohibits discrimination on the basis of race, color, handicap, or national origin.; (b) Title IX of the Education amendments of 1972, as amended (20 USC 1681-1683), which prohibits discrimination on the basis of sex.

I. Fire prevention and law enforcement efforts shall be coordinated to the maximum extent possible, at all levels of both parties. Each party shall render mutual assistance in law enforcement activities and the gathering of evidence, and in actual court prosecutions to the fullest extent practicable.

J. Parties shall furnish each other or otherwise make available upon request such maps, documents, instructions, and law enforcement reports, which either agency considers necessary in connection with this Agreement.

K. Supporting Agency shall adhere to the suppression and mop up standards of the Protecting Agency.

L. Personnel of either party shall, upon discovering or receiving reports of wildfires on areas protected by the other, report such wildfires promptly to the responsible party as described in the annual Operating Plan.
M. When a wildfire is on or threatening lands of both parties, either agency may, upon its own initiative and without reimbursement, go upon lands of the other to engage in wildfire suppression activities for the protection of its lands.

N. When a wildfire is burning on or near lands o both parties the officer-in-charge who arrives first will act as Incident Commander. When both parties have arrived, the officers-in-charge for each party will mutually agree to the designation of Incident Commander.

O. When the Supporting Agency suppresses wildfires burning wholly or in part on the Protecting Agency's lands, the necessary fire report data shall be forwarded to the responsible official identified on the Annual Operating Plan.

P. Personnel dispatched by the Supporting Agency under the terms of the Operating Plan shall be considered as employees of the Supporting Agency. That Supporting Agency shall be responsible for the welfare of such personnel, including the treatment of any injuries which may result on any fire or en route to or from any fire, as provided by the laws and regulations under which each party operates.

Q. Equipment owned and used by either party to suppress fires in lands for which the other is responsible shall normally be operated, serviced, and repaired by the owning agency. Exceptions to this practice, where needed, shall be agreed to in writing by both parties, in advance.

R. Neither party shall be bound to make any expenditures under the terms of this Agreement, except as authorized by law.

S. When either party requests reimbursable assistance from the other, the sending agency shall dispatch only personnel who meet or exceed the minimum requirements for the training and physical standards of the National Interagency Fire Qualification System.

T. All aircraft and pilots used to transport FWS personnel or that are directly controlled by the Forest Service shall be certified by a qualified Forest Service or United States Department of Interior Office of Aviation Services inspector prior to FWS work.

U. The Annual Operating Plan shall identify any special use permits that may be needed for fire control purposes.

V. Employees of the parties to the Agreement shall at all times be subject only to the laws, regulations, and rules governing their employment, regardless of incident location, and shall not be entitled to compensation or other benefits of any other than specifically provided by the terms of their employment.

U. Any service performed hereunder by any officer or employee of the United States or any member of any armed Forces of the United States shall constitute service rendered in line of duty in such office, employment, or force. The performance of such service by any other individual shall not constitute such individual an officer or employee of the United States for the purposes of the Federal Employees Compensation Act, as amended.

The parties hereto have executed this Agreement by and through their authorized representatives the day and year last written below.

_____	_____
US Fish and Wildlife	Fire Chief, Merced County Fire Department
_____	_____
Date	Date

APPENDIX I: LIST OF RESOURCES OF CONCERN (SPECIES, HABITAT, AND CULTURAL)
San Luis National Wildlife Refuge Complex Species List: Birds
(updated 2/16/2001)

		Status
Order		
Family		
Species	Common name	
Podicipediformes:		
Gavidae		
Gavia immer	Common Loon	
Podicipedidae		
Aechomophorus clarkii	Clark's grebe	
Aechomophorus occidentalis	Western grebe	
Podiceps auritus	horned grebe	
Podiceps nigricollis	eared grebe	
Podilymbus podiceps	pied-billed grebe	
Pelecaniformes:		
Pelecanidae		
Pelecanus erythrorynchos	American white pelican	
pelecanus occidentalis	Brown Pelican	#
Phalacrocoracidae		
Phalacrocorax auritus	double-crested cormorant	CS
Ciconiiformes:		
Ardeidae		
Ixobrychus exilis	least bittern	
Botaurus lentiginosus	American bittern	
Nycticorax nycticorax	black-crowned night heron	
Butorides striatus	green-backed heron	
Bubulcus ibis	cattle egret	
Egretta thula	snowy egret	
Ardea alba	great egret	
Ardea herodias	great blue heron	
Threskiornithidae		
Plegadis chihi	white-faced ibis	FC2,CS
Anseriformes:		
Anatidae		
Cygnus columbianus	tundra swan	
Cygnus buccinator	trumpeter swan	#
Anser albifrons	greater white-fronted goose	
Chen caerulescens	snow goose	
Chen rossii	Ross' goose	
Branta canadensis leucopareia	Aleutian Canada goose	FT
Branta canadensis minima	cackling Canada goose	
Branta canadensis moffitti	Great Basin Canada goose	
Branta canadensis parvipes	lesser Canada goose	
Branta bernicla	brant	#
Anas platyrhynchos	mallard	
Anas strepera	gadwall	
Anas crecca	green-winged teal	
Anas americana	American wigeon	
Anas penelope	Eurasian wigeon	
Anas acuta	northern pintail	

Anas clypeata	northern shoveler	
Anas discors	blue-winged teal	
Anas cyanoptera	cinnamon teal	
Oxyura jamaicensis	ruddy duck	
Aix sponsa	wood duck	
Aythya valisineria	canvasback	
Aythya americana	redhead	
Aythya collaris	ring-necked duck	
Aythya marila	greater scaup	
Athya affinis	lesser scaup	
Bucephala clangula	common goldeneye	
Bucephola albeola	bufflehead	
Mergus merganser	common merganser	
Lophodytes cucullatus	hooded merganser	
Aix galericulata	Mandarin duck	
Branta rufficollis	red-breasted goose	#
Dendrocygna bicolor	fulvous whistling duck	#,C2,CS
Melanitta perspicillata	surf scoter	#

Gruiformes:

Rallidae

Rallus limicola	Virginia rail	
Porzana carolina	sora	
Gallinula chloropus	common moorhen	
Fulica americana	American coot	

Charadriiformes:

Recurvirostridae

Recurvirostra americana	American avocet	
Himantopus mexicanus	black-necked stilt	

Charadriidae

Charadrius alexandrinus nivosus	Western snowy plover	FT,CS
Charadrius semipalmatus	semipalmated plover	
Charadrius vociferus	killdeer	
Charadrius montanus	mountain plover	FC2,CS
Pluvialis squatarola	black-bellied plover	
Pluvialis dominica	American golden plover	

Scolopacidae

Limosa fedoa	marbled godwit	
Newmenius phaeopus	whimbrel	
Newmenius americanus	long-billed curlew	CS
Catoptrophorus semipalmatus	willet	
Tringa melanoleuca	greater yellowlegs	
Tringa flavipes	lesser yellowlegs	
Tringa solitaria	solitary sandpiper	
Actitis macularia	spotted sandpiper	
Phalaropus tricolor	Wilson’s phalarope	
Phalaropus lobatus	red-necked phalarope	
Limnodromus griseus	short-billed dowitcher	
Limnodromus scolopaceus	long-billed dowitcher	
Gallinago gallinago	common snipe	
Calidris alpina	dunlin	
Calidris mauri	western sandpiper	
Calidris minutilla	least sandpiper	
Calidris bairdii	Baird’s sandpiper	

Calidris melanotos	pectoral sandpiper	
Limosa haemastica	Hudsonian godwit	#
Arenaria interpres	ruddy turnstone	#
Calidris canutus	red knot	#
Laridae		
Larus philidelphia	Bonaparte's gull	
Larus delawarensis	ring-billed gull	
Larus argentatus	herring gull	
Larus californicus	California gull	
Larus glaucescens	glaucous-winged gull	
Sterna forsteri	Forster's tern	
Chlidonias niger	black tern	FC2,CS
Sterna caspia	Caspian tern	
Falconiformes:		
Cathartidae		
Cathartes aura	turkey vulture	
Accipitridae		
Aquila chrysaetos	golden eagle	CS
Haliaeetus leucocephalus	bald eagle	FT,SE
Elanus leucurus	white-tailed kite	
Circus cyaneus	northern harrier	CS
Accipiter striatus	sharp-shinned hawk	CS
Accipiter cooperii	Cooper's hawk	CS
Buteo lineatus	red-shouldered hawk	
Buteo jamaicensis	red-tailed hawk	
Buteo swainsoni	Swainson's hawk	ST
Buteo lagopus	rough-legged hawk	
Buteo regalis	ferruginous hawk	FC2,CS
Pandion haliaetus	osprey	CS
Falconidae		
Falco sparverius	American kestrel	
Falco columbarius	merlin	CS
Falco mexicanus	prairie falcon	CS
Falco peregrinus	peregrine falcon	SE
Galliformes:		
Phasianidae		
Callipepla californica	California quail	
Phasianus colchicus	ring-necked pheasant	I
Columbiformes:		
Columbidae		
Columba livia	rock dove	
Zenaida macroura	mourning dove	
Cuculiformes:		
Cuculidae		
Coccyzus americanus	yellow-billed cuckoo	
Strigiformes:		
Tytonidae		
Tyto alba	barn owl	
Strigidae		

Asio flammeus	short-eared owl	CS
Asio otus	long-eared owl	CS
Bubo virginianus	great horned owl	
Otus kennicottii	western screech owl	
Athene cunicularia	burrowing owl	FC2,CS

Caprimulgiformes:
- Caprimulgidae
  - *Chordeiles acutipennis* — lesser nighthawk

Apodiformes:
- Apodidae
  - *Chaetura vauxi* — Vaux's swift
  - *Aeronautes saxatalis* — White-throated swift
- Trochilidae
  - *Archilochus alexandri* — black-chinned hummingbird
  - *Calypte anna* — Anna's hummingbird
  - *Selasphorus rufus* — rufous hummingbird

Coraciiformes:
- Alcedinidae
  - *Ceryle alcyon* — belted kingfisher

Piciformes:
- Picidae
  - *Colaptes auratus* — northern flicker
  - *Melanerpes formicivorus* — acorn woodpecker
  - *Melanerpes lewis* — Lewis' woodpecker
  - *Picoides pubescens* — downy woodpecker
  - *Picoides nuttallii* — Nuttall's woodpecker

Passeriformes:
- Tyrannidae
  - *Tyrannus verticalis* — western kingbird
  - *Tyrranus vociferans* — Cassin's kingbird
  - *Myiarchus cinerascens* — ash-throated flycatcher
  - *Contopus sordidulus* — western wood-pewee
  - *Sayornis nigricans* — black phoebe
  - *Sayornis saya* — Say's phoebe
  - *Empidonax oberholseri* — dusky flycatcher
  - *Empidonax traillii* — willow flycatcher
  - *Empidonax difficilis* — Pacific-slope flycatcher
- Alaudidae
  - *Eremophila alpestris* — horned lark
- Hirundinidae
  - *Tachycineta bicolor* — tree swallow
  - *Tachycineta thalassina* — violet-green swallow
  - *Progne subis* — purple martin
  - *Riparia riparia* — bank swallow
  - *Stelgidopteryx serripennis* — northern rough-winged swallow
  - *Petrochelidon pyrrhonata* — cliff swallow
  - *Hirundo rustica* — barn swallow
- Corvidae
  - *Aphelocoma californica* — western scrub jay

Pica nuttalli	yellow-billed magpie	
Corvus brachyrynchos	American crow	
Corvus corax	common raven	
Regulidae		
Regulus satrapa	golden-crowned kinglet	
Regulus calendula	ruby-crowned kinglet	
Muscicapidae		
Chamaea fasciata	wrentit	
Sialia mexicana	western bluebird	
Catharus ustulatus	Swainson's thrush	
Catharus guttatus	hermit thrush	
Ixoreus naevius	varied thrush	
Turdus migratorius	American robin	
Paridae		
Baeolophus inornatus	oak titmouse	
Aegithalidae		
Psaltriparus minimus	bushtit	
Certhiidae		
Certhia americana	brown creeper	
Sittidae		
Sitta carolinensis	white-breasted nuthatch	
Sitta canadensis	red-breasted nuthatch	
Troglodytidae		
Troglodytes aedon	house wren	
Troglodytes troglodytes	winter wren	
Thyromanes bewickii	Bewick's wren	
Cistothorus palustris	marsh wren	
Salpinctes obsoletus	rock wren	
Laniidae		
Lanius ludovicianus	loggerhead shrike	
Mimidae		
Mimus polyglottos	northern mockingbird	
Toxostoma redivivum	California thrasher	
Motacillidae		
Anthus rubescens	American pipit	
Bombycillidae		
Bombycilla cedrorum	cedar waxwing	
Sturnidae		
Sturnus vulgaris	European starling	I
Vireonidae		
Vireo cassinii	Cassin's vireo	
Vireo gilvus	warbling vireo	
Emberizidae		
Vermivora celata	orange-crowned warbler	
Vermivora ruficapilla	Nashville warbler	
Dendroica coronata	yellow-rumped warbler	
Dendroica nigriscens	black-throated gray warbler	
Dendroica townsendi	Townsend's warbler	
Dendroica occidentalis	Hermit warbler	
Dendroica petechia	yellow warbler	
Oporornis tolmiei	MacGillivray's warbler	
Wilsonia pusilla	Wilson's warbler	
Geothlypis trichas	common yellowthroat	

Icteria virens	yellow-breasted chat	
Pheucticus melanocephalus	black-headed grosbeak	
Guiraca caerulea	blue grosbeak	
Passerina amoena	lazuli bunting	
Pipilo maculatus	spotted towhee	
Pipilo crissalis	California towhee	
Ammodramus savannarum	grasshopper sparrow	
Pooecetes gramineus	vesper sparrow	
Passerculus sandwichensis	savannah sparrow	
Melospiza melodia	song sparrow	
Chondestes grammacus	lark sparrow	
Amphispiza belli	sage sparrow	
Spizella passerina	chipping sparrow	
Junco hyemalis	dark-eyed junco	
Zonotrichia leucophrys	white-crowned sparrow	
Zonotrichia atricapilla	golden-crowned sparrow	
Passerella iliaca	fox sparrow	
Melospiza lincolnii	Lincoln's sparrow	
Sturnella neglecta	western meadowlark	
Xanthocephalus xanthocephalus	yellow-headed blackbird	
Agelaius phoeniceus	red-winged blackbird	
Agelaius tricolor	tricolored blackbird	FC2,CS
Euphagus cyanocephalus	Brewer's blackbird	
Molothrus ater	brown-headed cowbird	
Icterus bullockii	Bullock's oriole	
Icterus cucullatus	hooded oriole	
Piranga ludoviciana	western tanager	
Passeridae		
Passer domesticus	house sparrow	I
Fringillidae		
Carduelis pinus	pine siskin	
Carduelis tristis	American goldfinch	
Carduelis psaltria	lesser goldfinch	
Carduelis lawrencei	Lawrence's goldfinch	
Carpodacus purpureus	purple finch	
Carpodacus mexicanus	house finch	

Status:
FE-federal endangered
FC-federal candidate 1 or 2
FT-federal threatened
SE-California endangered
ST-California threatened
CS-California species special concern
I-introduced
*-historical range within refuge lands and/or habitat types
#-accidental

Source:
San Luis NWRC staff observations
San Luis NWRC biological files
Grasslands Bypass Project EIS, December 2000
San Joaquin River NWR 1998 Biological Inventory

San Luis National Wildlife Refuge Complex Species List: Mammals
(updated 2/15/2001)

Order / Family / *Species*	Common name	Refuge Unit	Status
Marsupialia			
Dipelphidae-opossom			
Didelphis virginiana	Virginia opossum	S,K,M,A,R	I
Insectivora			
Sorcidae-shrews			
Sorex ornatus	ornate shrew	R	
Talpidae-moles			
Scapanus latimanus	broad-footed mole	*	
Chiroptera			
Vespertilionidae-evening bats			
Myotis californicus	California myotis	*	
Myotis yumaensis	Yuma myotis	*	FC2
Myotis ciliolabram	small-footed myotis	*	FC2
Myotis volans	long-legged myotis	*	FC2
Myotis evotis	long-eared myotis	*	FC2,T
Myotis thysanodes	fringed myotis	*	T
Myotis lucifugus occultus	Arizona myotis	*	FC2, CS
Lasiurus borealis	red bat	*	
Lasiurus cinereus	hoary bat	*	
Eptesicus fuscus	big brown bat	*	
Pipistrellus hesperus	western pipistrelle	*	
Antrozous pallidus	pallid bat	*	
Plecotus townsendii	Townsend's big-eared bat	*	FC2, CS
Euderma maculatum	spotted bat	*	T, FC2
Molossidae-free-tailed bats			
Tadarida brasiliensis	Brazillian free-tailed bat	*	
Eumops perotis californicus	California mastiff bat	*	FC2, CS
Lagomorhpa			
Leporidae-rabbits and hares			
Lepus californicus	black-tailed hare	S,K,M	
Sylvilagus audobonii	desert cottontail	S,K,M,A,R	
Sylvilagus bachmani riparius	Riparian brush rabbit	*	FE, SE
Rodentia			
Sciuridae-squirrels and chipmunks			
Spermophilus beecheyi	California ground squirrel	S,K,M,A,R	
Ammospermophilus nelsoni	San Joaquin antelope squirrel	*	FC2, ST
Geomyidae			
Thomomys bottae	southwestern pocket gopher	S,K,M,A,R	
Heteromyidae-kangaroo mice and rats, pocket mice			
Perognathus longimembris longimembris	little pocket mouse	*	
Perognathus inornatus inornatus	San Joaquin pocket mouse	*	FC2

Dipodomys heermanni	Heerman's kangaroo rat		S,K,M,A		
Dipodomys nitratoides excilis	Fresno kangaroo rat		*		FE, SE
Dipodomys ingens	giant kangaroo rat		*		FE, SE
Castoridae-beavers					
Castor canadensis	beaver		S,K,M,A,R		
Muridae-old world rats and mice, new world rate, mice, voles					
Reithrodontomys megalotis	western harvest mouse				
Peromyscus maniculatus	deer mouse		S,K,M,A,R		
Onychomys torridus	southern grasshopper mouse		*		
Neotoma fuscipes riparia	San Joaquin Valley wood rat		*		FE,SE
Microtus californicus	California vole		S,K,M,A,R		
Ondatra zibethicus	muskrat		S,K,M,A,R		I
Mus musculans	house mouse		S,K,M,A,R		I
Rattus norvegicus	Norway rat	S,M		I	
Rattus rattus	black rat		R		I
Carnivora					
Canidae-coyotes, foxes, dogs					
Canis familiaris	domestic dog				I
Canis latrans	coyote		S,K,M,A,R		
Vulpes macrotis mutica	San Joaquin Valley kit fox		S,K,M,		FE,ST
Urocyon cinereoargenteus	gray fox		K,R		
Vulpes vulpes	red fox				I
Procyonidae-raccoons, ringtails					
Procyon lotor	raccoon		S,K,M,R		
Mustelidae-weasels and kin					
Mustela vison	mink		S,K,M,R		
Mustela frenata	long-tailed weasel		S,K		
Lutra canadensis sonorae	southwestern river otter		S,K,R		FC2,CS
Taxidea taxus	badger		K,A		
Mephitis mephitis	striped skunk		S,K,M,A,R		
Spilogale gracillus	western spotted skunk				
Felidae-cats					
Lynx rufus	Bobcat		K		
Artiodactyla					
Cervidae-elk					
Odocoileus hemionus	black-tailed deer		K,R		
Cervus elaphus nannodes	Tule elk		S		!
Suidae-boar					
Sus scrofa	Domestic pig		#		I

RefugeUnit:
S-San Luis Unit, San Luis NWR
K-Kesterson Unit, San Luis NWR
M-Merced Unit, Merced NWR
A-Arena Plains Unit, Merced NWR
R-San Joaquin River NWR
*-historical range within refuge lands and/or habitat types

Status:

FE-federal endangered
FT-federal threatened
FC-federal candidate 1 or 2
SE-California endangered
ST-California threatened
CS-California species special concern
I-introduced
!-Captive Tule Elk heard at San Luis
#-one feral pig shot on Kesterson in 1987, one pig observed at Merced 1996

Source:
San Luis NWRC staff observations
San Luis NWRC biological files
San Joaquin River NWR 1998 Biological Inventory
San Luis NWRC kit fox surveys (1986-present)

San Luis National Wildlife Refuge Complex Species List: Fish
(updated 2/16/2001)

Family / *Species*	Common name	Refuge Unit	Status
Petromyzontidae			
Lampetra tridentata	Pacific Lamprey	R	
Acipenseridae			
Acipenser transmontanus	white sturgeon	R	
Clupeidae			
Alosa sapidissima	American shad	R	I
Dorosoma petenese	threadfin shad	K,R	
Cyprinidae			
Cyprinus carpio	common carp	S,K,M,RI	
Carassius auratus	goldfish	S,K,M,RI	
Notemigonus crysoleucas	golden shiner	R,K	
Lavinia exilicauda	hitch	R	
Orthodon microlepidotus	Sacramento blackfish	R	
Pogonichthys macrolepidotus	Sacramento splittail	S,K,R	FE
Ptychocheilus grandis	Sac. pikeminnow R		
Cyprinella lutrensis	red shiner	S,K,R	
Pimephales promelas	fathead minnow	R**,**K**.**S	
Catostomidaeca			
Catostomus occidedntalis	Sacramento sucker	R	
Ictaluridae			
Ameiurus catus	white catfish	S,K,R	I
Ameiurus nebulosus	brown bullhead	S,K,R	I
Ameiurus melas	black bullhead	S,K,R	I
Ictalurus punctatus	channel catfish	S,K,R	I
Salmonidae			
Oncorhynchus tshawytscha	chinook salmon	K,R	
Oncorhynchus mykiss	rainbow trout	R	
Poeciliidae			
Gambusia affinis	western mosquitofish	S,K,M	
Atherinidae			
Menidia beryllina	inland silverside	S,K,R	
Cottidae			
Cottus asper	prickly sculpin	R	
Percichthyidae			
Morone saxatilis	striped bass	S,K,R	I
Centrarchidae			
Pomoxis migromaculatus	black crappie	R	I
Pomoxis annularis	white crappie	S,K,R	I

Lopomis gulosus	warmouth	S,K,R	I
Lopomis cyanellus	green sunfish	S,K,M,RI	
Lopomis macrochirus	bluegill	S,K,M,RI	
Lopomis microlophus	red-ear sunfish	R	I
Micropterus salmoides	largemouth bass	S,K	I
Micropterus dolomieu	smallmouth bass	R	I
Percidae			
Percina macrolepida	bigscale logperch	K,R	
Archoplitis innterruptus	Sacramento perch	R	FC2
Embiotocidae			
Hysterocarpus traski	tule perch	R	

RefugeUnit:
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K-Kesterson Unit, San Luis NWR
M-Merced Unit, Merced NWR
A-Arena Plains Unit, Merced NWR
R-San Joaquin River NWR
*-historical range within refuge lands and/or habitat types

Status source: www.dfg.ca.gov/wmd/cwhr/natives.html

Status:
FE-federal endangered
FT-federal threatened
FC-federal candidate 1 or 2
SE-California endangered
ST-California threatened
CS-California species special concern
I-introduced

Data Source:
San Luis NWRC staff observations
San Luis NWRC biological files
Grasslands Bypass Project EIS, December 2000
FWS Contaminants Monitoring Project (1989-present)
San Joaquin River NWR 1998 Biological Inventory
CDFG, Stockton Fisheries Office

San Luis National Wildlife Refuge Complex Species List: Herptiles
(updated 2/15/2001)

		Refuge Unit	Status
Order			
Family			
Species	Common name		
Caudata			
Ambystomatidae-mole salamanders			
Ambystoma californiense	California tiger salamander	S,K,M,RFC2,CS	
Plethodontidae-lungless salamanders			
Batrachoseps attenuatus	California slender salamander	*	
Anura			
Pelobatidae-spadefoot toads			
Spea hammondii	western spadefoot toad	S,K,M,RFC2,CS	
Bufonidae-true toads			
Bufo boreas	western toad	S,K,M,R	
Hylidae-tree frogs			
Hyla regilla	pacific tree frog	S,K,M,R	
Ranidae-true frogs			
Rana aurora draytonii	California red-legged frog	*	FT
Rana catesbeiana	bullfrog	S,K,M,RI	
Rana pipiens	leopard frog	K	I
Testudines			
Emydidae-box and water turtles			
Clemmys marmorata marmorata	westen pond turtle	S,K,M,A,R	FC2,CS
Trachemys scripta	slider	R	
Trionychidae-soft shell turtles			
Trionyx sp.		S,K	I
Squamata			
Iguanidae-iguanid lizards			
Gambelia silus	blunt-nosed leopard lizard	*	FE,SE
Phrynosoma coronatum frontale	California horned lizard	K,A	FC2,CS
Sceloporus occidentalis	western fence lizard	S,K,M,A,R	
Uta stansburniana hesperis	Cal.side-blotched lizard		
Scincidae-skinks			
Eumeces gilberti	Gilbert's skink	S,K,A	
Teiidae-whiptail lizards			
Cnemidophorus tigris mundus	California whiptail	*	
Anguidae-alligator lizards			
Gerrhonotus multicarinatus multicarinatus	Cal. alligator lizard	*	
Anneillidae-legless lizards			
Anniella pulchra	California legless lizard	A	
Colubridae-colubrids			
Arizona elegans occidentalis	California glossy snake	*	
Coluber constrictor mormon	western yellow-bellied racer	S,K,M	
Lampropeltis getulus californiae	California kingsnake	S,K	
Masticophis flagellum ruddocki	San Joaquin whipsnake	*	FC2,CS

Pituophis melanoleucus	gopher snake	S,K,M,A	
Pituophis melanoleucus catenifer	pacific gopher snake		
Thamnophis couchi gigas	giant garter snake	S	FT,ST
Thamnophis elegans	west. terrestrial garter snake	S,K,M	
Thamnophis sirtalis	common garter snake	S,K,M	
Viperidae-rattlesnakes, vipers			
Crotalus viridis	western rattlesnake		

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*-historical range within refuge lands and/or habitat types

Status:
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I-introduced

Source:
San Luis NWRC staff observations
San Luis NWRC biological files
Grasslands Bypass Project EIS, December 2000
San Joaquin River NWR 1998 Biological Inventory

SAN LUIS NWR

STRUCTURE	DESCRIPTION	LOCATION
Water control structures	plastic pipe w/concrete weir	At each inlet/outlet of every pond
Elk pasture fence	8" wood posts	southwest corner of SNL
Elk pasture obs. tower	wood	Lat37E10'38" Long120E48'17"
Well #1	metal/electric	Lat37E10'26" Long120E46'40"
Well #3	metal/electric	Lat37E10'17"Long120E48'27"
Lift pump #4 panel	metal/electric/wood.	Lat37E12'35" Long120E49'12"
Lift pump #5/6 panel	metal/electric/wood	Lat37E12'35" Long120E49'12"
Souza Obs. Tower	wood	Lat37E10'22" Long120E48'19"
San Luis kiosk	wood	Lat37E10'54" Long120E48'27"
West Bear Creek main gate	electric/metal	Hwy 165 @ WBC Unit
Salt Slough boat ramp gate	electric/metal	Lat37E14'40" Long120E50'59"
San Luis entrance gate	electric/metal	Wolfsen Rd @ SNL boundary
East Bear Creek well #11	electric/metal/wood	Lat37E13'23" Long120E46'43"
East Bear Creek well #12	metal	Lat37E13'48"Long120E47'14"
East Bear Creek well #13	electric/metal/wood	Lat37E14'43" Long120E46'42"
Main Power Line	wood poles/high voltage	elk pasture and SNL hunt zone

SAN JOAQUIN RIVER NWR

STRUCTURE	DESCRIPTION	LOCATION
Former Dan Vierra residence	2,106 sq. ft. house	
Life estate Dave Vierra residence	2,034 sq. ft. house	
Dan's horse shelter	wood	
Dave's horse shelter	wood	
Green residence	wood house	
White residence	wood house with detached wood carport	
Milk barn	concrete	
Big barn	10,880 sq. ft. wood barn	
Shop storage building	3,875 sq. ft. wood barn	
Hagemann barn	1,578 sq. ft. metal barn	
Hagemann barn #2	5,000 sq. ft. metal barn	
Hagemann lift pumps (X 9)	lift pumps and power panels (X 9)	
Lara lift pumps (X 2)	lift pumps and power panels (X 2)	
Old shed, Lara	wooden storage building	
Airport hanger	metal storage building	
Diesel fuel tank	1,000 gallon above ground fuel storage tank	

MERCED NWR

STRUCTURE	DESCRIPTION	LOCATION
Shop/office building	metal style building	
Garage/metal shop	metal style building	
ATV storage/sign room	wood building	
Wood shop	metal style building	
Residence	custom style ranch home	
Old hay barn	wood	
23 deep wells		
3 domestic wells		
Mobile home/trailer (Arena Plains Unit)	3 room/5 person/2 baths	
Oil House		Lat37E10'22"N Long120E37'30"W
Welding Shop		Lat37E10'26"N Long120E37'31"W
Metal Shop/Office Building		Lat37E10'39"N Long120E37'38"W
Wood Shop		Lat37E10'16"N Long120E37'27"W
Residence		Lat37E10'42"N Long120E37'27"W
ATV/Tool Storage		Lat37E10'21"N Long120E37'29"W

APPENDIX K: FIRE HISTORY

Table 1: San Luis NWR Fires (1981-2000)

Year	Wildland Fire		Prescribed	
	# fires	# acres	# fires	# acres
1981	0	0	0	0
1982	1	2	5	209
1983	0	0	0	0
1984	0	0	0	0
1985	3	15	2	100
1986	1	1	2	151
1987	2	1	4	320
1988	1	12	2	197
1989	4	1	4	206
1990	2	1	4	380
1991	3	25	5	188
1992	0	0	0	0
1993	5	3	0	0
1994	2	5	0	0
1995	0	0	6	390
1996	3	10	5	230
1997	2	5	8	1025
1998	1	1	6	686
1999	6	4	4	740
2000	6	35	4	320

Table 2: Merced NWR Fires (1981-2000)

	Wildland Fire	Prescribed

Year	# fires	# acres	# fires	# acres
1981	0	0	0	0
1982	0	0	1	45
1983	0	0	0	0
1984	0	0	0	0
1985	2	85	0	0
1986	1	2	5	161
1987	0	0	2	107
1988	0	0	0	0
1989	0	0	0	0
1990	0	0	2	133
1991	1	10	0	0
1992	0	0	3	425
1993	0	0	1	95
1994	2	45	0	0
1995	0	0	2	125
1996	1	3	4	180
1997	0	0	2	100
1998	0	0	2	90
1999	0	0	2	60
2000	0	0	4	150

APPENDIX L: PRESCRIBED FIRE PLAN FORMAT

Prescribed Fire Plan
San Luis National Wildlife Refuge Complex

Approved By: _____ Date:
Refuge Manager

Prepared By: _____ Date:
Prescribed Fire Specialist / Burn Boss (circle one)

Reviewed By: _____ Date:
Fire Management Officer

Reviewed By: _____ Date:
Refuge Manager

Reviewed By: _____ Date:
Refuge Biologist

Reviewed By: _____ Date:
Burn Boss
(If not preparer of fire plan)

The approved Prescribed Fire Plan constitutes the authority to burn, pending approval of Section 7 Consultations, Environmental Assessments, or other required documents. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Prescribed burning conditions established in the plan are firm limits. Actions taken in compliance with the approved Prescribed Fire Plan will be fully supported, but personnel will be held accountable for actions taken which are not in compliance with the approved plan.
Refuge:

Name of Area:

Acres To Be Burned:

Legal Description:
State: California **County:**
Latitude: Longitude:
Township: Range: Sections:
Quad Map: USGS - CA **Series:** 7.5" **Scale:** 1:24000

Is a Section 7 Consultation being forwarded to Fish and Wildlife Enhancement for review? **YES / NO** (Programmatic section 7 is in place for this activity)

Prescribed Fire Burn Boss/Specialist participated in the development of this plan? **YES / NO**

(Included: Refuge map showing the location of the burn on Fish and Wildlife Service land.)

I. GENERAL DESCRIPTION OF BURN UNIT

Physical Features and Vegetation Cover Types (Species, height, density, etc.):
Elevation: Slope: 0-2% **Aspect:** Flat
Unit Description:
Vegetation:

Primary Resource Goals of Unit: (Be specific. These are management goals):

Objectives of Fire (Be specific. These are different than management goals)**and Acceptable Range of Results:** (Area burned vs. unburned, scorch height, percent kill of a species, range of litter removed)
General Objectives:
1) Provide for Firefighter and Public Safety.
2) Minimize smoke impacts
Resource Objectives and Ranges:
1) Reduce or consume 1 hr fuels(grass); 60 - 100%

II. PRE-BURN MONITORING

Vegetation Type Acres % FBPS Fuel Model

Total

Habitat Conditions: (Identify with transect numbers if more than one in burn unit.)

Type of Transects:

Photo Documentation (Add enough spaces here to put a pre-burn photo showing the habitat condition or problem you are using fire to change/correct. A photo along your transect may reflect your transect data.):

III. PLANNING AND ACTIONS

Complexity Analysis Results:(see attached complexity sheet)

Prescribed Fire Organization: (See Section VII, Crew and Equipment Assignments. All personnel and their assignments must be listed. All personnel must be qualified for the positions they will fill.)

Site preparation:
Who: **Time:**
Fire crew 1-2 weeks prior to burn
What to be done:

Weather information required:
Instrument Location and Elevation (s): On site (wx kit)

Data Collected and Sampling Period: Temp, RH, Wind Speed and direction(mid flame). On site will be 1 day prior to burn.

Forecasts: Weather forecasts(general) will be monitored 2 - 3 days prior to burning. A general (for Low complexity burns only)or spot weather forecast will be requested for the day of the burn or as needed. Forecast obtained from the local Fire Weather Unit:

Hanford Fire Weather Office
900 Foggy Bottom Road
Hanford, CA 93230
(559) 584-9505

Safety considerations and Protection of sensitive features:
(Adjacent lands, visitors, facilities, terrain, etc., and needed actions. Include buffer and safety zones. Be specific, indicate on a burn unit map. Map should be a USGS quadrangle if possible, so ridges, washes, water, trails, etc. can be identified.)

General: Unit is flat and has no major hazards.
Special Constraints and Considerations (Should be discussed with Burn Boss):
Special Safety Precautions Needing Attention:(Aerial ignition, aircraft, ignition from boat, etc.):
Public safety: The area is in a closed part of the refuge.
Safety Zones and Escape Routes: All areas will be identified in the pre-fire briefing.
Medical Facility: Minor injuries will be handled at the scene. Major injuries - call 911 from cell phone (burn Boss). At least 1 First aid trained person will be on scene**.**
Adjacent Lands:
Facilities:
Endangered, Threatened, or Listed Species:
PROTECTION ACTIONS:
Sensitive or Species of Concern:
PROTECTION ACTIONS:
Archeological, Historical, or Cultural Areas:
PROTECTION ACTIONS:

COMMUNICATION:

Communication and Coordination on the Burn (Who will have radios, frequencies to be used, who will coordinate various activities.):
All crews will have at least 1 radio or be teamed with a person with a radio. Tactical channel NIFC 2 (168.200)will be used. Cell phone will be on site and with the Burn Boss or Deputy

Media Contacts (Radio stations, newspaper, etc., list with telephone numbers): Burning is a common activity in the Los Banos area so no media contacts are needed. Adjacent land owners and neighbors will be notified prior to the burn. Burn information is available by request(in person or by phone) from the San Luis National Wildlife Refuge Complex Headquarters:
San Luis National Wildlife Refuge Complex
947-C West Pacheco Blvd.
Los Banos, CA 93635
Phone:(209)826-3508 Fax:(209)826-1445
Hrs: Mon - Fri 8:00 am to 4:30 pm

(see Contact list)

IV. IGNITION, BURNING AND CONTROL

Scheduling: Approx. Date(s):
Duration: days

Acceptable Range

FBPS Fuel Model 1	MIN	MAX	OPT
Temperature (degrees F)			
Relative Humidity (%)			
20' Wind Speed (mph)			
MF Wind Speed (mph) Gusts			
Wind Direction			
Cloud Cover (%)			
ENVIRONMENTAL CONDITIONS			
1 hr. Fuel Moisture			
10 hr. FM			
100 hr. FM			
Woody Live Fuel Moisture			
Herb. Live Fuel Moisture			
FIRE BEHAVIOR			
Rate of Spread (mph): Head fire Backing fire			
Flame Length(feet) Head fire Backing fire			

Cumulative effects of weather and drought on fire behavior: None

Ignition Technique: (Explain and include on map of burn unit. Use of aerial ignition must be identified in this plan. Last minute changes to use aircraft will not be allowed and will be considered a major change to the plan. This will require a resubmission):

Other: (If portions of the burn unit must be burned under conditions slightly different than stated above, i.e., a different wind direction to keep smoke off of a highway or off of the neighbors wash, detail here.)

Prescription monitoring: (Discuss monitoring procedure and frequency to determine if conditions for the burn are within prescription)

V. SMOKE MANAGEMENT

Make any Smoke Management Plan an attachment.

Permits required:(who, when)

Burn will be conducted on a declared "burn day" or as planned under a favorable 48 and 24 hour smoke forecast from the San Joaquin Valley Air Pollution Control District. A call will be placed at 08:30 am the day of the burn to for Burn Day status and to register the acres for the day.

Total Emissions Estimate(Tons/# of acres): FOFEM Generated

PM 10:
PM 2.5:
CO:
Total:

Distance and Direction from Smoke Sensitive Area(s):

Visibility Hazard(s) (Roads, airports, etc.):

Actions to Reduce Visibility Hazard(s):

Residual Smoke Problems: 100% mop-up of the unit after ignition and burn down is completed. No more than 24 hours for any smoke in unit.

Necessary Transport Wind Direction, Speed and Mixing Height: (Explain how this information will be obtained and used)

VI. FUNDING AND PERSONNEL

Activity Code: 11650-9263

Est Costs: (See Attached)

VII. BURN-DAY ACTIVITIES

Public/Media Contacts on Burn Day: (List with telephone numbers):

Crew & Equipment Assignments: (List all personnel, equipment needed, and assignments. The following is not an all-inclusive list for what you may need.)

Crew Briefing Points: Area / unit overview, burn objectives, safety including escape and safety zones, weather, fire behavior, crew assignments, firing pattern and timing, holding concerns, communication, and contingency actions and responsibilities.

Firing Procedures: (Methods, how, where, who, and sequence. Go over what was submitted in Section IV and any changes needed for the present conditions. Attach ignition sequencing map if necessary)

Personnel Escape Plan:

Special Safety Requirements:

Go-No-Go Checklist:(see Attached)

Holding Actions: (crew placement, duties)

Critical Control Problems:

Water Refill Points:

Contingency Plan:(Are there crews standing by to initial attack or will people doing other jobs be called upon to do initial attack, who must be called in case of an escape, what radio frequencies will be used, etc.).
In the event of an escape or conditions become unfavorable(smoke, weather, fire behavior, and/or objectives not being achieved)the Burn Boss will declare the fire out of prescription or escaped(which ever is the situation)and will assume IC of the fire(until relieved by a higher rated IC). All new burning will stop unless needed to contain the RX or escaped fire. The holding crew will begin attacking the escape and the ignition crew will hold and work the RX fire until the RX fire is contained or is deemed as no threat.

If the fire exceeds the capability of the crews on hand a call will be placed for assistance from local resources through the Sierra National Forest Dispatch. The contingency plan will be outlined in the briefing with procedures for activation of the contingency plan. A list of the available resources will be posted with the Sierra NF Dispatch which will be the ordering point for the incident. If the fire exceeds the capability of the crews on hand a call will be placed for assistance from local resources (Merced County Fire Department and Sierra NF) through the Sierra National Forest Dispatch. The contingency plan will be outlined in the briefing with procedures for activation of the contingency plan. Sierra NF dispatch will be the ordering point for the incident. If the escape fire exceeds more than 12 hours, a Wildland Fire Situation Analysis(WFSA) will be completed for the incident.

Minimum required on - site contingency resources and response times:
1- Tractor w/ disk and driver
1- Tractor w/ mower and driver

Minimum required off - site contingency resources and response times:
1- Type III IC - 1 hr
1- Engine (Merced County FD) - ½ -1 hr
1- Helicopter (1-2 hr CWN or SNF)

Mop Up and Patrol: Mop-up will be 100% due to the fuel load. Smoldering heavy fuels will be extinguished. The area will be patrolled by at least 1 crew through the evening and the following days as needed.

Rehabilitation Needs:

Special Problems:

San Luis National Wildlife Refuge Complexes

GO-NO-GO CHECKLIST

Unit

Answer Yes or No to the following:

___ Do you have an APPROVED fire plan?

___ Are ALL fire prescriptions elements met?

___ Are ALL smoke management prescriptions met?

___ Are ALL permits and clearances obtained?

___ Has an area spot weather forecast been OBTAINED and is it FAVORABLE?

___ Are ALL required personnel in the prescribed fire plan on-site?

___ Have ALL personnel been briefed on the prescribed fire plan requirements?

___ Have ALL personnel been briefed on safety hazards, escape routes, and safety zones?

___ Has the contingency planning process adequately considered FUELS ADJACENT TO and in REASONABLE PROXIMITY to the burn unit?

___ Has the availability of ALL contingency resources been checked, and are they available?

___ Are the ON-SITE holding forces adequate for containment under the expected conditions?

___ Have ALL the required notifications been made?

___ Is ALL of the required equipment in place and in working order?

___ In YOUR OPINION, can the prescribed fire meet the planned objectives, be carried out according to the approved plan?

We certify that we have reviewed the burn objectives, we are in agreement that the Prescribed Fire Complexity Analysis is correct, and that ALL of the questions above were answered "YES"?

Refuge Manager Date Burn Boss Date

VIII. CRITIQUE OF BURN

Were burn objectives within acceptable range of results? (Refer to Section I):

What would be done differently to obtain results or get better results?

Was there any deviation from plan? If so, why?

Problems and general comments:

IX. POST-BURN MONITORING

Date:_____ Refuge Burn Number:

Length of Time after Burn:

Vegetative Transects:

Comments on Habitat Conditions, etc.:

Photo Documentation:

Other:

X. FOLLOW-UP EVALUATION

Date: _____ Refuge Burn Number:

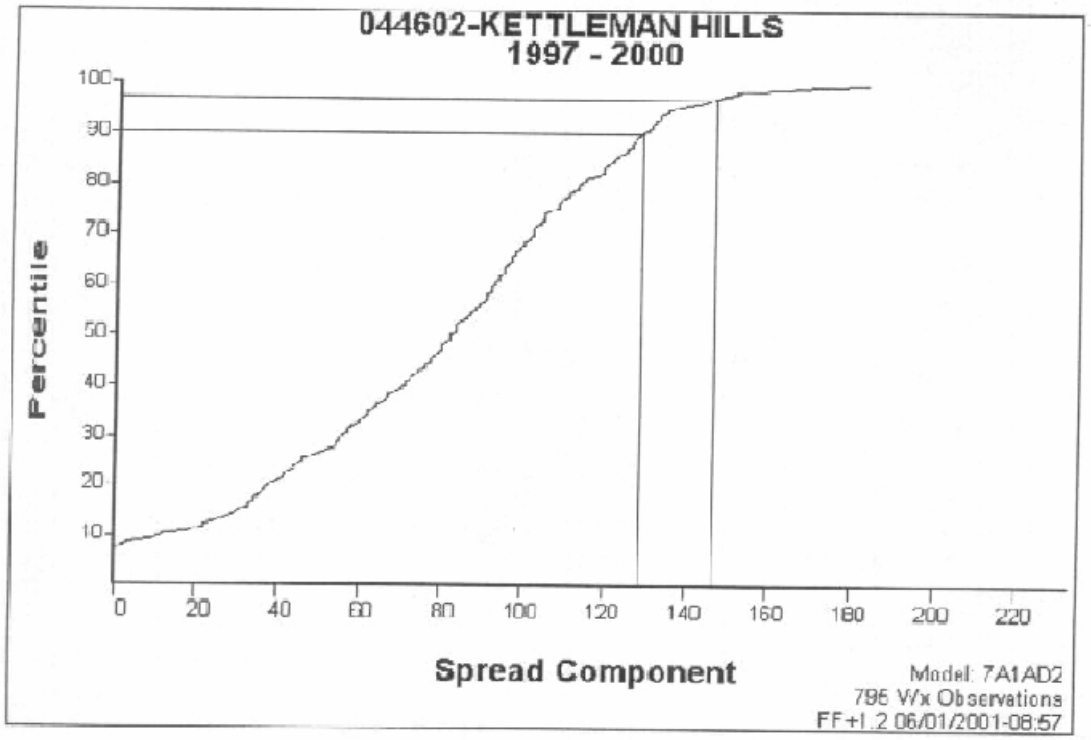
Length of Time after Burn:

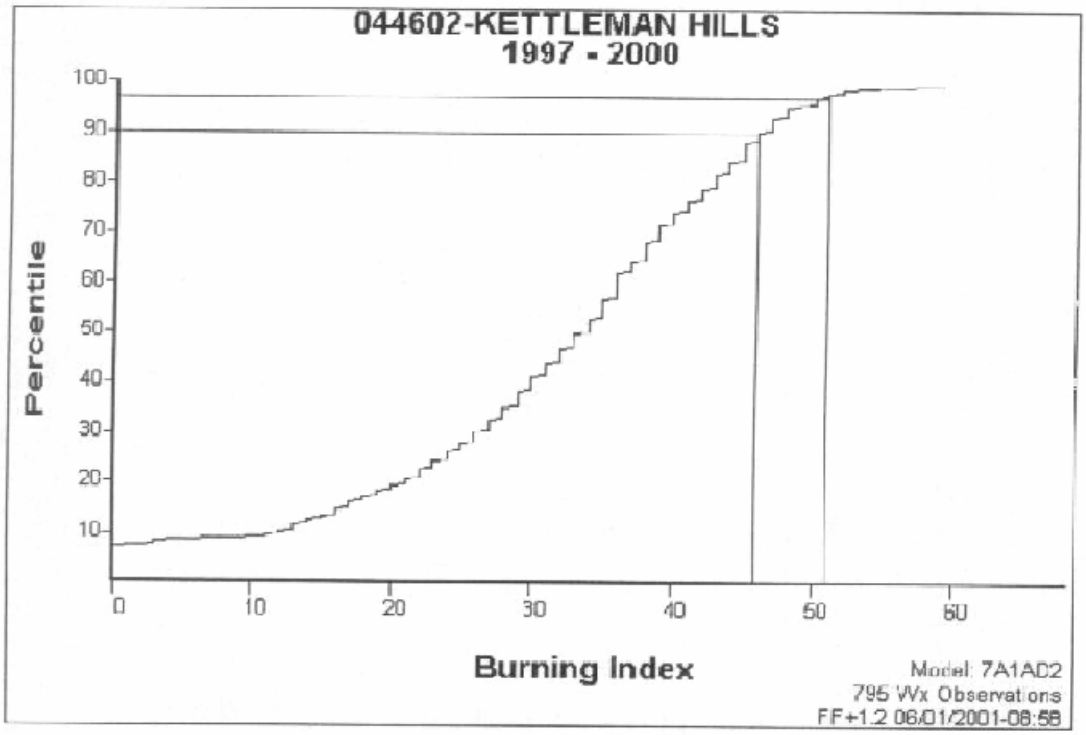
Vegetative Transects:

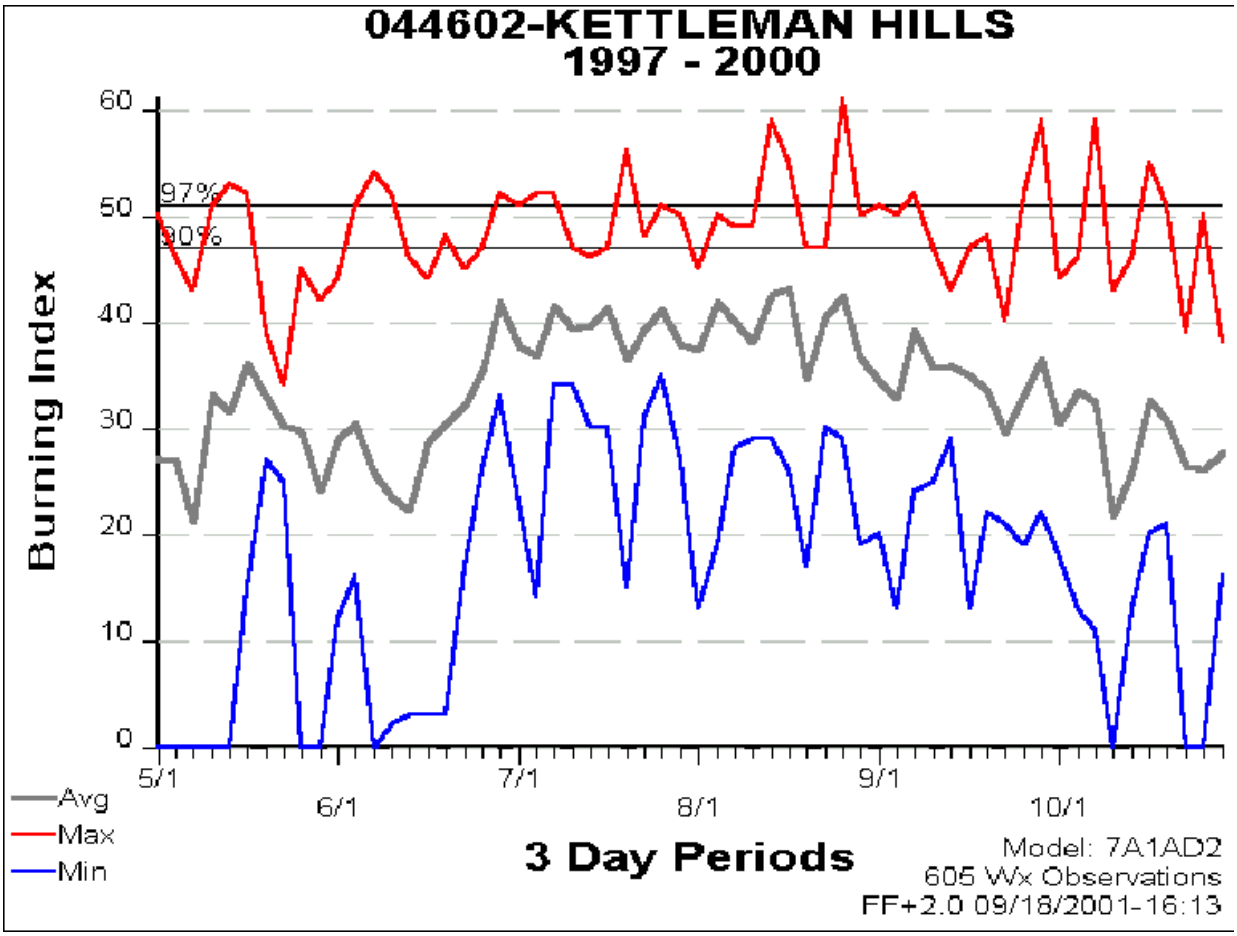
Comments on Habitat Conditions, etc.:

Photo Documentation:

APPENDIX M: WEATHER ANALYSIS






044602-KETTLEMAN HILLS
1997 - 2000
Burning Index
60
50
40
30
20
10
0
97%
90%
5/1
6/1
7/1
8/1
9/1
10/1
Avg
Max
Min
3 Day Periods
Model: 7A1AD2
605 Wx Observations
FF+2.0 09/18/2001-16:13

APPENDIX N: STEP-UP PLAN

The Step-up plan in designed to maintain adequate fire readiness during the year.
Staffing Level Definitions:

LOW - Declared non-fire season (late autumn-winter).

MEDIUM - Declared fire season, normal summer weather and fuel conditions, drought or dry periods during the non-fire season (winter), and/or preparedness levels III (National or State/Local).

HIGH - Fire Weather Watch or Warning for high wind and/or low humidity as issued from the Hanford Fire Weather Office; or air temperature at 1600 hours >100 degrees F or B.I.> 46; and/or National or State/Local preparedness levels are IV or V.

PREPAREDNESS ACTIONS	STAFFING LEVELS		
	LOW	MEDIUM	HIGH
FIRE STAFF			
Dress in nomex and boots, carry PPE while on duty, and maintain contact with headquarters.		X	X
Maintain a minimum response time (with assigned engine at duty station) of:	1 hr	15 min	5 min
Remain with assigned engine at station or on patrol		X	X
Work weeks and/or tours of duty may be extended			X
REFUGE STAFF/COLLATERAL FIREFIGHTERS			
Carry PPE with them while on duty (Including Nomex and boots)		X	X
May be assigned to an engine at a station or patrol			X
Work weeks and/or tours of duty may be extended			X
PRESCRIBED FIRE ACTIVITY			
Prescribed Burning Allowed	X	X	
FIRE EQUIPMENT			
Engines in ready status	1	2	2
Reserve engine in ready status	0	1	1
MISCELLANEOUS EMERGENCY PRESUPPRESSION ACTIONS			
Notify RFMC and open emergency preparedness account			X
Preposition USFWS and interagency resources as needed			X

APPENDIX O: COMMUNICATIONS PLAN

Channel	Frequency		Description
	Transmit	Receive	
1	151.335	159.300	CDF 1 COMMAND
2	151.265	151.330	CDF 2 COMMAND
3	151.460	159.390	LOCAL NET
4	151.400	159.375	CDF SUPPORT
5	154.400	159.045	MERCED COUNTY LOCAL
6	151.325	151.315	CDF 6 TACTICAL
7	151.340	151.340	CDF 7 TACTICAL
8	151.370	151.370	CDF 8 TACTICAL
9	154.340	154.340	ORANGE TACTICAL
10	154.070	154.385	VALLEY COMMAND
11	154.355	154.355	PURPLE COMMAND
12	168.200	168.200	NIFC 2 TACTICAL
13	OPEN	OPEN	OPEN
14	172.225	169.925	SIERRA NF FIRE

APPENDIX P: SAMPLE WFSA

WILDLAND FIRE SITUATION ANALYSIS

7. Jurisdiction: **US Fish and Wildlife Service**	8. Geographic Area: **Southern California Operations**
9. Unit: National Wildlife Refuge	10. WFSA Number of .
11. Fire Name:	12. Incident Number:
13. Accounting Code:	
14. Date/Time prepared / / @ : .	
15. Attachments	
-Complexity Analysis X -Risk Assessment/Analysis X Probability of success Consequences of Failure -Maps -Decision Tree -Fire Behavior Projections X -Calculations of Resource Requirements -Other	

OBJECTIVES AND CONSTRAINTS

$Objectives (Must be specific and measurable) These objectives must be considered in the development of alternatives in III, below. Suppression objectives must relate to the Unit resource management objectives.

$ Safety (These must receive the highest priority)
  -Public
  -Firefighter

$ Economic (May include closure, which could impact the public through transportation, communication and resource values)

$ Environmental (e.g. management objectives for wildlife habitat, water quality, etc.)

$ Social (May include local attitudes twoards fire that might affect decisions on the fire)

$ Other (e.g. legal or administrative constraints needing consideration such as fire encroaching onto other jurisdictions)

$Constraints (e.g. environmentally and culturally sensitive areas, irreprarable damage to resources, and economic constrants)

ALTERNATIVES

	A.	B.	C.
Wildland Fire Strategy	e.g. Allow fire to play a natural role	e.g. Aggressive attack	
Narrative			
Resources Needed Hand Crews Engines Dozers Air Tankers Helicopters			
Final Size			
Est. Contain/ Control Date			
Costs			
Risk Assessment -Probability of success -Consequence of failure			
Complexity			
Attach maps for each alternative			

EVALUATION OF ALTERNATIVES

	A.	B.	C.
Evaluation Process			
Safety Firefighter Aviation Public			
Sum of safety values			
Economic Forage Improvements Recreation Water Wildlife Other			
Sum of economic values			
Environmental Air Visual Fuels T&E Species Other			
Sum of environmental values			
Social Employment Public Concern Cultural Other			
Sum of social values			
Other			
Sum of other values			
TOTAL			

ANALYSIS SUMMARY

	A.	B.	C.
Compliance with Objectives Safety Economic Environmental Social Other			
Pertinent Data Final fire size Complexity Suppression cost Resource values Probability of success			
External/Internal Influences			

VI. DECISION

The Selected Alternative is: .
Rationale:
Agency Administrator's Signature Date/Time

VII. DAILY REVIEW

			PREPAREDNESS LEVEL	INCIDENT PRIORITY	RESOURCE AVAILABILITY	WEATHER FORECAST	FIRE BEHAVIOR PREDICTIONS	WFSA VALID
Date	Time	By						

VIII. FINAL REVIEW

The elements of the selective alternative were met on:

Date Time:

By:

Agency Administrator

APPENDIX Q: RCRC

Request for Cultural Resource Compliance

U.S. Fish and Wildlife Service, Region 1

Project Name:					**Program:** (Partners, Refuges, JITW, WSECP, etc.)	
State: CA, ID, HI, NV, OR, WA		**EcoRegion:** CBE, IPE,KCE, NCE			**FWS Unit:** **Org Code:**	
Project Location:	**County**	**Township**	**Range**	**Section**	**FWS Contact:** Name, Tel#, Address	
USGS Quad:					**Date of Request:**	
Total project acres/linear ft/m:		**APE Acres / linear ft/m (if different)**			**Proposed Project Start Date:**	

MAPS Attached	**Check below**		
Copy of portion of USGS Quad with project area marked clearly **(required)**			Project (sketch) map showing Area of Potential Effect with locations of specific ground altering activities **(required)**
Photocopy of aerial photo showing location **(if available)**			Any other project plans, photographs, or drawings that may help CRT in making determination **(if available)**

Directions to Project: (if not obvious)	
Description of Undertaking:	Describe proposed project and means to facilitate (e.g., provide funds to revegetate 1 mile of riparian habitat, restore 250 acres of seasonal wetlands, and construct a 5-acre permanent pond). How is the project designed (e.g., install 2 miles of fence and create approximately 25' of 3' high check dam)?

Area of Potential Effects (APE):	Describe where disturbance of the ground will occur. What are the dimensions of the area to be disturbed? How deep will you excavate? How far apart are fenceposts? What method are you using to plant vegetation? Where will fill be obtained? Where will soil be dumped? What tools or equipment will be used? Are you replacing or repairing a structure? Will you be moving dirt in a relatively undisturbed area? Will the project reach below or beyond the limits of prior land disturbance? Differentiate between areas slated for earth movement vs. areas to be inundated only. Is the area to be inundated different from the area inundated today, in the recent past, or under natural conditions? Provide acres and/or linear ft/m for all elements of the project.
Environmental and Cultural Setting:	Briefly describe the environmental setting of the APE. **A)** What was the natural habitat prior to modifications, reclamation, agriculture, settlement? **B)** What is land-use history? When was it first settled, modified? How deep has it been cultivated, grazed, etc.? **C)** What is land use and habitat today? What natural agents (e.g., sedimentation, vegetation, inundation) or cultural agents (e.g., cultivation) might affect the ability to discover cultural resources? **D)** Do you (or does anybody else) know of cultural resources in or near the project area?

APPENDIX R: MUTUAL AID RESPONSE

MERCED COUNTY FIRE DEPARTMENT
FIRST ALARM VEGETATION FIRE

Refuge/Location	Units Responding
San Luis NWR Hwy 165 including W. Bear Creek and Kesterson Units	Engine 97 (Stevinson) Engine 71 (Los Banos) Chief Officer
San Luis NWR Hwy 140 (Kesterson Check Station)	Engine 74 (Gustine) Engine 97 (Stevinson) Chief Officer
Merced NWR Sandy Mush Road	Engine 93 (El Nido) Engine 81 (Merced) Chief Officer
Merced NWR Hwy 140 Arena Plains Unit	Engine 97 (Stevinson) Engine 96 (Livingston) Chief Officer

Central Valley Eco-Region Prescribed Fire Request Form

This form is to be submitted to the Refuge burn coordinator at least 2 months prior to the planned burn. This will allow for the planning, scheduling, and permitting required for a Prescribed Burn Project.

Please submit 1 form per project:

Please provide all the information requested:

Refuge Name: _____

Name of Project / Unit:_____

Acres of Unit:_____ Season Preferred: _____

Location and Legal (provide a Refuge map of unit): _____

Township:_____, Range:_____, Section(s):_____

Latitude:_____, Longitude:_____

USGS Map and Scale: _____

Habitat or Resource Goals:_____

_____
__

_____
__

_____
__

Burn Objectives: 1.)_____

_____
__

2.)_____
_

_____

__
Vegetation in Unit: _____

_____
__

_____
__

Adjacent Unit Vegetation:_____

_____
__

_____
__

Smoke Sensitive Areas (ie. roads, schools, visitor areas, towns, airports, ect):

SSA:	Distance from Burn Unit:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Project Contact (name): _____

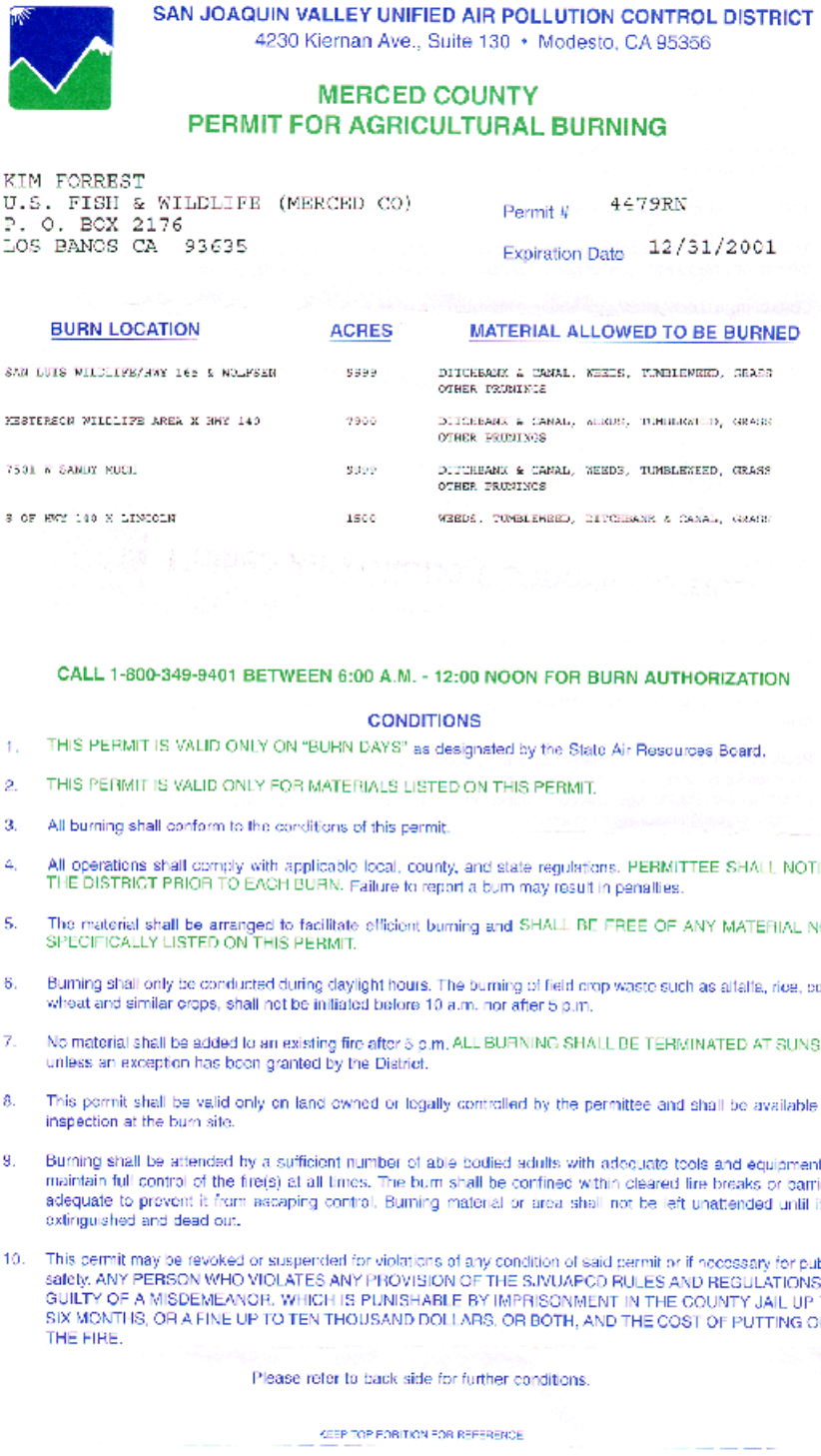
Refuge Address: _____

_____
__

_____
__

Phone: (____) _____ Fax: (____) _____

Email: _____



SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT
4230 Kiernan Ave., Suite 130 • Modesto, CA 95356

MERCED COUNTY
PERMIT FOR AGRICULTURAL BURNING

KIM FORREST
U.S. FISH & WILDLIFE (MERCED CO)
P. O. BOX 2176
LOS BANOS CA 93635

Permit # 4479RN
Expiration Date 12/31/2001

BURN LOCATION	ACRES	MATERIAL ALLOWED TO BE BURNED
SAN LUIS WILDLIFE/HWY 165 & NOLAN	9999	DITCHBANK & CANAL, WEEDS, TUMBLEWEED, GRASS OTHER PRUNINGS
WESTERGON WILDLIFE AREA X HWY 140	7900	DITCHBANK & CANAL, WEEDS, TUMBLEWEED, GRASS OTHER PRUNINGS
7501 W SANDY MUEL	9999	DITCHBANK & CANAL, WEEDS, TUMBLEWEED, GRASS OTHER PRUNINGS
S OF HWY 140 X LINCOLN	1500	WEEDS, TUMBLEWEED, DITCHBANK & CANAL, GRASS

CALL 1-800-349-9401 BETWEEN 6:00 A.M. - 12:00 NOON FOR BURN AUTHORIZATION

CONDITIONS

1. THIS PERMIT IS VALID ONLY ON "BURN DAYS" as designated by the State Air Resources Board.
2. THIS PERMIT IS VALID ONLY FOR MATERIALS LISTED ON THIS PERMIT.
3. All burning shall conform to the conditions of this permit.
4. All operations shall comply with applicable local, county, and state regulations. PERMITTEE SHALL NOTIFY THE DISTRICT PRIOR TO EACH BURN. Failure to report a burn may result in penalties.
5. The material shall be arranged to facilitate efficient burning and SHALL BE FREE OF ANY MATERIAL NOT SPECIFICALLY LISTED ON THIS PERMIT.
6. Burning shall only be conducted during daylight hours. The burning of field crop waste such as alfalfa, rice, corn, wheat and similar crops, shall not be initiated before 10 a.m. nor after 5 p.m.
7. No material shall be added to an existing fire after 5 p.m. ALL BURNING SHALL BE TERMINATED AT SUNSET unless an exception has been granted by the District.
8. This permit shall be valid only on land owned or legally controlled by the permittee and shall be available for inspection at the burn site.
9. Burning shall be attended by a sufficient number of able bodied adults with adequate tools and equipment to maintain full control of the fire(s) at all times. The burn shall be confined within cleared fire breaks or barriers adequate to prevent it from escaping control. Burning material or area shall not be left unattended until it is extinguished and dead out.
10. This permit may be revoked or suspended for violations of any condition of said permit or if necessary for public safety. ANY PERSON WHO VIOLATES ANY PROVISION OF THE SJVUAPCD RULES AND REGULATIONS IS GUILTY OF A MISDEMEANOR, WHICH IS PUNISHABLE BY IMPRISONMENT IN THE COUNTY JAIL UP TO SIX MONTHS, OR A FINE UP TO TEN THOUSAND DOLLARS, OR BOTH, AND THE COST OF PUTTING OUT THE FIRE.

Please refer to back side for further conditions.

KEEP TOP PORTION FOR REFERENCE

APPENDIX T: SAN JOAQUIN VALLEY BURN PERMIT

PERMIT Permit #:C0017___ Expiration Date: 123100 Issued Date: 111599
Air Pollution #: _____ Revoked Date: _____ Revoked By: _____
Name: U.S. FISH & WILDLIFE_____ Phone: 826-3508____
Address: P.O. BOX 2176_____ City: LOS BANOS CA_____ Zip: 93635
LOC: RIVER_____ Cross: E WEST STANISLAUS Blk: G101 Acres: 150_
Crop: 581 Crop: 582 Crop: 583 Crop: ___ Crop: ___ Crop: ___
LOC: _____ Cross: _____ Blk: ____ Acres: ____
Crop: ___ Crop: ___ Crop: ___ Crop: ___ Crop: ___ Crop: ___
LOC: _____ Cross: _____ Blk: ____ Acres: ____
Crop: ___ Crop: ___ Crop: ___ Crop: ___ Crop: ___ Crop: ___
LOC: _____ Cross: _____ Blk: ____ Acres: ____
Crop: ___ Crop: ___ Crop: ___ Crop: ___ Crop: ___ Crop: ___
LOC: _____ Cross: _____ Blk: ____ Acres: ____
Crop: ___ Crop: ___ Crop: ___ Crop: ___ Crop: ___ Crop: ___
LOC: _____ Cross: _____ Blk: ____ Acres: ____
Crop: ___ Crop: ___ Crop: ___ Crop: ___ Crop: ___ Crop: ___
Comment: PD 11-15-99 FOR MERCED PERMIT(#4479RN) WHICH HAS MORE THAN 3 LOC.$62.
00 CK#936350 THIS PERMIT IS TO REMAIN INVALID UNTIL NESTING SEASON IS OVER, JUNE
1, NO EXCEPTIONS!!!_____