

WILDLAND FIRE MANAGEMENT PLAN
WILLIAM L. FINLEY NATIONAL WILDLIFE REFUGE
DECEMBER 2001

WILDLAND FIRE MANAGEMENT PLAN
WILLIAM L. FINLEY NWR

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EXECUTIVE SUMMARY

When approved, this document will become the William L. Finley NWR=s fire management plan. Major components include:

B updated policy for prescribed fires.

B continues prescribed burning as a management tool as described in the Management Summary: Willamette Valley National Wildlife Refuges, October, 1985 and the Grazing Management Plan of March, 1988.

B format changes under the direction of Fire Management Handbook.

This plan is written to provide guidelines for appropriate suppression and prescribed fire programs at William L. Finley NWR and Oak Creek. Prescribed fires may be used to reduce hazard fuels, restore the natural processes and vitality of ecosystems, improve wildlife habitat, remove or reduce non-native species, and/or conduct research.

INTRODUCTION

This plan will establish a Fire Management Plan for William L. Finley NWR and Oak Creek. An Environmental Assessment and Finding of No Significant Impact (FONSI) was prepared for prescribed burning in 1992 and is still applicable (Appendix R). Prescribed burning on Oak Creek is covered by a Categorical Exclusion. (Appendix D) This plan will meet the requirements of the National Environmental Protection Act (NEPA) and the National Historic Preservation Act (NHPA).

This plan is written as an operational guide for managing the refuge's wildland fire and prescribed fire programs. It defines levels of protection needed to ensure safety, protect facilities and resources, and restore and perpetuate natural processes, given current understanding of the complex relationships in natural ecosystems. It is written to comply with a service-wide requirement that refuges with burnable vegetation develop a fire management plan (620 DM 1). This plan outlines both wildland fire suppression and prescribed fire activities on William L. Finley NWR and Oak Creek. Full suppression is the norm for all wildland fires to protect property, structures, and resource values. Prescribed fire will be used to enhance native plant communities (including listed species), improve wildlife habitat, provide research opportunities, and reduce undesirable vegetation. These are all major objectives for management on W.L. Finley NWR and Oak Creek.

There is no established on-site fire management organization at Willamette Valley NWRC, although positions for a prescribed fire specialist, a lead range/forest technician (engine foreman), and two range/forest technicians (firefighters) were approved in 2001. The prescribed fire specialist position has been filled effective October 21, 2001. Fire related assistance is provided by the Fire Management Officer and staff at Malheur NWR. The Refuge Biologist at Willamette Valley NWRC coordinates the day to day aspects of the program. Several staff members at Willamette Valley NWRC are qualified as basic firefighters. Wildland fire coverage for W.L. Finley NWR, including off-duty work hours as well as assistance during on-duty hours, is provided by the Oregon Department of Forestry in Philomath. Wildland fire coverage for Oak Creek is provided by the Lebanon Fire District.

COMPLIANCE WITH USFWS POLICY

W.L. Finley NWR was established under the authority of the Migratory Bird Conservation Act of February 18, 1929 (45 Stat.1222) as amended (16 U.S.C. 715-715r). On February 19, 1963, the Migratory Bird Conservation Commission authorized establishment of refuges within the Willamette Valley.

Oak Creek is a 48 ha (113 acre) ranch foreclosed on by the Farm Services Administration (FSA) in 1989. In November 1990, a Finalized Caretaker Agreement was established by FSA with the USFWS, and the Willamette Valley NWRC was identified as easement manager. Transfer of fee-title by FSA to USFWS was finalized in December 1995.

The Willamette Valley Refuges are scheduled to have a CCP completed by 2007. Prescribed burning is mentioned in the Management Summary, Willamette Valley National Wildlife Refuges, October, 1985. Under habitat diversity the following statement is found: "Vegetative manipulations are undertaken periodically, hedgerows are thinned, marshes rehabilitated, and prescribed burns increase diversity and set back plant succession". Prescribed burning is used to enhance habitat diversity as well as provide optimum conditions for several endangered species to recover. Restoration of native prairie has also been accomplished using prescribed fire to remove woody species and allow sunlight to reach native forbs and grasses. Burning is mentioned as a method to control plant succession in the March, 1988 Grazing Management Plan.

The purpose of W. L. Finley NWR is "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds"... 16 U.S.C. § 715d (Migratory Bird Conservation Act).

The Department Manual, DM 910 (USDI 1997) states the following regarding wildland fires:

AWildland fires may result in loss of life, have detrimental impacts upon natural resources, and damage to or destruction of man-made developments. However, the use of fire under carefully defined conditions is to be a valuable tool in wildland management. Therefore, all wildland fires within the Department will be classified either as wildland or as prescribed fires."

"Wildland fires, whether on lands administered by the Department or adjacent thereto, which threaten life, man-made structures, or are determined to be a threat to the natural resources or the facilities under the Department's jurisdiction, will be considered emergencies and their suppression given priority over normal Departmental programs."

"Bureaus will give the highest priority to preventing the disaster fire - the situation in which a wildland fire causes damage of such magnitude as to impact management objectives and/or socio-economic conditions of an area. However, no wildland fire situation, with the possible exception of threat to human survival, requires the exposure of firefighters to life threatening situations.

Within the framework of management objective and plans, overall wildland fire damage will be held to the minimum possible giving full consideration to (1) an aggressive fire prevention program; (2) the least expenditure of public funds for effective suppression; (3) the methods of suppression least damaging to resources and the environment; and (4) the integration of cooperative suppression actions by agencies of the Department among themselves or with other qualified suppression organizations."

"Prescribed fires may be used to achieve agency land or resource management objectives as defined in the fire management plans. Prescribed fires will be conducted only when the following conditions are met:

- a. Conducted by qualified personnel under written prescriptions.
- b. Monitored to assure they remain within prescription.

Prescribed fires that exceed the limits of an approved prescribed fire plan will be reclassified as a wildland fire. Once classified a wildland fire, the fire will be suppressed and will not be returned to prescribed fire status.@"

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.

The Reciprocal Fire Protection Act of May 27, 1955 (42 USC 815a; 69Stat 66) provides Authorities to enter into agreements with other Federal bureaus and agencies; with state, county, and municipal governments; and with private companies, groups, corporations, and individuals regarding fire activities. Authority for interagency agreements is found in AInteragency Agreement between the Bureau of Land Management, Bureau of Indian Affairs, National Park Service, US Fish and Wildlife Service of the United States Department of the Interior and the Forest Service of the United States Department of Agriculture@ (1996).

FIRE MANAGEMENT OBJECTIVES

The overall goals of W. L. Finley NWR are to:

1. Provide high quality wintering habitat for Canada geese, especially the dusky subspecies, to ensure a healthy, viable goose population that minimizes damage to private agricultural lands in the Willamette Valley.
2. Protect, restore and develop a diversity of habitats for all other migratory birds such as neotropical songbirds, wading birds and shorebirds with special emphasis on wintering waterfowl (other than Canada geese).
3. Protect, restore and develop habitats for and otherwise support recovery of Federally listed endangered and threatened species and help prevent the listing of candidate species and species of management concern.
4. Protect and restore a diversity of native habitats for indigenous fish, wildlife, invertebrate and plant species of the Willamette Valley ecosystem.
5. Provide high quality opportunities for wildlands and wildlife-dependent recreation and environmental education to enhance public appreciation, understanding and enjoyment of refuge fish wildlife, habitats and cultural resources.

The overall objectives for fire management are to promote a program to ensure firefighter and public safety, to ensure appropriate suppression response capability to meet expected wildland fire complexity, and to continue use of prescribed fire. Specific fire management objectives are to:

- Promote a fire management program and provide appropriate suppression response on all wildland fires.
- Protect life, property, and resources from wildland fires while considering resource values at risk.
- Use prescribed fire to reduce hazard fuel accumulation, restore fire to fire-dependent ecological communities and enhance populations of rare and listed species, and to contribute to research related to the use of fire for resource management.
- Use appropriate suppression tactics and strategies that minimize long-term impacts of suppression actions.

DESCRIPTION OF REFUGE

William L. Finley NWR is located in the Willamette Valley approximately 18 km (11 mi) south of Corvallis, Benton County, Oregon (Figure 1). The refuge was established in 1964 and includes 2,155 hectares (5,325 acres) of land.

Elevations range from about 80 to 175 m (260 to 575 ft). Physical features include alluvial floodplain, small creeks, a diversity of wetlands including ponds, marshes, and managed impoundments, an abandoned rock quarry, and rolling hills and ridges. Habitats include Douglas-fir woodland, oak woodland, oak savannah, wet prairie, riparian woodland, emergent wetlands, and agricultural cropland.

W. L. Finley NWR was acquired to provide wintering habitat for dusky Canada geese. The primary habitat management objectives for the refuge are to 1) provide wintering habitat for dusky Canada geese and other migratory waterfowl; 2) protect, restore, and enhance populations of threatened and endangered species; 3) maintain habitats for indigenous species and perpetuate natural diversity; 4) and provide for environmental education, research, and wildlife oriented recreation.

Oak Creek is located approximately 1 km (2/3 mile) northwest of Sodaville in Linn County, Oregon (Figure 2). The property was established as a conservation easement in November 1990 and obtained in fee title in December 1996. It consists of 48 ha (113 acres) at an elevation of 104 m (339 feet). Habitat includes pasture, herbaceous wet prairie, and riparian woodland. Oak Creek provides habitat for native prairie plants and songbirds. The property was acquired to protect the high density of Bradshaw's desert parsley (*Lomatium bradshawii*), a federally endangered plant that was discovered on the property in 1994.

Cultural Resources

Kalapuyah village sites and artifacts may be present all along Muddy Creek on W. L. Finley NWR. Although this area seldom burns, ground disturbance associated with prescribed burning or wildland fire should be avoided near Muddy Creek. Almost every structure on the refuge is listed as a state historic building, including the Fiechter House, which is the oldest known house in the Willamette Valley. Fuels are reduced annually around these structures to avert possible damage from wildland fire.

All prescribed burns will require a cultural resource clearance from an archeologist prior to ignition. The clearance form required by the regional archeologist is included in Appendix E.

Fish and Wildlife

The variety of habitats on W.L. Finley allows for a diversity of plant and animal species. Over 230 species of birds and over 50 species of mammals have been recorded on the refuge. Canada geese winter in large numbers, representing seven different sub-species. Oregon chub, a listed endangered fish, is one of 15 fish species found on the refuge. Twenty-two species of amphibians and reptiles, including western pond turtles and northern red-legged frogs, have been documented. Oak Creek provides habitat for grassland birds, neotropical migrants, amphibians, and small mammals.

Figure 1: Vicinity Map

Figure 2: Oak Creek Area Map

Vegetation

Approximately 35% of W. L. Finley NWR is managed as cropland to provide food for wintering Canada geese and other waterfowl (Figure 3). Most of this area is

planted with perennial and annual ryegrass, fescue, and pasture grasses. Grass seed crops are harvested in June. The straw is either baled and removed, or chopped and disced under. Small fields of corn and sudan grass are planted in some years. The pasture fields are seasonally grazed by cattle in May-July to reduce vegetative growth and enhance the sites as goose pastures for the following winter.

Some of the grasslands east of Muddy Creek have never been plowed and still support a native wet prairie plant community. The Willamette Valley Floodplain Research Natural Area (RNA) is the largest remnant of native Willamette Valley prairie in existence. The habitat is typical of the wet prairie present prior to European settlement. The dominant species include Willamette Valley tufted hairgrass (*Deschampsia caespitosa*), representative of the historic grassland communities in the Willamette Valley. There is a high diversity of grass, forb, and shrub species, both native and introduced, found within the prairie habitat. Low fire frequency over the past decades has resulted in encroachment of woody shrubs in some areas. Current management of this area is based on prescribed burning.

Other grassland areas on the refuge are old fields and pastures which contain a mixture of native and introduced grasses and forbs, although there is little native upland prairie remaining.

The major wetland areas are McFadden Marsh, Cheadle Marsh, and Cabell Marsh (see Appendix F). A number of smaller managed wetlands are present throughout the refuge. Common wetland plants in these areas include spike-rushes (*Eleocharis* spp.), rushes (*Juncus* spp.), smartweeds (*Polygonum* spp.) and sedges (*Carex* spp.).

Riparian woodlands are dominated by Oregon ash (*Fraxinus latifolia*) with Oregon white oak (*Quercus garryana*) becoming co-dominant in some areas. Upland forest areas vary in composition. The north side of Maple Knoll is dominated by bigleaf maple (*Acer macrophyllum*). Forest stands on the top and south side of the Maple Knoll and Pigeon Butte are dominated by Oregon white oak. Much of the upland area in the western 1/3 of the refuge is dominated by Douglas fir (*Pseudotsuga menziesii*), however much of this is historic oak woodland or oak savannah habitat. Poison oak (*Rhus diversiloba*) is common in most forest habitats. At Oak Creek (Figure 4), riparian vegetation occurs along the western portion of the property and consists primarily of an overstory of domestic pear (*Pyrus communis*), Oregon ash (*Fraxinus latifolia*), and black hawthorn (*Crataegus douglasii*). Understory vegetation in the wooded areas is comprised of mixed grass and forb species, and a few shrubs including evergreen blackberry (*Rubus laciniatus*) and rose (*Rosa nutkana*).

Figure 3: Finley NWR Vegetation

Figure 4: Oak Creek Vegetation

The herbaceous wet prairie areas on the eastern portions of the Oak Creek property support a large population of Bradshaw's desert parsley (*Lomatium bradshawii*) and tufted hairgrass (*Deschampsia caespitosa*), as well as a variety of mostly introduced grasses and forbs. These areas were once disced and furrowed by the previous land owner in an attempt to propagate improved pasture grass and forb cultivars. When the cultivated crops failed to become established, the fields were abandoned and left to produce "natural" pasture crops.

The pasture areas were intensively managed as improved pasture units by the former owner and contain mostly introduced grasses and forbs.

Climate

In general, the climate is mild and moist. It is strongly influenced by Pacific weather systems which move across the valley from west to east. Temperature extremes are moderated by these maritime systems. Normal summer maximums are in the 70's and 80's, but can be expected to exceed 90 F several days each year. Winter highs generally range in the 40's and low 50's, but freezing temperatures at night are common. The mean annual temperature is 52 F. The average annual precipitation is 110 cm (43 in), almost all of which is in the form of rain. The wettest months are November through March when over 70% of the precipitation occurs. There is a pronounced hot, dry period during the summer and early fall; the average precipitation in June, July, August, and September accounts for less than 10% of the annual average.

Table 1: Climatic Data for Corvallis, Oregon

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean High												
Temp (C)	45.5	50.4	54.9	59.5	66.1	73.1	80.2	81.1	75.5	64.3	52.2	45.6
Mean Low												
Temp (C)	33.0	35.1	37.0	39.2	43.1	48.6	51.0	51.2	47.8	41.7	38.0	33.9
Mean Precip.												
(in)	6.8	5.0	4.6	2.6	2.0	1.2	0.5	0.9	1.5	3.1	6.8	7.7

Temperature and precipitation values are 30 year averages from Corvallis NOAA station at Hyslop Farms.

Soils

The Benton County soil survey (USDA 1975) describes 16 different soil series on W. L. Finley NWR. The general soil map for Benton County indicates that there are five soil associations on the refuge. Paralleling Muddy Creek is a band of poorly drained silty clay loams and clays in the Waldo-Bashaw association.

Northeast of that band and southwest of it are areas in the Dayton-Amity association characterized as poorly drained and somewhat poorly drained silt loams. A narrow strip in the southeastern part of the refuge is in the Malabon-Coburg association characterized by well drained and moderately well drained silty clay loams. A small area immediately southeast of the maintenance area is in the Woodburn-Willamette association characterized by moderately well drained and well drained silt loams. Most of the eastern 1/3 of the refuge is comprised of deep and moderately deep, well-drained silty clay loams of the Jory-Belpine association.

According to the USDA, the Oak Creek property is characterized by seasonally flooded Bashaw silty clay, Courtney gravelly silt clay loam, Clackamas Variant silt loam, and Pengra silt loam soil types. These soils are generally inundated with standing water from December through April, and are dry and cracked by July.

Structures and Facilities

A complete list of structures on W.L. Finley NWR can be found in the Firebase data (Appendix C). To minimize the chance of wildland fire destroying

government owned structures, vegetation is mowed during the spring and summer around buildings where a fire hazard may exist. There are no government structures at Oak Creek.

The majority of the lands adjacent to the Refuge are utilized for agricultural purposes. However, there are several scattered homes and structures on these lands. A list of these structures and their owners will be updated annually.

WILDLAND FIRE MANAGEMENT SITUATION

Historic Role of Fire

Pre-settlement fires

Historical records suggest that prior to settlement, the Willamette Valley was dominated by vast oak savannas and wet meadows. The general climate of the recent past is that of a humid forest region. Prairie areas were apparently maintained by fires initiated by Kalapuya Indians during the dry season. While traveling from Multnomah River to the Umpqua River in 1826, David Douglas reported on the 27th of September that the country had been completely burned. Again on the 2nd of October he noted that the country was all blackened except for deep ravines. By the 6th of October Douglas and his party were not far from the present site of W. L. Finley NWR and he again commented on the extensive burned areas. In 1834 an employee of the Hudson's Bay Company observed Indians setting fires in the grasslands south of Corvallis. Apparently, such observations by settlers and travelers in the Willamette Valley were common.

Post-settlement Fire History

Only a few white settlers inhabited the Willamette Valley in the 1840's. During the next 100 years their numbers rapidly increased and by 1950 the Valley was well settled. The shift from nomadic hunters to white settlements brought with it the cessation of burning, the introduction of domestic livestock and large scale cultivation of the land for food and forage crops.

There have been no known wildland fires on Oak Creek since it came into USFWS ownership in 1995, and previous wildland fire history is unknown.

Wildland fires have not been common in the Willamette Valley in recent times. Lightning storms are not common and during much of the year the humidity is high and precipitation occurs frequently. The highest fire danger comes during the relatively warm dry summer period. Forested areas of the refuge have large amounts of fuel that could sustain a fire. The grassland areas are generally dry and the vegetation cured out by mid to late summer.

The general fire season recognized by the U. S. Forest Service, Siuslaw Forest and the Oregon Department of Forestry at Philomath, runs from 10 June through 15 October. In the past 10 years (1991-2000) there have been 13 wildland fires on the refuge. All wildland fires were within the normal fire period (8 July - 4 Oct). Other notable wildland fires are listed in (Table 2).

Table 2: Wildland Fires

Date	Fire Name	Acres	Cause
1972	Willamette Floodplain RNA	30	Escaped controlled burn.

1976, Prairie, 25, Escaped controlled burn.
8/8/79, Prairie 2, 100, Escaped field burn.
1980, Pigeon, 5, Escaped field burn.
9/6/85, Pigeon 2, 50, Escaped field burn.
9/30/87, Bruce, .5, Vandalism.
9/16/91, Lomatium 91, 12, Farm machinery
9/23/91, Mcfadden, 330, Escaped prescribed fire.
9/27/91, Field 11 Bags, .1, Farm machinery.
10/4/91, Rizor, .3, Farm machinery.
9/6/93, Nusbaum 94, 9, Farm machinery.
9/8/93, Nusbaum 15, 3, Farm machinery.
7/7/94, Schrok 3945, 20, Farm machinery.
8/12/96, Tractor, 55, Farm machinery.
8/15/96, Nusbaum1, 28, Farm machinery.
8/24/96, Warden 64, 67, Escaped field burn.
8/18/99, Field 9, 2, Farm machinery.
7/8/00, Duck Club, 2, Farm machinery.
7/12/00, Warden 8, 1.5, Farm machinery.

Prescribed fire history

The prescribed fire season is expected to be from August 15 to October 15. There may be opportunities for upland prairie burns in oak savannah habitat from 1 February through March, weather and fuel conditions permitting.

The prescribed fire history on the refuge from 1990 through 1999 is outlined in Appendix H. One hundred and fifty-one prescribed burns consumed 7,129.5 acres during that time period. Before 1997 many of these burns were conducted by permittee farmers. Since 1997 all prescribed burns have been done by refuge fire personnel. Crews and engines from ODF, BLM, and the USFS have helped with the prescribed fires.

Studies were initiated in 1983 to measure the response of plant and animal species to different fire frequencies. Between 1983 and 1987, fires in the prairie were confined to seven 25 acre study plots. These studies were conducted in cooperation with the Cooperative Wildlife Research Unit, the Department of Fisheries and Wildlife, the Department of Geography, and the Department of Rangeland Resources at Oregon State University. The results of these studies indicate that frequent prescribed burning is a key component of wetland prairie management.

In 1990 and 1991 larger areas of prairie were burned: approximately 100 acres in 1990 and 200 acres in 1991. The 1991 prescribed burn of 100 acres in the southeast corner of the prairie jumped the firelines along the southwest boundary and became a wildland fire which burned McFadden Marsh (north and south) and the riparian areas west of the marsh.

Upland grasslands/savanna, that were historically grazed or grazed and mowed, were burned following grazing each year from 1982 - 1987 and again in 1989, 1990 and 1991. Grazing no longer occurs in the upland grasslands, but prescribed fire has been used in various units on an approximate 3-5 year rotation (Appendix G). Burning of cultivated grass fields following the harvest was a common agricultural practice before W. L. Finley NWR. Field burning has declined over the past decade and is no longer permitted to be done by cooperative farmers on the refuge.

There have been no prescribed burns conducted on Oak Creek.

Responsibilities

Agency Administrator/ Project Leader (PL)

- * Is responsible for implementation of all Fire Management activities within the Complex and will ensure compliance with Department, Service and refuge policies.
- * Selects the appropriate management responses to wildland fire.
- * Coordinates Complex programs to ensure personnel and equipment are made available and utilized for fire management activities including fire suppression, prescribed burning and fire effects monitoring.
- * Ensures that the fire management program has access to Refuge and resources when needed.
- * Ensures that Staff consider the fire management program during Refuge related planning and implementation.
- * Biologist
- * Identifies prescribed burn units and biological objectives to Prescribed Fire Specialist (PFS), notifies PFS of prescribed fire project constraints, and ensures that Refuge resources are available to accomplish prescribed fire and fire suppression objectives.
- * Acts as the primary Refuge Resource Management Specialist during fire management planning and operations.
- * Drafts wildland fire Rehabilitation Plans for Project Leader.
- * Coordinates through Project Leader to provide biological input for the Fire program to the FMO and PFS.
- * Assists in design and implementation of fire effects monitoring, to the PFS.
- * Participates, as requested, in prescribed burning and wildland fire suppression.

Fire Management Officer (FMO)

- * Responsible for all fire related planning and implementation.
- * Is responsible for implementation of this Plan. This responsibility includes coordination and supervision of all prevention, pre-suppression, detection, wildland fire, prescribed fire, suppression, monitoring, and post-fire activities involving Refuge lands.

Prescribed Fire Specialist (PFS)

- * Integrates biological Refuge objectives into all fire management planning and implementation.
- * Solicits program input from the PL.
- * Supervises prescribed fire planning.
- * Is responsible for planning, coordinating, and directing preparedness activities including fire training, physical fitness testing and Interagency Fire Qualification System (IFQS) data entry, fire cache and equipment inventory accountability, maintenance, and operation, cooperation with cooperative agencies.
- * Is responsible for preparation of fire reports following the suppression of wildland fires and for operations undertaken while conducting prescribed fires.
- * Prepares an annual report detailing fire occurrences and prescribed fire activities undertaken in each calendar year. This report will serve as a post-year's fire management activities review, as well as provide documentation for development of a comprehensive fire history record for the complex.
- * Submits budget requests and monitors FIREBASE funds.
- * Nominates personnel to receive fire-related training, as appropriate.
- * Responsible for Interagency coordination.
- * Ensures fire management policies are observed.
- * When available, may serve as prescribed fire burn boss, propose prescribed fire projects.

- * Helps prepare a Refuge fire prevention plan, and coordinates fire prevention with other employees.
- * Assists in updates of this Plan, maintains fire records, reviews fire reports (DI-1202) for accuracy, and enters fire reports into FMIS.
- * Maintains engines in state of readiness.

Fire Management/Suppression Personnel

- * Consist of all Complex Refuge personnel, whether permanent or seasonal, who meet the minimum standard set by the National Wildfire Coordinating Group (NWCG) for firefighters.
- * Are fully equipped with proper personal protective equipment, have taken and passed the minimum classroom training, and meet physical fitness standards required.
- * Undertake fire management duties as assigned by the qualified IC on each suppression action or by the Prescribed Fire Burn Boss on each prescribed fire project.
- * Are responsible for their personal protective equipment and physical conditioning, qualifying annually with the work capacity test.

Incident Commander

Incident Commanders (of any level) use strategies and tactics as directed by the Project Leader and WFSA where applicable to implement selected objectives on a particular incident. A specific Limited Delegation of Authority (Appendix I) 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 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.

Initial attack teams

Initial attack teams consist of experienced, fully-qualified firefighters, including those on their first fire. Teams will be prepared and equipped with hand and power tools as needed and will be dispatched with a day's supply of food and water, so they can continue work for 24 hours without additional support.

Employees participating in any wildland fire activities on Fish and Wildlife Service or cooperator's lands will meet fitness requirements established in PMS 310-1, except where Service-specific fitness requirements apply.

Exceptions to fitness requirements on initial attack activity are available from the Regional Fire Management Coordinator per guidelines in Chapter 1.5 of the Fire Management Handbook (USFWS 2000).

Interagency Operations

The U. S. Fish and Wildlife Service has no formal agreement for fire protection at W. L. Finley NWR or Oak Creek. The refuge is within the jurisdiction of the Oregon Department of Forestry for fire control. Response time from the nearest station is about 30 minutes.

Monroe Rural Fire District may respond to fires on the Refuge since the refuge is within its protection area. Likewise Lebanon Fire District would respond to wildland fires at Oak Creek. The PFS will work with the Oregon Department of Forestry in accordance with the Master Cooperative Fire Protection Agreement to set up formal protection for both W.L. Finley NWR and Oak Creek.

Willamette Valley NWRC will use the Incident Command System (ICS) as a guide for fireline organization. Qualifications for individuals is per DOI Wildland Fire Qualifications and Certification System, part of NIIMS and the National Wildland Fire Coordination Group (NWCG) Prescribed Fire Qualification Guide. Depending on fire complexity, some positions may be filled by the same person. The Siuslaw National Forest has verbally agreed to cover interagency dispatch duties as necessary.

Protection of Sensitive Resources

Resource Advisors (RA) will be requested for any wildland fire outside of agricultural lands. Unless there are imminent threats to life and/or structures, resource advisor approval is required prior to the use of heavy equipment to construct new firelines outside of agricultural areas (i.e., no approval is required to improve existing firebreaks).

Motor vehicles will be used in Maple Knoll and Pigeon Butte RNA's only through designated access points (Figure 5); any other use of motorized vehicles requires resource advisor approval. Additionally, any line construction requiring soil disturbance (i.e., hand line or dozer line) requires approval of the Resource Advisor, unless there are imminent threats to life. Suppression strategies in these RNAs may range from the use of engines to extinguish small fires too holding the fire to existing at firebreaks.

The Willamette Valley Floodplain RNA should be managed to protect the ecological values of the prairie. The prairie is surrounded predominately by agricultural fields. Except for two sections along the west side, these agricultural fields can be protected by plowing firebreaks. Established fire breaks have been disced in these areas prior to prescribed burns, and can be used in the event of a wildland fire. Motor vehicles can be used in Willamette Valley Floodplain RNA only on designated routes (see Figure 5). The use of heavy equipment (e.g., dozers) outside of preexisting firebreaks and the creation of handlines requires the approval of the resource advisor, unless there are imminent threats to life.

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 (RCRC, attached) 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 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 wildfire 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 Refuge 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 PFS 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 known cultural significance.
- * The location of any sites discovered as the result of fire management activities will be reported to the Regional Archaeologist.

Figure 5: Roads

WILDLAND FIRE ACTIVITIES

Fire program management describes the operational procedures necessary to implement fire management at W.L. Finley NWR. 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. Refuge engine(s) with trained personnel would be the first to respond. Heavy equipment with trained operators may also be available and may include tractors with large discs, bulldozers, and road graders. Oregon Department of Forestry would be called for assistance if the fire exceeds the

ability of qualified Refuge personnel. Benton County Sheriff may be notified, as appropriate.

Fire Management Strategies

Although resource impacts of suppression alternatives must always be considered in selecting a fire management strategy, managing fire for resource benefit will not be the primary consideration. Appropriate suppression action will be taken to ensure firefighter safety, public safety, and protection of the resources. Critical protection areas, such as structures, Research Natural Areas, adjacent private lands, and unharvested agricultural crops will receive priority consideration in fire control planning efforts. In all cases, the primary concerns of fire suppression personnel shall be the safety, and if needed, all individuals not involved in the suppression effort may be evacuated.

Suppression strategies should be applied so that the equipment and tools used to meet the desired objectives are those that inflict the least impacts upon the natural and cultural resources. Minimum impact suppression strategies will be employed to protect all resources. Natural and artificial barriers will be used as much as possible for containment. When necessary, fire line construction will be conducted in such a way as to minimize long-term impacts to resources and must be approved by a resource advisor in RNAs. Sites impacted by fire suppression activities or by the fire will be rehabilitated as necessary, based on an approved course of action for each incident.

Specific fire management strategies for the Refuge are:

- * All wildland fires will be controlled using the appropriate suppression strategy which considers safety, property, natural resources, and economics.
- * Mechanical treatment will be used to reduce hazardous fuels around structures and improvements annually.
- * Known cultural resource areas will be excluded from all fire management activities including fire line location, retardant drops, and adverse fire effects.

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 within the refuge. Preparedness efforts are to be accomplished in the time frames outside the normal fire season dates.

Historical weather analysis

W. L. Finley NWR uses the weather measurements taken from Wilkinson Ridge (351811) Remote Automated Weather Station (RAWS). Wilkinson Ridge RAWS is located approximately 5 miles west of the refuge. The station is maintained by the Salem Bureau of Land Management. A second RAWS is in the process of being updated and will be in use by summer 2002. This station is centrally positioned at W. L. Finley NWR.

The most accurate way of displaying the relationship of weather and fuels to the fire danger is through the Burning Index or BI. The BI is an estimate of the potential difficulty of containment of a wildland fire as it relates to the flame length at the head of the fire. The BI value is a function of the spread component (how fast the fire could spread) and the energy release component (how hot the fire could burn). The BI is scaled such that a BI value of 40 would indicate a predicted average mid-flame length of 4 feet. Wildland fires where the mid-flame length exceeds 4 feet are judged to be too hazardous for hand crews and engines to attack along the direct edge of the fire. The BI may also communicate the relative fire danger in a rating area. The 90th percentile is defined as 90 percent of all BI's are at or below this index for the time period calculated, and the same is true for the 97th percentile. When overlaid with historic fire occurrence, a relationship with fire weather can assist with more accurate preparedness planning.

The fire season at the W. L. Finley NWR can begin in July, and continue through October during drought years. Fire season can be influenced by both moist Pacific weather systems, and drying trends created through a warm easterly flow. The wettest months are November through March when over 70% of the precipitation occurs. There is a pronounced warm, dry period beginning in mid July and running through late September. This period accounts for less than 10% of the annual average precipitation.

Fire Prevention

An active fire prevention program may be conducted in conjunction with other agencies to protect human life and property, and prevent damage to cultural resources or physical facilities.

Most wildfires at W. L. Finley NWR have been escaped agricultural fires, however fires have still occurred infrequently. Cooperative farmers no longer conduct field burning. Most of the fires in the past have been detected and reported by cooperators, often started during harvest operations. The cooperators have also completed and/or assisted in the suppression actions.

To date, the Willamette Valley NWRC has not implemented Industrial Fire Precautions levels related to management activities and has not implemented public use restrictions based on fire danger situations. The Willamette Valley NWRC would implement such restrictions if deemed necessary by the PFS or Oregon Department of Forestry. The refuge is only open to the public during daylight hours and no camping or overnight use is allowed. Wood cutting or collecting plants is illegal as well.

A program of internal and external education regarding potential fire danger will be implemented. Visitor contacts, bulletin board materials, handouts and interpretive programs may be utilized to increase visitor and neighbor awareness of fire hazards.

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 Project Leader.

Structure Protection

A complete list of structures on W.L. Finley NWR can be found in Appendix C. Vegetation around these buildings consists of grass and blackberry. If a fire ignites in these areas, a four foot firebreak is generally sufficient to halt fire spread. To minimize the chance of a wildland fire destroying government owned structures, a twelve foot firebreak is mowed during the spring and summer around buildings. Additionally, herbicides and manual thinning are used on these areas to limit fuel build-up.

The majority of the lands adjacent to the Refuge are utilized for agricultural purposes. However, there are several scattered homes and structures on these lands. A list of these structures and their owners will be updated annually. The private structures are surrounded by irrigated fields which serve as a firebreak.

There are no private inholdings within the Refuge boundaries.

Staffing Priority Levels

The Finley NWR has limited fire staffing, and staffing levels per say are not relevant. Fire Danger calculations and adjectives are necessary on this refuge for communicating the fire danger and growth potential on a given day, and determining the precautions necessary when performing field work. Since there is limited fire staff located on the refuge, all severity augmentation will be in the form of repositioning personnel and equipment to the Refuge. All severity actions will follow FWS Fire Management Handbook direction in Section 3.1. which gives guidance on when this type of action is warranted and the process for implementation.

Training

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

Basic wildland fire training refreshers are offered annually for red-carded firefighters and records kept in a centralized database. Additional training is available from surrounding agencies in pump and engine operation, power saws, firefighter safety, fire weather and fire behavior, helicopter safety and prescribed fire objectives and activities. 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 PFS will coordinate fire training needs with those of other nearby refuges, cooperating agencies, and the RO.

The refuge supports the development of individual Incident Command System (ICS) overhead personnel from among qualified and experienced refuge staff for assignment to overhead teams at the local, regional, and national level. Fire suppression is an arduous duty. On prescribed fires, personnel may be required to shift from implementation/monitoring activities to suppression. Poor physical condition of crew members can endanger safety and lives during critical situations.

Personnel performing fire management duties will maintain a high level of physical fitness. This requires successful completion of a fitness pack test. Personnel must complete a three mile hike with a 45 pound pack in less than 45

minutes to qualify for arduous duty. Annual refresher courses are mandatory for all fire qualified personnel and are either completed in-house or in cooperation with other federal/state agencies.

Supplies and Equipment

The Willamette Valley NWRC does not maintain a separate fire cache at this time, although the refuge is in the process of establishing a 5-person cache. Most equipment is stored on engines and the supply cache will be located in the engine bay. The PFS will be responsible for ensuring equipment is properly maintained. Fire-qualified personnel are responsible for their own PPE. Additional equipment and supplies are available through cooperators and the interagency cache system and would be ordered through Dispatch at the Siuslaw National Forest (Appendix O).

Detection

Most wildland fires are caused on W. L. Finley NWR by arson or other human-related causes. Many times the person who started the fire will call refuge headquarters for help or the local fire department if the refuge office is closed after hours. If the fire is not contained by refuge fire personnel or local fire department personnel within an hour, it could become a large fire during a hot, dry summer. Most fires are contained in the field where they started. If it is not contained, numerous historic refuge buildings and adjacent farm dwellings and structures could be threatened immediately.

Fires are reported to the refuge office, through the contact list, or by emergency personnel. At present, any fire reported to the county (e.g., 9-1-1) would be reported to ODF, who would then contact refuge personnel. Refuge staff are currently working with ODF to improve communication with the local fire departments, USFS, and BLM in notification of suppression actions.

The Fire Management Plan does not discriminate between human-caused and lightning caused fire. All wildland fires will be suppressed. Human-caused fires may require an investigation if arson is suspected. For undetermined fires a qualified fire investigator may be requested.

Communications

The Refuge maintains a radio system which includes portable and mobile radios in fire vehicles. Other means of communications are available at the refuge office. Cellular phones are also used on nearly all parts of the refuge for communication.. All immediate emergency notifications and contacts can be found in (Appendix O). During emergency fire operations, mutually agreed upon command and tactical channels will be used. Frequencies that may be used are found in (Appendix S).

Pre-Attack Plan

Upon discovery of a fire, all subsequent actions will be based on the following:

1. The Incident Commander (IC) will locate, size-up, and coordinate suppression actions. The IC will complete the pre-attack planning checklist (Appendix K).
2. Provide for public safety.
3. Considering the current and predicted fire conditions, the Incident Commander will assess the need for additional suppression resources and estimate the final size of the fire. The potential for spread outside of the refuge should be predicted, as well as the total suppression force required to initiate effective containment action at the beginning of each burning period.

4. The Incident Commander will assess the need for law enforcement personnel for traffic control, investigations, evacuations, etc. and make the request to the PFS.
5. Document decisions and complete the fire report (DI-1202).
6. Should a wildland fire move into an extended attack a Delegation of Authority will be invoked. Once a Delegation of Authority has been authorized the Incident Commander will make the final decisions pertaining to the fire. A copy of Delegation of Authority is in Appendix I.

Fire Management Units

Fire Management Units (FMUs) are areas on a refuge which have common wildland fire management objectives and strategies, are manageable units from a wildland fire standpoint, and can be based on natural or manmade fuel breaks. An FMU may coincide with a prescribed fire burn block or treatment area or unit, but this is not always the case.

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. Wildland fires will be suppressed using the appropriate suppression response. Prescribed fires will be used to reduce hazardous fuels and to meet resource management objectives. There are four FMUs at Finley NWR and Oak Creek: agricultural fields, RNAs, Oak Creek, and Other Lands.

Agricultural Lands

All wildland fires within agricultural lands should be suppressed utilizing the safest and most efficient tactics available. The agricultural lands do not require the presence of a resource advisor to build firelines and there are no limitations on the use of heavy equipment.

Research Natural Areas

There are three Research Natural Areas encompassed by W. L. Finley NWR: Willamette Floodplain, Pigeon Butte, and Maple Knoll RNA's. These three RNAs comprise one Fire Management Unit (Figure 5). Fires in this area will be monitored by all available refuge firefighters. A Resource Advisor will be requested immediately from the refuge upon notification of a wildland fire in an RNA. Oregon State Department of Forestry will likely initiate suppression efforts in these areas. All fires will be suppressed, but MIST tactics should be utilized whenever possible due to the sensitive nature of the resources in the RNAs.

Firelines should be constructed outside the RNA boundaries or utilizing existing firebreaks to contain fire, where possible. Fires can be suppressed using water or foam from engines located on access roads. Steel tracked or lugged vehicles must be approved by a Resource Advisor in all the RNAs, unless there are imminent threats to life. Discing, mowing, removal of trees and shrubs by chainsaw and herbicide will be allowed in RNAs to create a secure fireline.

Willamette Floodplain RNA

This 239 acre RNA typifies the grassland-forest community mosaic found on wet valley-bottom habitats in western Oregon's Willamette Valley. The grasslands

which dominate the eastern half of the area, are a rich mixture of native and introduced species of grasses, forbs, and shrubs. The floodplain forest is dominated by Oregon ash, with Oregon white oak co-dominant in some areas. These forests are subject to winter flooding by Muddy Creek.

The grassland areas are Fuel Model 1 or 3 and the ash forest is best predicted by Fuel Model 9. Based on past experience it is expected that fires will burn through the grassland areas very quickly and then slow considerably or die out once they reach the cool forest area. This RNA is surrounded by agricultural fields and roads.

Pigeon Butte RNA

Pigeon Butte RNA is located on the crest and northerly slopes of a hill in the center of W. L. Finley NWR. Pigeon Butte is 70 acres in size and rises up 250 feet from the valley floor. Fuel Model 9 best describes this forest of Oregon white oak. The well developed understory is composed primarily of western hazel (*Corylus cornuta*), serviceberry (*Amelanchier alnifolia*), western hawthorn (*Crataegus douglassii*), Indian peach (*Osmaronia cerasiformis*), bigleaf maple (*Acer macrophyllum*), and poison oak (*Rhus diversiloba*).

This area was last burned in 1985 when an escaped field fire burned into the RNA. This fire burned through the underbrush in a patchy manner and did not injure the oaks. This RNA is surrounded by roads and agricultural fields on all sides except a small area on the west border.

Maple Knoll

Maple Knoll is a 100 acre area on the north and south slopes of a low ridge located at a western corner of the refuge. This is the most difficult modified suppression area on the refuge. The west border and part of the south border of the RNA extends to the refuge boundary. This forested ridge rises approximately 250 feet above the valley floor and is best described by Fuel Model 9. The stands on the crest and south slopes are dominated by Oregon white oak with a scattering of Douglas-fir. This area has probably never been logged. The north slope, in contrast, is dominated by big leaf maple and some grand fir which were left after harvest removed Douglas-fir prior to or during World War II.

The understory varies with aspect and overstory, however, poison oak, mock orange (*Philadelphus lewisii*), western hazel, and Pacific yew (*Taxus brevifolia*) are common understory shrubs. It is important to note that poison oak is a common understory component on Maple Knoll and Pigeon Butte. People who are extremely allergic to this plant should not fight fires in this area. It is unknown when this area was last burned.

Oak Creek

Oak Creek is located approximately 1 km (2/3 mile) northwest of Sodaville in Linn County, Oregon (Figure 2). It consists of 113 acres of a diversity of habitats including pasture, herbaceous wet prairie, and riparian woodland. Oak Creek provides habitat for native prairie plants, in particular a large population of Bradshaw's desert parsley (*Lomatium bradshawii*), a federally endangered plant. Research has shown that fire is an important tool in conserving Bradshaw's desert parsley. Plans include slashing and removal of much of the pear/ash woodland where *Lomatium brashawii* now occurs.

Suppression would likely occur before a Resource Advisor would be available, although a Resource Advisor will be ordered. Suppression should be limited to pumper attacks or aerial drops as necessary, as tracked vehicles could cause significant resource damage. However, the urban-interface nature of the property may dictate strong suppression tactics from the local fire district.

Other Lands

This FMU encompasses all lands outside the RNAs that are not being managed as cropland.

Upon detection of a wildland fire in these areas, a Resource Advisor will be ordered. Handline construction is permitted in these areas, but the use of heavy equipment requires the approval of the Resource advisor, unless there are threats to life and/or public or privately-owned structures. The use of motorized vehicles will be at the discretion of the IC. The Resource Advisor should be notified of any cultural resources discovered as a result of suppression actions.

Fuel Types

The vegetation at W. L. Finley NWR can be broadly classified according to the following four categories: agricultural, grassland, wetland, and forest (Figure 3). The cultivated areas and the upland grasslands are Fuel Model 1 and the wet prairie areas and marshes are Fuel Model 3, although many areas on the refuge are a mosaic of vegetation types. Fuel Models 1 and 3 best describe approximately 70% of the refuge acreage.

In portions of the wet prairie, shrubs are becoming established due to lack of fire and are best represented by Fuel Model 5. The forested portion of the refuge is best represented by Fuel Models 9 and 10 with the exception of the small area of evergreens which is best described by Fuel Model 8.

The water areas, roads and parking lots are the only areas on the refuge which do not contain burnable fuels. Buffer areas around the office, residences, shops and barns are mowed during the summer thus reducing fuels and minimizing the chances that a fire would carry to the buildings.

Table 3: Vegetation Types and Fuel Models

	Acres	Fuel Model
Agricultural Fields	1950	1
Grasses and Small Grains	1875	1
Corn	75	3
Oak Savanna	450	1
Prairie	400	1, 3
Marsh	485	3
Hedgerow	50	5
Riparian Forest	1200	8, 9
Upland Forest	700	9, 10
Water	50	-
Road/Graveled	25	-
Buildings	15	-
Total Acreage	5325	-

Fire Behavior

Grass Fuels

Fires in this fuel type are surface fires and move rapidly through the cured grass. Seasonal changes from live to dead (cured) for the perennial and annual species are very important to potential fire behavior. Grass fuel beds transition through growing seasons from green up in the spring, to curing in summer, to a cured stage in late-summer, and then to a winter rain compacting stage.

Brush

Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and the grasses or forbs in the understory. Fires are generally not very intense because surface fuel loads are light, and the foliage is not as volatile as the chaparral or dormant brush fuel types.

Timber Litter Fuels

This fuel type is found in closed canopy stands of short needle conifers. The fuel layer is mainly needles and occasionally twigs. Little undergrowth is present in the stand. Slow burning ground fires with low flame lengths are generally the case. Occasional "jackpots" of heavy fuel concentrations occur in this type. During periods of severe fire weather conditions involving high temperatures, low humidity, and high winds these fuels pose a hazard. Fuel loading is approximately 7 tons per acre. Duff fuel loading can be up to 12 tons per acre.

Timber Fuels

Fires burn in the surface and ground fuels with greater fire intensity than the timber litter models. Dead and down fuels include greater quantities of 3 inch or larger limbwood, that accumulates as a result from stand maturity or natural events that create a large load of dead material on the forest floor. Small to medium height conifers in the stand understory contribute to a ladder fuel situation. Crowning, spotting and torching of individual trees are more frequent in this fuel situation. Any forest vegetation type may be considered if heavy down material is present. Insect or disease ridden stands, wind thrown stands or material from natural thinning of stands contribute to this fuel type. Fuel loading is approximately 18 tons per acre. Duff fuel loading can be up to 15 tons per acre or more.

Table 4: Predicted Fire Behavior

	5 mph midflame wind speed	10 mph
midflame windspeed		
Fuel Model,Rate of Spread -		
CH/HR,Flame Length -		
FEET,Fireline Intensity-		
BTU/FT,Rate of Spread -		
CH/HR,Flame Length -		
FEET,Fireline Intensity-		
BTU/FT		
NFFL 1		
Short grass,		

8,
1,
4,
25,
2,
25
NFFL 3
Tall grass,
115,
12.5,
1400,
260,
18,
3100
NFFL 5
Brush,
8.5,
2.5,
40,
20,
5,
60
NFFL 8
Closed litter,
2,
1,
6,
2,
1,
4
NFFL 9
Hardwood litter,
11,
3,
60,
28,
5,
150
NFFL 10
Timber,
5,
3.5,
90,
16,
6.5,
350

The above behaviors are based on these weather conditions which may be found in mid-August for the 1400 observations. These conditions include "maximum temp of 75 degrees F; 30% RH; mid-flame wind speed of 5 and 10mph; and 11% average 1 hr (<1/4" diameter) dead fuel moisture. The slope is 0% to 30%. The outputs are from nomograms and based on the conditions above and for the major fuel models found within the Refuge Complex.

Suppression Tactics

Wildland fires will be suppressed in a prompt, safe,, and cost-effective manner to produce fast, efficient action with minimum damage to resources. Suppression involves a range of possible actions from initial attack to final suppression. All wildland fires will be suppressed.

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

In some refuge locations, attempts to suppress a wildland fire could potentially have greater ecological impacts than the fire. Thwe use of heavy equipment requires resource advisor approval on all areas of tyhe refuge EXCEPT agricultural lands. Construction of handline requires Resource Advisor approval in RNAs and Oak Creek. Off-road travel is not permitted in RNAs without Resource Advisor approval. Discing, mowing, removal of trees and shrubs by chainsaw and herbicide will be allowed in RNAs to create a secure fireline.

Table 5: Suppression Tactics by FMU
,Agricultural Lands,RNAs,Oak Creek,Other Lands
Water/ Foam,IC,IC,IC,IC
Hand line,IC,RA,RA,IC
Dozer Line,IC,RA,RA,RA
Off road travel,IC,RA,IC,IC
IC = Incident Commander discretion
RA = Resource Advisor Approval, unless there are threats to life/ property

Suppression Conditions

Most wildland fires are caused on W. L. Finley NWR by arson or other human-related causes. Many times the person who started the fire will call refuge headquarters for help or the local fire department if the refuge office is closed after hours. If the fire is not contained by refuge fire personnel or local fire department personnel within an hour, it could become a large fire during a hot, dry summer. Most fires are contained in the field where they started. If it is not contained, numerous historic refuge buildings and adjacent farm dwellings and structures could be threatened immediately.

A full suppression alternative was selected for this refuge which requires aggressive containment and control of all wildland fires. Heavy equipment use is restricted due to the potential impact to natural resources. Unless life or property is in imminent risk, consultation with the Resource Advisor prior to their use is necessary. Issues of restrictions should be discussed with cooperators annually and included in agreements between agencies. Changes and areas of concerns should be documented.

The refuge has primary responsibility for all pre-suppression and prevention activities on refuge lands. Refuge personnel will make immediate initial attack on all fires occurring on the refuge until assistance arrives. All wildland fires will be actively suppressed.

Occupied residences, administrative buildings, and maintenance buildings are first priority, control-at-all-cost areas. Adjacent private structures should also be protected with whatever tactics are necessary. Second priority areas are refuge historical sites; control-at-all-cost. Third priority are the protection of permittee cattle, equipment, and crops.

Most of the fuels on the refuge are light and volatile grasses. Given low fuel moisture and moderate winds fires will travel very quickly. Safety is the first concern when suppressing fires. Wetland areas can generally burn without resource damage, and then be suppressed at roadsides or other appropriate locations.

Wildland Fire Situation Analysis

For fires that cannot be contained in one burning period, a WFSA must be prepared (Appendix P). In the case of a wildland fire, the Project Leader, in conjunction with the FMO/PFS or Resource Advisor, will prepare the WFSA. Approval of the WFSA resides with the Refuge Project Leader.

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, and the probable character of suppression actions are all important considerations. Public safety will require coordination between all refuge 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 utilize 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

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, bucket drops and transportation of personnel and equipment. Natural helispots and parking lots are readily available in most cases. Clearing for new helispots should be avoided where possible. Improved helispots will be rehabilitated following the fire. As in all fire management activities, safety is a primary consideration. Qualified aviation personnel will be assigned to all flight operations.

Rehabilitation and restoration

There are 3 types of fire rehabilitation, Suppression, Burn Area, and Emergency Stabilization.. Suppression rehabilitation is to restore and repair property and resources from direct suppression activity damage, i.e. cut fences, dozer lines, and campsites. Burn area rehabilitation and stabilization is to restore resources and property damaged or otherwise impacted from the fire, i.e. burned waterlines, denuded hill sides, etc.

Suppression Rehabilitation

In the event of a wildland fire, rehabilitation of fire suppression damage should be accomplished immediately. An appropriate time is within 7 days after the fire is controlled unless the regional fire coordinator grants an extension. Funding for suppression rehabilitation is from the specific fire cost account as established by the PFS. The Incident Commander as agreed to by the Project Leader or Refuge Manager will initiate suppression rehabilitation.

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.
 - * Restore natural ground contours, which were altered.
 - * Remove all flagging, equipment and litter.
 - * Completely restore camping areas and improved helispots.
 - * Re-vegetation to restore sensitive impacted areas due to suppression actions*.
- * If re-vegetation or seeding is necessary, only locally procured seeds of native plant species will be used.

A written suppression rehabilitation plan may be appropriate on larger incidents. Contractors or equipment may be hired to accomplish specialized work.

Emergency Stabilization Versus Rehabilitation

Emergency stabilization is the use of appropriate emergency stabilization techniques in order to protect public safety and stabilize and prevent further degradation of cultural and natural resources in the perimeter of the burned area and downstream impact areas from erosion and invasion of undesirable species. Rehabilitation is the use of appropriate rehabilitation techniques to improve natural resources as stipulated in approved refuge management plans and the repair or replacement of minor facilities damaged by the fire.

Total "rehabilitation" of a burned area is not within the scope of the Emergency Rehabilitation funding. Emergency Rehabilitation funding can be used to begin the rehabilitation process if other funding is committed to continue the rehabilitation throughout the life of the project (beyond the initial 3 years of Emergency Rehabilitation funding). Major facilities are repaired or replaced through supplemental appropriations of other funding.

Burned Area Emergency Stabilization and Rehabilitation (ESR) Plan

The goal of the ESR Plan is to protect public safety and stabilize and prevent further degradation of natural and cultural resources, and to rehabilitate the stability, productivity, diversity, and ecological integrity of refuge lands after a wildland fire as described in approved refuge management plans. The ESR Plan is tiered to the refuge Comprehensive Conservation Plan (CCP), Habitat Management Plan (HMP), Fire Management Plan (FMP), and operations or step-down plans. Development of ESR Plan objectives is guided by resource management objectives, general management practices, and constraints identified in approved CCP, HMP, and/or supporting step-down plans.

If Burned Area Emergency Stabilization and Rehabilitation is required to reduce the effects of a wildland fire, then the Refuge should request appropriate funding through the Burned Area Emergency Stabilization and Rehabilitation (ESR) fund. The Service representative at the National Interagency Fire Center administers the ESR fund. A rehabilitation and restoration survey, plan, and request must be prepared and submitted according to agency guidelines. Smaller incidents may only need simple plans prepared by refuge staff. Larger incidents with extensive rehabilitation efforts should employ a ESR Team. A ESR Team is composed of personnel who specialize in key disciplines of resource management

and are experts in ESR Plan preparation. A formal request for a ESR Team should be made in consultation with the Incident Management Team as soon as it appears damage may be significant. Instructions for ESR Team mobilization can be found in the National Wildfire Coordinating Group mobilization guide. Delays in making a request may hinder funding approval and magnify the damage. Once a ESR Team is employed, the Project Leader or their representative should provide guidance to the ESR team leader with expectations. The Project Leader, biologist, and PFS will review all ESR Plans. The final plan will be submitted to the Region for review prior to submission to the WO. Direction on ESR guidelines can be found in the Service Fire Management Handbook section 5.1.

Required Reporting

The IC will be responsible for documenting decisions and completing the fire report (e.g., Ics-214, DI-1202, examples in Appendix L). The PFS will be responsible for any additional required reports.

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 will be carried out. However, fire management personnel should not question suspects or pursue the fire investigation unless they are currently law enforcement commission qualified. Personnel and services of other agencies may be utilized to investigate wildland fire arson or fire incidents involving structures. All fire investigations should follow the guidelines outlined in 4.1-2 of the Fire Management Handbook (USFWS 2000). The local fire investigator that would serve the refuge is Steve Elefant, Oregon Department of Forestry, Philomath, Oregon ((541) 929-3266. The fireline supervisor will be responsible for contacting the fire investigator as deemed necessary.

PRESCRIBED FIRE ACTIVITIES

The earliest historical records indicate that Native Americans started fires that burned extensive areas of the Valley annually. What role fire played prehistorically is not known. In general, fire is considered beneficial to the native grassland areas and oak savanna uplands. Fire is considered essential in the Willamette Valley Floodplain RNA to maintain the grassland condition and suppress encroaching woody vegetation. An intense crown fire could result in a significant loss of conifer trees in the forested areas of the refuge. However, it is more likely that a fire will carry in the understory or along the ground without killing the trees. The 1985 Pigeon Butte fire cleared large areas of brush and stimulated sprouting of grasses and forbs, indicating that the maintenance of fire may be ecologically beneficial. Prescribed fire would enable management of woody species (e.g., Oregon ash) invasion into grassland areas. Prescribed fire would also assist in managing Douglas fir density in oak savannah and oak woodland habitats and bigleaf maple in the understory of the Pigeon Butte RNA.

Prescribed Burn Program Objectives

Prescribed fire has been a useful tool for restoring and maintaining natural conditions and processes at the Willamette Valley NWRC. The goals of prescribed fire are to:

1. Restore and maintain native wetland prairies and oak savannah using fire to set back and reduce woody vegetation.
2. Provide benefits to specific rare plant species, specifically Bradshaw's lomatium (*Lomatium bradshawii*) and peacock larkspur (*Delphinium pavanaceum*).
3. Provide opportunities for research of fire-dependent species and plant communities.
4. Remove unwanted accumulations of residual vegetation in association with wetland restoration.
5. Realize beneficial effects upon non-native noxious weeds.

Specific management needs for the refuge as a whole and for specific areas 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. The Refuge Project Leader will approve prescribed fire plans.

Upland grasslands are burned to maintain an open oak savanna habitat by inhibiting the encroachment of shrubs and woody vegetation. Burning also improves the quality of goose forage by increasing the accessibility of green grass, and creates preferred foraging sites for elk. Wetland habitats of the refuge are burned to remove the dense stands of reed canarygrass (*Phalaris arundinacea*), which dominate the shallow moist soil areas. Some areas may be treated with herbicide post-burn, as the reed canarygrass sprouts quickly following fire. The increase in sunlight and exposed soil will allow native species to germinate.

Fire Management Strategies

Prescribed fire will be used to reduce hazard fuel accumulations, restore fire to fire-dependent ecological communities, improve conditions for listed species, improve wildlife habitat, and contribute to research. All prescribed fire activity will comply with applicable Federal, state, and local air quality laws and regulations.

The Willamette Prairie was created and maintained under a regime of fire. There are no known ecological equivalents to the use of fire, although mowing can be used to mimic some of the effects.

Management constraints include safety, achievement of refuge objectives, special constraints for Research Natural Areas, and smoke management.

Protection of visitors and other personnel, wildlife, buildings and livestock are obviously of utmost importance in completing prescribed burns or suppressing wildland fires. Prescribed burning will not be employed except to help achieve specific refuge management objectives. In order to achieve the desired results with minimum disturbance to wildlife and maximum success and safety, prescribed fires must be conducted at a specific time of year and under a specified range of weather conditions.

Prescribed Fire Planning

Annual Activities

The PFS 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, personnel utilized, and fire effects.

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

Prescribed burns are normally accomplished between August 15 and October 15. Oak savannah units have the potential to be burned during February and March, weather permitting. The following table shows the annual activities involved in accomplishing prescribed burns on the refuge.

Table 6: Annual Prescribed fire Burn Activities

Date,Task

July,Select burn units for next FY and input into FIREBASE

Jul - Aug,Prepare units for burning this year; Pack tests, SA-130, practice shelter deployment

Aug - Oct,Burn units selected previous year

Oct,Renew contracts (if any)

Nov - Feb,Order cache supplies; repair equipment; prepare Prescribed fire burn plans; update all fire plans

Jan,Announce fire crew positions

Mar,Select fire crew positions

Apr - May,Check cache and equipment for fire readiness

Jun - Jul,Update contact lists for Smoke Mgmt. and Prescribed fire burns

Prescribed Burn Plan

The Prescribed Burn Boss will conduct a field reconnaissance of the proposed burn location with the FMO, PFS, biologist, and/or Refuge Manager to discuss objectives, special concerns, and gather all necessary information to write the burn plan. After completing the reconnaissance, the PFS will 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 those parameters will be suppressed. Prescribed Burn Plans will follow the format contained in Appendix M. Each burn plan will be reviewed by the Biologist, FMO/PFS, and Burn Boss. The Project Leader has the authority to approve the burn plan. The term 'burn unit' refers to a specific tract of land to which a prescribed burn plan applies.

Strategies and Personnel

Execution of prescribed burns will only be executed by qualified personnel. The Prescribed Burn Boss will fill all required positions to conduct the burn with qualified personnel. All positions listed in the burn plan must be available for the duration of the burn or the burn will not be initiated.

Weather and fuel moisture conditions must be monitored closely in planned burn units to determine when the prescription criteria are met. A belt weather kit may also be utilized to augment monitoring. The Prescribed fire burn plan checklist and the Go-No-Go checklist will be completed before any burn is executed (Appendix M).

All burning in the Willamette Valley is strictly regulated by the Oregon Department of Environmental Quality (DEQ) and Oregon Department of Agriculture, Division of Smoke Management (DSM), to minimize smoke intrusion into populated areas. DSM decides, on a daily basis, whether burning will be allowed and how many acres may be burned. If the Fire Danger Rating is extreme, then no prescribed burning will be allowed even when weather conditions are favorable for smoke dispersion.

When all prescription criteria are within the acceptable range, the Burn Boss will select an ignition date based on current and predicted weather forecasts. A thorough briefing will be given by the 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. 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.

Burn Units

The following are the areas that are presently burned at W. L. Finley NWR and Oak Creek. Appendix G and Figure 4 show locations and boundaries for units that are presently on a 3-5 year burn rotation. A 5-10 year plan will be established to begin incorporating potential burn units at W. L. Finley NWR and Oak Creek into the existing rotation. Additional goals and needs will be set and determined by the Project Leader, Refuge Biologist, and PFS.

1. Willamette Valley Floodplain Research Natural Area
 - approximately 400 acres
 - wetland prairie dominated by grasses
 - Fuel Model 1,2

2. Wet or Upland Prairie Restoration Sites
 - approximately 200 acres
 - seasonal wet prairie restoration sites or retired agricultural fields with grass
 - Fuel Model 1,3

3. Upland Oak Savannah
 - approximately 450 acres
 - upland prairie (primarily non-native grasses) with scattered/clumped Oregon white oak
 - Fuel Model 1,2

4. Wetlands- Reed Canarygrass dominated sites
 - approximately 200 acres
 - various shallow water/moist soil habitats, or islands within wetlands
 - Fuel Model 3
5. Oak Creek- wet prairie and wet pear/ash forest
 - approximately 25 acres
 - wet prairie grassland and forested areas after slashing/tree removal
 - Fuel Model 1,2

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 fire. This information will be very useful in fine-tuning the prescribed burn program.

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 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 PFS will establish specific fire information guidelines for each fire to update intelligence about the fire. Several studies investigating the response of vegetation, small mammals, and birds to different fire frequencies have been conducted on the Willamette Valley Floodplain RNA (see Appendix N).

Required Reports

All prescribed burn forms will be completed as outlined by the Prescribed Burn Boss. A monitor will be assigned to collect all predetermined information and complete all necessary forms prior to, during, and after the burn. All records will be archived in the refuge's 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

A critique will be conducted for each prescribed burn. A report detailing the actual burn will accompany any recommendations or changes deemed necessary in the program. This report will be submitted to the Refuge Project Leader. A post-season critique of the fire management program, including the prescribed burn program, will be held each year at the conclusion of the fall fire season. The format for the Critique of Burn is included within the Prescribed Burn Plan (Appendix M).

AIR QUALITY / SMOKE MANAGEMENT GUIDELINES

All burning in the Willamette Valley is strictly regulated by the Oregon Department of Environmental Quality (DEQ) and Oregon Department of Agriculture, Division of Smoke Management (DSM), to comply with smoke dispersal requirements in the Willamette Valley. No burn permits are required, however, DSM decides, on a daily basis, whether burning will be allowed and how many acres may be burned. No prescribed burns are conducted without DSM approval. Approval is obtained by contacting DSM on the morning of a proposed burn. Because of the proximity of Highway 99W to W. L. Finley NWR, prescribed burns of areas on the eastern portion of the refuge must be closely monitored to ensure that weather changes do not result in smoke hazards to motorists. In addition to smoke management by DSM, the refuge lands are also constrained by Fire Danger Ratings for the area. If the Fire Danger Rating is extreme, then no prescribed burning will be allowed even when weather conditions are favorable for smoke dispersion.

FIRE RESEARCH

Past and on-going research on the Willamette Valley NWRC related to fire and fire-dependent species and ecosystems is listed in Appendix N. Much of the research has been done by Oregon State University, Dept. of Botany and Plant Pathology. Additional fire research within the southern Willamette Valley has been conducted within the West Eugene Wetlands Project Area, completed by The Nature Conservancy, Army Corps of Engineers, and Eugene District BLM. Funding for the research has most often been on a cost-share basis between the USFWS and Oregon State University. USFWS funding has come from refuge operations or from threatened/endangered species funds out of the Oregon State Office. Annual fire appropriations have not included funding for fire-related research/monitoring. National fire research funds are very limited.

PUBLIC SAFETY

The Willamette Valley NWRC is dedicated to ensuring the safety of each visitor and to all residents and property adjacent to the refuge's boundary. Residents adjacent to the refuge will be notified in advance of any prescribed burn and if any fire poses a threat to burn outside the refuge boundaries. A list of adjacent landowners with phone #s and addresses for notification purposes is included within the Prescribed Burn Plan (Appendix M). During prescribed burns at least one burn team member will have first aid training. First aid kits will be in every vehicle for all fire management activity. Local law enforcement officials will be notified as necessary regarding wildland fires on refuge lands.

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 fire management program. The refuge will use the most appropriate and effective means to explain the overall fire and smoke management program. This may include supplemental handouts, signing, personal contacts, auto tour routes, or media releases. When deemed necessary, interpretive presentations will address the fire management program and explain the role of fire in the environment. Options for the public information program include as follows:

1. Concepts of the prescribed burn program will be incorporated, as appropriate, in publications, brochures, and handouts.
2. During periods when prescribed burns are ignited, handouts will be prepared and distributed to all visitors entering areas of fire activity.
3. 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.
4. The public information outlets of neighboring and cooperating agencies and the regional office will be provided with all fire management information.
5. The fire management program will be discussed in informal talks with all employees, volunteers, residents, and neighbors.

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 PFS will retain a copy for the refuge files. A sample critique for both wild and prescribed wildland fires is included (Appendix Q).

Annual Fire Summary Report

The PFS 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 utilized, 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 Refuge 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.

Roddy Baumann, Prescribed Fire Specialist, Pacific Region, USFWS, Portland, OR.
Brian Gales, Prescribed Fire Specialist, Willamette Valley NWRC, Corvallis, OR.
James Houk, Deputy Project Leader, Willamette Valley NWRC, Corvallis, OR.
Amanda McAdams, Fire Planner, Pacific Region, USFWS, Portland, OR.
Oregon Department of Forestry, Philomath Office, Philomath, OR.
Lebanon Fire District, Lebanon, OR.

APPENDICES

Appendix A: Literature Cited

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Appendix B: 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, chief of refuges, regional director, regional chief of refuges, refuge supervisor, 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. Wildland fire. 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 C: Structures

GOVERNMENT OWNED STRUCTURES

NFFL

Structure	Value (x\$1000)	Fuel Model	Residence (Q4)*
96.4 1Garage (Q4)		4.0	1,5Pump
House (Q4)	1.0	1Pump House (Q1)*	
2.5 1Shop/Vehicle Storage*		107.7	1Shed (Q4)
2.0 1Bridge (Brown Swamp)		25.0	5,9Bridge
(Muddy Creek)	25.0	9Kiosks and Information Panel	
30.0 1,3Interpretive Trail Overlook		25.0	1Historic
BuildingsOffice (Q1)*		200.9	1Residence -
Fiechter House (Q2)*	55.0	1Carriage House (Q2)*	
6.5 1,5Barn #1		80.0	1,5,9Shed
(Barn #1)	0.5	9Cheadle Barn	
60.0 1Shed (Cheadle Barn)		50.0	1Big Barn*
265.0 1Granary/Tool Shed		25.0	1Smoke
House	1.3	1	PRIVATE STRUCTURES
Gallows Residence	50.0	1Sherry Residence	
50.0 9Warden Residence		40.0	1Fortmuller
Residence	50.0	1,9	

Appendix D: NEPA Compliance Categorical Exclusion

UNITED STATES FISH AND WILDLIFE SERVICE

ENVIRONMENTAL ACTION STATEMENT FOR CATEGORICAL EXCLUSION

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA), and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and determined that the following proposed action is categorically excluded from NEPA documentation requirements consistent with the 40 CFR 1508.4 and 516 DM 2.3A.

Proposed Action and Alternative
 Categorical Exclusion(s)
 Permits/Approvals
 Interagency Coordination
 Supporting Documents

 (Project Leader) (date)

Appendix E: Cultural Resource Clearance Form

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 F: Wetlands

Appendix G: Prescribed Burn Units

Appendix H: Prescribed Fire History

1991-2000 Rx. Fire at W. L. Finley NWR

DATENAMEACREAGEDATENAMEACREAGE9/1/91Field 1360.09/12/91Field 2940.09/1/91Field
1521.09/12/91Field 2280.09/1/91Field 1942.09/12/91Field 22SW20.19/1/91Field
2075.09/12/91Field 22NW30.39/1/91Field 2410.09/12/91Field 48 Stock8.09/1/91Field
2613.09/14/91N Prairie80.09/1/91 Field 427.09/23/92S Prairie110.09/1/91Field
545.010/23/91Hay 8 Stock.19/1/91Field 5818.010/23/91Hay 52 Stock.19/1/91Field
5915.08/15/92Field 1140.09/1/91Field 6217.08/15/92Field 5818.09/1/91Field
6316.08/15/92Field 5915.09/1/91Field 6465.08/15/92Field 746.09/1/91Field
746.08/15/92Field 6037.09/1/91Field 8W120.08/15/92Field 6135.09/4/91Field 61
Ward35.08/15/92Field 6217.09/4/91Field 12 Ward260.08/15/92Field
6316.09/5/91Field 60 Ward37.08/15/92Field 1942.09/8/91Field 11
Ward44.08/15/92Field 1521.09/11/91Field 34 Stock10.08/15/92Field
2410.09/11/91Field 35 Stock7.08/15/92Field 2613.09/11/91Field 40

Stock10.08/15/92Field 427.09/11/91Field 41 Stock10.08/15/92Field
545.09/11/91Field 6 Stock49.08/15/92Field 0545.0
DATENAMEACREAGEDATENAMEACREAGE8/15/92Field 6465.08/10/94Field 6465.08/15/92Field
12135.08/10/94Field 6040.09/1/92Field 8E100.08/17/94Field 12SW135.09/1/92Field
2075.08/17/94Field 6625.09/5/92Field 1360.09/14/94Field 2935.010/13/92Prairie
NW809/14/94Field 22S25.010/14/92Field 2945.09/20/94Field 3175.010/14/92Field
2275.010/6/94NW Prairie80.09/1/93Field 0545.010/6/94SE Prairie110.09/1/93Field
1046.010/13/94Bald Top40.09/1/93Field 1521.09/1/95Field 1050.09/1/93Field
1613.09/1/95Field 1140.09/1/93Field 1942.09/1/95Field 4942.09/1/93Field
4228.09/1/95Field 428.09/1/93Field 4912.09/1/95Field 5818.09/1/93 Field
5818.09/1/95Field 5915.09/5/93Field 2075.09/1/95Field 6037.09/6/93Field
545.09/1/95Field 6135.010/19/93NW Prairie80.09/1/95Field 6217.010/20/93Field
2945.09/1/95Field 6812.08/10/94Field 1360.09/1/95Field 1290.08/10/94Field
1942.09/1/95Field 6465.08/10/94Field 2075.09/1/95Field 1360.08/10/94Field 10
50.09/3/95Field 2075.08/10/94Field 5817.09/3/95Field 156.08/10/94Field
1140.08/15/96Field 1360.08/15/96Field 1942.09/11/98NW Prairie80.08/15/96Field
5817.09/11/98Swale 2.08/15/96Field 12100.09/16/98S Prairie120.08/15/96Field
746.09/30/98Unit 22 Main5.08/15/96Field 2075.08/13/99Field 158.28/16/96Field
1050.08/18/99NWWoodpecker10.09/1/96Field 6037.08/19/99SWoodpecker10.09/1/96Field
6135.08/20/99Field 8189.29/1/96Field 6217.08/25/99SWoodpecker8.89/1/96Field
6316.09/2/99Bald Top54.19/1/96Field 8W120.09/3/99Field 295.09/1/96Field
5915.09/22/99Swale 7.39/26/96NW Prairie80.09/23/99Shop/Barn11.89/26/96Prairie
Sch1.010/14/99Mid Prairie287.58/20/98Unit 2219.09/27/00Prairie 758.28/20/98Unit
295.09/27/00N Prairie76.09/1/98Elk Pasture38.09/28/00S Prairie107.0

Appendix I: Delegation of Authority & Management Team Transition Guidelines

Appendix J: RAWs Data

Appendix K: Pre-Attack Planning Checklist

Appendix L: Fire Report Forms

Appendix M: Prescribed Burn Plan

Appendix N: Research

FIRE RELATED RESEARCH ON WILLAMETTE VALLEY

NATIONAL WILDLIFE REFUGE COMPLEX LANDS

Bartels, M. R. 2000. Conservation of *Sidalcea nelsoniana* through habitat management: effects of burning, mowing, and altered flooding regime on a rare Willamette Valley perennial. M.S. Thesis, Oregon State University.

Bartels, M. R., and M. V. Wilson. 2001. Fire and mowing as management tools for conserving a threatened perennial and its habitat in the Willamette Valley, Oregon. Proceedings of the 17th North American Prairie Conference (in press).
Clark, D. L., and M. V. Wilson. 1998. Fire effects on wetland prairie species. Report to U.S. Fish and Wildlife Service. 26 pages.

Clark, D. L. and M. V. Wilson. 2000. Promoting regeneration of native species in Willamette Valley upland prairies. Report to the U.S. Fish and Wildlife Service and the Oregon Natural Heritage Program. 20 pages.

Leininger, S. 2001. Promoting and restoring Kincaid's lupine (*Lupinus sulphureus* spp. *kincaidii*) and Willamette daisy (*Erigeron decumbens* var. *decumbens*) at Baskett Slough NWR. Senior honors thesis, Oregon State University.

Patterson, M. T., and Carpenter, H. In progress. The effects of fire on nitrogen fixing lichens in Oregon oak savannahs.

Wilson, M. V. 1997. Final report: Effects of fire fighting foam on the survival, size, and reproduction of Kincaid's lupine and spur lupine, Baskett Slough National Wildlife Refuge. Report to U.S. Fish and Wildlife Service. 8 pages.

Wilson, M. V., and D. L. Clark. 1997. Final report: Effects of fire, mowing, and mowing with herbicide on native prairie on Baskett Butte, Baskett Slough National Wildlife Refuge. Report to U.S. Fish and Wildlife Service. 25 pages.

Wilson, M. V. 1999. Evaluating prescribed burning to improve prairie quality in the Willamette Floodplain Research Natural Area, W. L. Finley National Wildlife Refuge, Oregon. Report to U.S. Fish and Wildlife Service. 25 pages.

Wilson, M. V., and D. L. Clark. 2000. Restoration of Fender's blue butterfly and its prairie ecosystem: Management applications of fire to Baskett Slough NWR. Report to U.S. Fish and Wildlife Service and the Oregon Natural Heritage Program. 7 pages.

Wilson, M. V. In progress. Long term responses of wetland prairie in the William L. Finley National Wildlife Refuge to three burning regimes (1991-1997). Report to the U.S. Fish and Wildlife Service, Willamette Valley National Wildlife Refuge Complex.

Appendix O: Fire Dispatch and Emergency Contact Numbers

NAME	POSITION	CELL	OFFICE	HOME	Carol Shuler	Project Leader	(541) 740-3612	(541) 757-7236	(503) 658-2537
Jim Houk	Deputy Project Leader	(541) 740-6356	(541) 757-7236	(541) 342-5447	Jock Beall	Refuge Biologist	(541) 740-5147	(541) 757-7236	(541) 463-7625
Brian Gales	Prescribed Fire Specialist	(541) 740-8865	(541) 757-7236	(503) 709-7732	Pam Ensley	Regional Fire Coordinator	(503) 731-7978	(503) 231-6174	Andy Anderson
Regional FMO	(503) 805-1312	(503) 231-6175	Roddy Bauman	Region Rx Fire Specialist	(503) 784-8348	(503) 231-2075	Rod Blacker	Zone FMO	(541) 493-2612
(541) 573-5343	Steve Elefant	Oregon Dept. Forestry	(541) 929-3266	IACC	Eugene Interagency Disp.	(541) 465-6712	SADS	Salem Interagency Disp.	(503) 375-5692
Siuslaw N.F.	Fire Dispatch	(541) 750-7024	OSP-Non Emergency	Oregon State Police non-emergency	(541) 967-2021	Dispatch	Benton County Sheriff	(541) 757-6911	Hospital
Good Samaritan	Corvallis	(541) 768-5111	Lebanon Rural	Fire Department	(541) 451-1901	Monroe Rural	Fire Department	(541) 847-5170	EMERGENCY
Fire	Police	Ambulance	911						

Appendix P: Wildland Fire Situation Analysis

Appendix Q: Wildland Fire Critique

Appendix R: Environmental Assessment

Appendix S: Radio Frequencies