WILDLAND FIRE MANAGEMENT PLAN

Tualatin River National Wildlife Refuge

September 2002

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This document is stored in H:/petes/fmp/fire management plan final.wpd

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A fire scholls.mxd
A fire steinborn.mxd
A fire onion flats.mxd
A fire rock creek.mxd

Weather data (Excel). H:/petes/fmp/raws data.xls

Neighboring landowners list (Excel). H:/petes/fmp/neighbor list.xls

Monitoring forms, appendices Q, R, S (Excel). H:/petes/fmp/rx monitoring forms.xls

RAWS station description: http://www.wrcc.dri.edu/cgi-bin/raws2a_pl

Insert these pages in the appropriate place after printing the document.

WILDLAND FIRE MANAGEMENT PLAN

Tualatin River National Wildlife Refuge

SEPTEMBER 2002

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INTRODUCTION

This document will establish a Fire Management Plan (FMP) for Tualatin River National Wildlife Refuge (Refuge). This plan will meet the requirements of the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA) and the National Historic Preservation Act (NHPA).

This plan is written as an operational guide for managing the Refuge's wildland fire program. 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 FMP outlines a program of full suppression of all wildland fires and pile burning, a limited form of prescribed burning, within the Refuge to protect property, structures, and resource values.

There is no established on-site fire management organization at The Refuge. Wildland fire coverage for the Refuge is provided by Tualatin Valley Fire and Rescue, Tualatin District.

COMPLIANCE WITH USFWS POLICY

The Refuge was established under the authority of the Migratory Bird Conservation Act of February 18, 1929 as amended (16 U.S.C. 715-715r), the Fish and Wildlife Act of August 8, 1956 as amended (16 U.S.C. 742(a)-754), and the Emergency Wetlands Resources Act of November 10, 1986 as amended (16 U.S.C. 3901(b)).

Authority and guidance for implementing this plan are found in:

- Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C.594): authorizes the Secretary of the Interior to protect from fire, lands under the jurisdiction of the Department directly or in cooperation with other Federal agencies, states, or owners of timber.
- Economy Act of June 30, 1932: authorizes contracts for services with other Federal agencies.
- Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856, 1856a and b): authorizes reciprocal fire protection agreements with any fire organization for mutual aid with or without reimbursement and allows for emergency assistance in the vicinity of agency lands in suppressing fires when no agreement exists.
- Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121): authorizes Federal agencies to assist state and local governments during emergency or major disaster by direction of the President.
- National Wildlife Refuge System Administrative Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd): defines the National Wildlife Refuge System as including wildlife refuges, areas for the protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas and waterfowl production areas. It also establishes a conservation mission for the Refuge System, defines guiding principles and directs the Secretary of the Interior to ensure that biological integrity and environmental health of the system are maintained and that growth of the Refuge System supports the mission.

- < Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C.2201): provides for reimbursement to state or local fire services for costs of firefighting on federal property.
- < Wildfire Suppression Assistance Act of 1989. (Pub.L. 100-428, as amended by Pub.L 101- 11, April 7, 1989).
- < Departmental Manual (Interior), Part 620 DM, Chapter 1, Wildland Fire Management: General Policy and Procedures (April 10, 1998): defines Department of Interior fire management policies.
- < Service Manual, Part 621, Fire Management (February 7, 2000): defines U.S. Fish and Wildlife Service fire management policies.
- < National Environmental Policy Act of 1969: regulations implementing the National Environmental Policy Act (NEPA) encourages the combination of environmental comments with other agency documents to reduce duplication and paperwork (40 CFR 1500.4(o) and 1506.4).
- < Clean Air Act (42 United State Code (USO) 7401 et seq.): requires states to attain and maintain the national ambient air quality standards adopted to protect health and welfare. This encourages states to implement smoke management programs to mitigate the public health and welfare impacts of Wildland and prescribed fires managed for resource benefit.
- < Endangered Species Act of 1973.
- < U.S. Fish & Wildlife Service Fire Management Handbook.

This plan meets NEPA / NHPA compliance and will be implemented in cooperation with the Endangered Species Act of 1973, as amended, under the Section 7 programmatic review, and will take appropriate action to identify and protect from adverse effects on any rare, threatened, or endangered species (Appendix E). 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.

DESCRIPTION OF REFUGE

The Refuge is located in the northern Willamette Valley about 15 miles southwest of Portland, near the city of Sherwood, Washington County, Oregon (Figure 1). The Refuge was established in 1992, with an approved acquisition boundary encompassing 3,058 acres in several disjunct units. Currently, the Refuge owns 1,203 acres in fee title and has management authority on an additional 50 acres owned by Metropolitan Service District (Metro). The Refuge does not have fire management authority on the Metro-owned property. Elevations range from about 110 to 300 feet. Physical features include mainstem Tualatin River, Chicken and Rock Creeks and their associated floodplains; semi-permanent and seasonal managed and natural wetlands; prairies and grasslands; mixed coniferous and riparian forests; and agricultural areas. Structures include office buildings, quarters, shops, barns, other outbuildings, and numerous water control structures, pumps, and other water conveyance and storage structures (Appendix L).

Refuge Establishing and Acquisition Authorities, Purposes, and Operational Goals.

Designated purposes for the Refuge are:

"...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds..." Migratory Bird Conservation Act of 1929 (16 U.S.C. 715-715r).

"...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." Fish and Wildlife Act of 1956 (16 U.S.C. 742f(a)(4))

"... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." Fish and Wildlife Act of 1956 (16 U.S.C. 742f(b)(1))

"... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ..." Emergency Wetlands Resources Act of 1986 (16 U.S.C. 3901(b))

The overall goals of the Refuge, as found in the Refuge Management Information System, 13 September 2002, are to:

1) Protect and restore a diversity of native habitats and associated populations of indigenous fish, wildlife, invertebrate, and plant species of the Tualatin River Basin.

2) 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, with an emphasis toward urban residents.

3) Protect, restore, and develop a diversity of habitats for migratory birds such as neotropical songbirds,

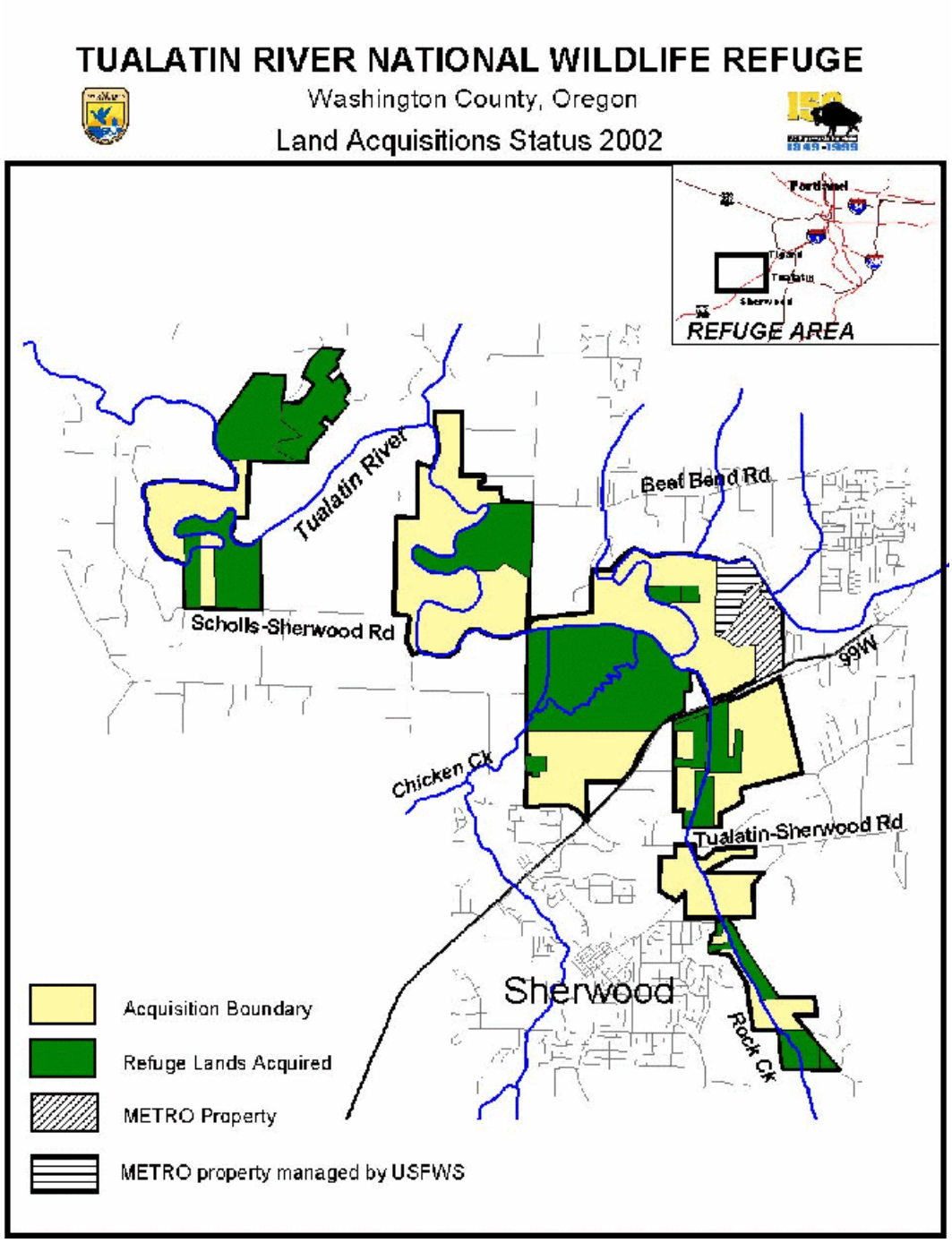
TUALATIN RIVER NATIONAL WILDLIFE REFUGE
Washington County, Oregon
Land Acquisitions Status 2002
REFUGE AREA
Tualatin River
Scholls-Sherwood Rd
Beat Bend Rd
99W
Chicken Ck
Tualatin-Sherwood Rd
Sherwood
Rock Ck
Acquisition Boundary
Refuge Lands Acquired
METRO Property
METRO property managed by USFWS

Figure 1. Refuge map and land acquisition status for Tualatin River NWR.

wading birds, and shorebirds, with special emphasis on wintering waterfowl.

4) Protect and restore floodplain type benefits associated with the Tualatin River including water quality, flood storage, water recharge, etc.

5) 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.

Fish and Wildlife

The diverse habitat types found on Refuge host a variety of fish and wildlife. Over 165 species of birds have been recorded on the Refuge. Mammals, reptiles, amphibians, and fish have not been inventoried on the Refuge, but a diverse number of species breed, migrate, or forage on Refuge properties. Large concentrations of waterfowl including Canada geese, northern pintails, and green-winged teal occur during late fall and winter. In spring and summer numerous species of neotropical migrant songbirds migrate through or nest on the Refuge. Two Federally threatened species, the bald eagle and upper Willamette steelhead, are potentially present year-round on the Refuge, although no known bald eagle nesting territories occur or have been located on Refuge. In addition, peregrine falcons are present during fall through early spring. Western pond turtles and red-legged frogs use many of the Refuge wetlands (Appendix E).

Vegetation

The Refuge contains habitat types ranging from dense mixed coniferous/deciduous forest to open prairies and wetlands. Most forest habitat types on the Refuge are small fragmented stands bordered by open habitats, or in some cases by forest on adjacent private land, and comprise only a small percentage of the total land base. Riparian forest occurs primarily in narrow strips along the mainstem Tualatin River, and portions of Rock and Chicken Creeks. Wetland plants are comprised mainly of annual moist-soil varieties with some persistent vegetation. Upland prairies and grasslands contain annual and perennial grasses and forbs with scattered shrubs and trees. Areas in agricultural production rotate a variety of field and row crops such as winter wheat, oats, barley, grass hay, and potatoes. Vegetation on Refuge lands has been drastically altered since the time of European habitation. Lands have been cleared for agriculture, logging, and development. Recently, numerous restoration projects have been implemented on the Refuge including restoring wetland hydrology and planting of upland parcels with historic vegetation types. Surveys have been conducted for listed plant species and none have been found on Refuge properties to date.

Physical Resources

Much of the Refuge property lies within the 100-year floodplain of the Tualatin River. Soil types here are typically heavy clays to silty clay loams. Most of the uplands outside the floodplain consist of various silt loam soil types with the exception of the Rock Creek Unit. The southern portion of Rock Creek is characterized by rocky scab lands that resulted from the Missoula floods.

Structures and Facilities

Refuge structures include a Headquarters building, Cultural Resources office, living quarters, shops, barns, unused structures, other outbuildings, and numerous water control structures, pumps, and other water conveyance and storage structures. See Appendix L for a complete list.

While many of the properties adjacent the Refuge are of a rural agricultural nature, there are highly urbanized components nearby as well. Many of the rural lots have single-family homes with other structures such as barns. Urban areas include closely spaced single- and multi-family residences and commercial businesses of various types. Adjacent and near Refuge boundaries are large subdivisions within the urban growth boundary (Figure 2).

Cultural Resources

Three pre-European sites have been recorded on the Refuge. They are not listed but may be eligible for listing on the National Register of Historic Places. Two post-European sites have not been evaluated, but may qualify for listing on the National Register of Historic Places. Ground disturbance will be avoided if possible during suppression activities on all archeological sites. The Regional Archeologist will be notified of any suppression actions taken on Refuge lands.

Public Use
Currently, the Refuge is closed to public use with the exception of requested staff-led tours, special events, and activities authorized under special use permit.

FIRE MANAGEMENT OBJECTIVES

The goal of wildland fire management is to plan and make decisions that help accomplish the mission of the National Wildlife Refuge System. "The mission of the system is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." Fire management objectives are used in the planning process to guide management to develop a program to provide for public and firefighter safety, aimed at reducing human-caused fires and to ensure appropriate suppression response capability to meet expected wildland fire complexity. Specific fire management objectives are:

- Safely suppress all wildfires using strategies and tactics appropriate to safety considerations, values at risk, and in accordance with Service policy.
- Minimize the cost and impact of wildland fire suppression activities.
- Prevent human-caused wildfires.
- Take actions to reduce vulnerability of Refuge resources to fire.
- Use pile burning to reduce hazard fuel accumulation and assist managers in maintaining habitat and meeting Refuge operational goals through pile burning.

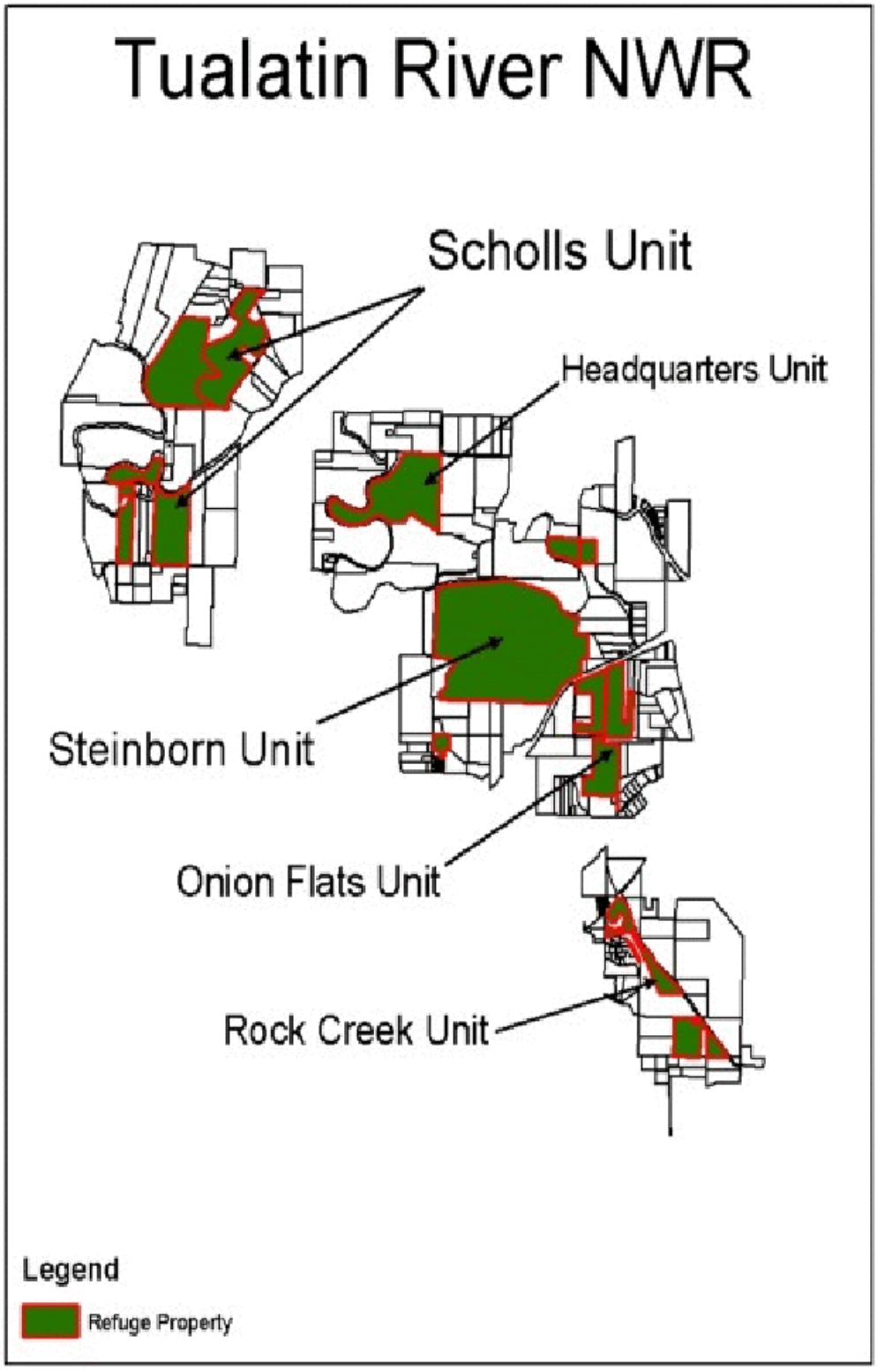
Tualatin River NWR
Scholls Unit
Headquarters Unit
Steinborn Unit
Onion Flats Unit
Rock Creek Unit
Legend
Refuge Property

Figure 2. Refuge properties and adjacent ownership.

WILDLAND FIRE MANAGEMENT SITUATION

Historic Role of Fire

Pre-settlement Fires
Native peoples in the Tualatin River Valley used fire as a management tool for the purpose of hunting and to produce certain plant species that were harvested for food and medicine. Large areas of oak savanna and prairies were burned to prevent the invasion of shrubs.

There have been natural fires in the western Willamette valley, however the interval is long and far between 50-100 years. Historically, large devastating fires like the Tillamook and Yacolt burns occurred on a 100 year fire regime. Human caused fires have been on the rise in this area with the increase of population to the area. Typically these fires are along roads, in grass fuels, and burn with low intensity.

Post-settlement Fire History
Land survey teams during the 1850's noted large areas that were burned in the Tualatin River Valley. It is likely that early settlers logged and burned much of the forested areas for agricultural use. Since that time, intentional burning of this area has ceased. It is unknown when large-scale burning by native people in the Tualatin River Valley ended. In other parts of the Willamette Valley prescribed fire is still used as a management tool for both natural vegetation and for agricultural purposes.

Wildland fires are not common in the Tualatin River Valley. Lightning storms are not common and during much of the year humidity is high and precipitation occurs frequently. The highest fire danger is during the late summer months when precipitation is infrequent and temperatures are high. Grassland areas on the Refuge are generally dry by mid to late summer and could sustain a fire if ignited. Most forest areas have green shrubby vegetation in the understory and have limited dry fuels present. Since establishment in 1992, there have been no wildland fires on Refuge.

Prescribed Fire History
There has not been a prescribed fire program implemented on Refuge since its establishment. Pile burning was a common practice on the Refuge and was conducted in accordance with regional and local laws and regulations.

Responsibilities
The Refuge does not have a dedicated fire management organization. The Project Leader is responsible for planning and implementing the fire management program on the Refuge. The Zone Fire Management Officer (FMO) is located at the Willamette Valley National Wildlife Refuge Complex, and is responsible for fire management program oversight. The Project Leader will assign fire management responsibilities as collateral duties to staff who possess appropriate training, experience, and incident qualifications. Pre-suppression planning and work is accomplished by Refuge staff in accordance with national and regional fire management direction under guidance from the Zone FMO. Emergency fire management actions will be handled by Refuge staff according to training and incident qualifications. The Zone FMO will be immediately notified of all emergency actions. Additional information and direction is included in the Fire Dispatch Plan (Appendix I).

Project Leader (PL)
< Responsible for implementation of all fire management activities within the Refuge and will ensure compliance with Department and Service policies.

< Selects the appropriate management responses to wildland fire.
< Approves any Pile Burn Plan.

Deputy Refuge Manager (DM)
< Coordinates Refuge programs to ensure trained personnel and equipment are made available and utilized for fire management activities including fire suppression, presuppression projects, and fire effects monitoring.
< Ensures that the fire management program has access to Refuge resources when needed.
< Ensures that management and support staff consider the fire management program during Refuge-related planning and project implementation.
< Identifies presuppression projects and biological objectives to Fire Management Officer (FMO), notifies FMO of project constraints, and ensures that Refuge resources are available to accomplish presuppression projects.
< Acts as the primary Refuge Resource Advisor during fire management planning and operations.
< Responsible for posting and enforcing fire restriction regulations.

Biologist
< Coordinates through Deputy Refuge Manager and Project Leader to provide biological input for the fire program with the FMO or Assistant FMO.
< Assists in design and implementation of fire effects monitoring, with FMO or Assistant FMO.
< Participates, as requested, in presuppression projects, fire suppression, and rehabilitation according to level of training.
< Ensures fire effects monitoring is being implemented; drafts Wildland Fire Burned Area Emergency Stabilization and Rehabilitation Plans for Deputy Refuge Manager.

Fire Management Officer (FMO)
< Maintains oversight and review role for fire management activities on Refuge lands.

Prescribed Fire Specialist (PFS)
< Responsible for all fire-related planning and implementation for the Refuge.
< Integrates biological objectives into all fire management planning and implementation.
< Solicits program input from the PL, DM, and Biologist.
< Supervises presuppression project planning.
< Coordinates fire-related training.
< Coordinates with cooperators to ensure adequate resources are available for fire operational needs.
< Responsible for implementation of this Plan.
< Responsible for preparation of fire reports following the suppression of wildland fires and for presuppression projects requiring such.
< Prepares an annual report detailing fire occurrences and presuppression 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 Refuge.
< Submits budget requests and monitors FIREBASE funds.

< Maintains records for all personnel involved in suppression and presuppression activities, detailing each individual's qualifications and certifications for such activities.
< Updates all fire qualifications for entry into the Fire Management Information System.
< Nominates personnel to receive fire-related training, as appropriate.

Resource Advisor (RA)

The RA is a technical specialist appointed by the Agency Administrator and reports to the IC or designee and provides guidance for natural and cultural resource protection from suppression operations. The RA provides input to the IC in the development of fire suppression strategies and tactics to minimize or mitigate the expected impacts of fire and fire and fire suppression actions upon natural and cultural resources. The RA also provides input required for the development of rehabilitation plans. Resource Advisor responsibilities include (NWCG 1996):

$ Provides analysis, information, and advice to fire managers for areas of concern, including:
<
Critical watersheds, riparian areas, fisheries, and water sources
< Threatened or Endangered species
< Prehistoric and historic archaeological sites and cultural landscapes
< Fuel breaks – locations and specifications
< Urban interface impact – structures and improvements
< Hazardous materials
$ Assists the planning function in developing fire maps and identifying areas of concern
$ Determines environmental restrictions commensurate with FMP resource protection in the fire area
$ Provides recommendations to fire management personnel and agency administrators for fire suppression rehabilitation needs
$ Documents potential and actual suppression/fire-related resource impacts and the rationale for protection of priority areas
$ Provides resource information to local initial attack IC's, dispatchers, or other fire personnel during pre-season training and planning meetings.

Incident Commander (IC)

Incident Commanders (of any level) use strategies and tactics as directed by the Project Leader and Wildland Fire Situation Analysis (WFSA) where applicable to implement selected objectives on a particular incident. A specific Delegation of Authority (Appendix O) will be provided to each IC prior to assuming responsibility for an incident. Major duties of the IC, as found in the National Wildfire Coordinating Group (NWCG) Fireline Handbook, include:

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

Initial Attack Modules
Initial attack modules will consist of red-carded firefighters with appropriate red-carded supervision. An IC Type 5 (ICT5) or Crew Boss (CRWB) is the basic requirement of leadership when responding to a fire with an organized suppression module, *i.e.* an engine. Modules 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 cooperators' lands will meet fitness requirements established in PMS 310-1, except where Service-specific fitness requirements apply.

Interagency Operations
The U.S. Fish and Wildlife Service Regional Fire Management Officer is in the process of setting up a cooperative agreement with Tualatin Valley Fire and Rescue (TVFR). At this time TVFR will respond to both structural or wildland fires on the Refuge. When completed, the cooperative agreement will be amended to this plan.

The Refuge will use the Incident Command System (ICS) as a guide for fireline organization. Qualifications for individuals is per the U.S. Department of Interior Wildland Fire Qualifications and Certification System, part of the National Interagency Incident Management System (NIIMS) and the NWCG Prescribed Fire Qualification Guide. Depending on fire complexity, some positions may be filled by the same person.

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, RA 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).

Areas along mainstem Tualatin River and perennial streams will be protected at all cost to prevent adverse effects to listed upper Willamette steelhead. Likewise, known roost trees will be protected to prevent adverse effects to listed bald eagles. RA or refuge staff will assist IC in locating areas of special concern.

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" (RCRC) form (Appendix D) 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 listed or eligible for listing in 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 wildland fire holding actions.

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.

Pile Burning

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

WILDLAND FIRE ACTIVITIES

Fire program management describes the operational procedures necessary to implement fire management at The Refuge. 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. Although the Refuge has habitat management authority, the Refuge does not have fire management authority on Metro's Morand property. However, Refuge staff will assist local management and fire suppression personnel in detecting and reporting any fires occurring on Metro property.

All fires not classified as prescribed fires are wildland fires and will be appropriately suppressed. TVFR will be called for assistance in the event of a structural or wildland fire on the Refuge. Heavy equipment with trained Refuge operators may also be available and may include tractors with large discs and bulldozers. Washington County Sheriff may be notified, as appropriate.

The general fire season recognized by the Oregon Department of Forestry, Forest Grove District, runs from 10 June through 15 October. Depending on the specific weather of any particular year the seasons may be shorter or longer and, therefore, may start earlier or last longer.

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 provide for firefighter and public safety, and protection of natural and cultural resources.

Critical protection areas, such as Headquarters, Cultural Resources office, Refuge housing, other occupied and unoccupied buildings, and other physical structures, as well as residences, businesses and other structures off Refuge will receive priority consideration in fire control planning efforts. In all cases, the primary concerns of fire suppression personnel shall be safety. 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 natural and cultural resources. Minimum impact suppression tactics (MIST) 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. 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 an appropriate suppression strategy that considers safety, property, natural resources, and economics.

$ Mechanical treatment will be used annually to reduce hazardous fuels around structures and improvements, and open habitats that pose a threat to adjacent private properties.

$ Known cultural resource areas will be carefully considered during all fire management activities, including fire line location, retardant drops, and adverse fire effects.

$ Pile burning will be used to reduce hazardous fuels accumulated on Refuge property.

Historic Weather Analysis

The Refuge uses weather measurements taken from the Rye Mountain Remote Automated Weather Station (RAWS). Rye Mountain RAWS is located approximately 35 miles from the Refuge. The station sits 2,000 feet above sea level in the coast range, Yamhill County, Oregon. The site is exposed, but somewhat higher in elevation than the Refuge. The station is maintained by the U.S. Bureau of Land Management.

Table 1 summarizes weather data from the Rye Mountain RAWS station. For additional information see Appendix H.

Table 1. Weather summary from Rye Mountain RAWS station.

Date	Average Rain/month	Wind Speed	Wind Direction	24 Hr Temp F	24 Hr Fuel Temp	% Humidity
Average July 1998-2002	0.27	1.14	235	60	61	82
Average Aug 1998-2002	0.62	0.95	232	60	61	81

Average Sep 1998-2001	1.55	0.87	211	59	57	76
Average Oct 2001 - June 2002	10.54	1.10	188	43	42	89

The most accurate way of displaying the relationship of weather and fuels to fire danger is through the Burning Index (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 flame length of 4 feet. Wildland fires where the 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 Refuge fire season typically begins in August and continues through September. During drought years, however, it can last from July to October. 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.

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 outside of the normal fire season dates.

FIRE PREVENTION

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

Although the Refuge is presently closed to public use, a program of internal and external education regarding potential fire danger may be implemented. Visitor contacts, bulletin board materials, handouts and interpretive programs can be utilized to increase visitor and neighbor awareness of fire hazards once opened for public use.

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. Restrictions or closures will be authorized by the Project Leader.

HAZARD FUEL REDUCTION FOR STRUCTURE PROTECTION

Hazard fuel reduction is conducted to prevent wildland fires from spreading onto structures owned by the USFWS. Protection measures include removing weedy vegetation near structures, limiting dry fuels, mowing around buildings, and mowing or discing along boundaries adjacent to privately owned high-risk areas. Vegetation around buildings includes grass, ornamentals, fruit trees, agricultural and fallow fields. The majority of lands adjacent the Refuge are agricultural lands and private residences. In many cases the Tualatin River provides a natural fire break, and Highway 99W and county roads provide fire breaks around other Refuge parcels.

STAFFING PRIORITY LEVELS

The Refuge has no fire staffing and no currently red-carded personnel, and staffing levels are not relevant. Fire Danger calculations and objectives 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 USFWS 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 Wildfire Coordinating Group (NWCG). The Refuge will conform strictly to the requirements of the wildland fire management qualification and certification system and USFWS guidelines.

Fire suppression is an arduous duty. 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.

SUPPLIES AND EQUIPMENT

The Refuge does not maintain a separate fire cache and has no fire funded/maintained equipment. Earth moving equipment is available in the event of a wildland fire, however, it will only be used after approval of the Project Leader and when no alternatives exist. Heavy equipment includes a D3 dozer, farm tractor with stubble disc, and backhoe. Other equipment consists of 2" and 4" water pumps, and various hand tools.

Additional equipment and supplies are available through cooperators and the interagency cache system. Requests for additional personnel and equipment are made through the servicing Dispatch for the area.

Detection

Since establishment, The Refuge has not experienced any wildland fires. The Refuge does not maintain detection resources of its own. It is likely that any wildland fires will be reported to Refuge Headquarters or directly to emergency responders by general public. Refuge staff will notify both Refuge Headquarters and emergency services by calling 9-1-1.

The Fire Management Plan does not discriminate between human-caused and lightning caused fire. All wildland fires will be suppressed. However, detection shall include a determination of fire cause. Moreover, human-caused fires will require an investigation and report by law enforcement personnel. For

serious human-caused fires, including those involving loss of life, a qualified arson investigator will be requested.

Communications
Refuge field personnel carry cellular telephones and will use them in event of fire for communication with emergency responders and with Refuge Headquarters. During emergency fire operations, mutually agreed upon radio command and tactical channels will be used. Appendix J lists emergency contact information.

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.
2. Provide for public safety.
3. Considering the current and predicted fire conditions, the IC 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 IC will assess the need for law enforcement personnel for traffic control, investigations, evacuations, etc., and make requests to the FMO.
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 IC will make the final decisions pertaining to the fire. A copy of the Delegation of Authority form is in Appendix O.

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. On smaller refuges the whole refuge may be treated as a single FMU.

Due to staff limitations, relatively small land management parcels, 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.

There are two FMUs at The Refuge: forest habitat types (mixed coniferous/deciduous, riparian forest, and forested wetlands) and open habitat types (semi-permanent and seasonal wetlands, grasslands, and agricultural areas). A map of each FMU can be found in Appendix M.

FOREST HABITAT TYPES
Most of this FMU occurs in small patches or linearly along streams or the mainstem Tualatin River, and is commonly bordered by open habitat types. Forests are typically comprised of Douglas-fir, Garry oak (Oregon white oak), Oregon ash, bigleaf maple, or western red-cedar, with an understory of shrubby species. This habitat type is typically cooler with higher humidity than neighboring open habitat types. Fires in this FMU would be expected to burn slower except during the driest periods of the year or during periods of extended drought. First priority for suppression should employ Minimum Impact Suppression Tactics (MIST) tactics. Heavy equipment may be used in this FMU if deemed necessary to prevent fire from spreading off Refuge or to provide for safety of personnel or resources.

OPEN HABITAT TYPES

This FMU contains large areas in excess of 400 acres often bordered by similar habitat types in private ownership. During fire season this FMU typically contains tall grasses and agricultural crops that will readily carry a fire. Common species include timothy and other pasture grasses, reed canary grass, wild millet, and crops such as barley, oats, and potatoes. Some areas within this FMU contain scattered shrubs and considerable amounts of Himalayan blackberry. Other areas have been recently restored to native vegetation that includes herbaceous plants, shrubs, and seedling trees of various species. First priority for suppression should employ Minimum Impact Suppression Tactics (MIST) tactics. Heavy equipment may be used in this FMU if deemed necessary to prevent fire from spreading off Refuge or to provide for safety of personnel or resources.

All fires in these FMUs will be suppressed, but MIST should be employed whenever possible to protect resource values. Any cultural resources discovered as a result of suppression activities will be reported to the Regional Archeologist.

Fire Effects

Low intensity fires that occurred fairly frequently due to Native American burning and lightning were likely part of this ecosystem for millennia, and as such the vegetation and wildlife variably benefitted from fire. Some habitat types such as oak savanna and wet meadow prairies were maintained by fire, which removed invasive woody species on a regular basis. This in turn benefitted grazing animals such as elk, and predators such as coyotes and red-tailed hawks that foraged in these open habitat types. In forest habitat types, fire likely had less effect on decadent vegetation and woody debris. It is probable that much of the forest litter decayed naturally due to the frequent rain and high humidity. New growth of vegetation from fires in open habitats is preferred forage by species such as black-tailed deer. On the other hand, fire may cause short-term loss of individual wildlife species that are not capable of escaping fire. Nesting birds, various amphibians and reptiles, and small mammals may not be able to escape fire and would suffer some mortality. Large trees and snags might also be lost in a fire and take decades to replace. Additionally, invasive plant species are likely to invade after a fire and cause habitat management concerns.

Fuel Types

In open habitat types fuels consist of annual and perennial grasses, herbaceous wetland plants, small woody species, and scattered trees. Fuels may accumulate in the form of decadent stands of grass that form dense mats, occasional dead shrubs, and scattered tree branches. In forest habitat types fuels may exist in the form of a duff layer, dead leaves, twigs, branches, and larger dead woody debris. During the majority of the year forest habitat types are humid with high fuel moisture. However, during fire season fuels may be dry enough to carry a fire.

Fire Behavior

During late summer grass fuels in open habitat types are expected to readily carry a fire. During periods of high heat or windy conditions fire would likely spread rapidly in this FMU. After fall rains begin grass breaks down and is less likely to burn. During winter, precipitation usually keeps fuel moisture high, and in spring green-up fuel is also less likely to burn. Grasses begin to dry in early summer and are cured by mid to late summer. In drought conditions fire behavior would be more extreme, with the extreme behavior lasting for a longer period of time. In forest habitat types temperatures are usually a few degrees cooler than surrounding areas and humidity is higher. However, from mid to late summer fuel moisture is lower and would be expected to carry a fire easily. Typically once fall rains begin forest habitats remain moist through spring and are not as susceptible to fire. During late summer fuel moisture may be lower and fire danger could be high with dry ladder fuels leading to tree canopies. In extremely dry or windy conditions a fire could spread rapidly through this habitat type. Fire Behavior Fuel Models were

determined for each of the following fuel types using Anderson's (1982) *Aids to Determining Fuel Models for Estimating 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. Grass fuel represent fuel models 1-3 and typically contain 1-4 tons/acre.

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 under story. Fires are generally not very intense because surface fuel loads are light, and the foliage is not as volatile as chaparral or dormant brush fuel types. Brush fuel represent fuel models 4-7 and typically contain 6-13 Tons/acre.

TIMBER LITTER FUELS

This fuel type is found in closed canopy stands of short needle conifers and deciduous trees. The fuel layer is mainly needles, leaves, and occasionally twigs. Considerable green 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 fuel models represent models 8-10. Fuel loading is approximately 7 tons per acre. Duff fuel loading can be up to 12 tons per acre.

LOGGING SLASH

This fuel type is representative of a range of timber harvest practices. The range can vary from light logging slash residuals from mixed conifer stands to west coast Douglas-fir clear cuts. Logging slash fuel models represent models 11-13 and tons per acre can vary from 12-60 depending on the harvest unit and treatment.

Table 2 below shows predicted fire behavior in Refuge fuel models. These predictions are based on weather conditions in mid-August for 1400 observations. These conditions include a maximum temperature of 75EF, 30% Relative Humidity, mid-flame wind speeds of 5 and 10 mph, 11% average 1-hour (<1/4" diameter) dead fuel moisture, and a slope of 0% to 30%. These values were input into nomograms to obtain the outputs in Table 2. Weather inputs were averages taken from local weather data for the area.

Table 2. Predicted fire behavior for Refuge fuel models.

	5 mph mid-flame wind speed			10 mph mid-flame wind speed		
Fire Behavior Fuel Model	Rate of Spread (ch/hr)	Flame Length (ft)	Fireline Intensity (BTU/ft)	Rate of Spread (ch/hr)	Flame Length (ft)	Fireline Intensity (BTU/ft)
Fuel Model 1 Short grass	8	1	4	25	2	25
Fuel Model 3 Tall grass	115	12.5	1400	260	18	3100

Fuel Model 5 Brush	8.5	2.5	40	20	5	60
Fuel Model 8 Closed litter	2	1	6	2	1	4
Fuel Model 9 Hardwood litter	11	3	60	28	5	150
Fuel Model 10 Timber	5	3.5	90	16	6.5	350

Suppression Tactics

Wildland fires will be suppressed in a prompt, safe, and cost-effective manner while considering damage to Refuge resources and limiting smoke impacts to local communities. Suppression involves a wide range of possible tactics from initial attack to final control. All wildland fires will be suppressed at The Refuge.

All fires will be assessed by the first on-scene IC and attacked using minimum impact fire suppression tactics for the Refuge. Personnel and equipment must be efficiently organized to suppress fire effectively and safely. Roads and natural barriers will be used as much as possible to reduce fireline construction. Fireline and mop-up through riparian areas should consider long-term damage to vegetation. Unnecessary cutting and bucking should be replaced with alternative actions whenever possible. Back-fires and burnout operations should consider head fire intensities and attempt to avoid damaging the soil or running fire into riparian areas.

In some Refuge locations, attempts to suppress a wildland fire could potentially have greater ecological impacts than the fire itself. The use of heavy equipment requires RA approval on all areas of the Refuge EXCEPT agricultural lands. Construction of handline requires RA approval in forest habitat types. Off-road travel is up to the discretion of the IC. Mowing and removal of trees and shrubs by chainsaw will be allowed in all areas to create a secure fireline. Table 3 details required approval for suppression tactics by FMU.

In addition to the consultation with the Project Leader or his/her representative, an RA should be assigned to the incident from the beginning to both document rehabilitation needs and assist with on-the-ground tactical decisions.

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

Table 3. Approval requirements for suppression tactics by FMU.

Suppression Tactic	Open Habitat Types	Forest Habitat Types
Water/foam	Incident Commander discretion	Incident Commander discretion
Hand line	Incident Commander discretion	Resource Advisor approval*
Dozer line	Resource Advisor approval*	Resource Advisor approval*
Aircraft/retardant	Resource Advisor approval*	Resource Advisor approval*

Off-road travel	Incident Commander discretion	Incident Commander discretion
* Unless there are threats to life, structures, or private property		

SUPPRESSION CONDITIONS

A full suppression alternative was selected for this Refuge, which requires containment and control of all wildland fires. Typically, hand crews and water tankers should be able to suppress most fires that occur on The Refuge. Heavy equipment and aircraft/retardant use is restricted due to safety concerns and potential impacts to cultural and natural resources. Unless life or property is in eminent risk, consultation with the Project Leader or his/her representative 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.

Administrative buildings, occupied residences, maintenance buildings, and adjacent private structures are first priority areas for suppression activities. Second priority is protection of areas within the Forest FMU, cultural resource sites, and restored habitat areas. Third priority is protection of agricultural crops and equipment on cooperative farming units. Most of the fuels on the Refuge are light and volatile grasses. Given low fuel moisture and moderated winds, fires will travel very quickly. Wetland and grassland areas can generally burn without significant resource damage, and may be suppressed at roadsides or other appropriate locations. Safety is the first concern when suppressing fires.

WILDLAND FIRE SITUATION ANALYSIS

For fires that cannot be contained in one burning period, a WFSA must be prepared. In the case of a wildland fire, the Project Leader, in conjunction with the FMO, 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, the IC, and local law enforcement authorities. 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 in conjunction with 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. Likely sources of water for bucket drops will be reaches of mainstem Tualatin River. Natural helispots and parking lots are readily available at The Refuge. 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, Burned Area, and Emergency Stabilization. Suppression rehabilitation restores and repairs property and resources from direct suppression activity damage, e.g., cut fences, dozer lines, and campsites. Burned area rehabilitation and stabilization restores resources and property damaged or otherwise impacted from the fire, *e.g.*, burned waterlines, denuded hillsides, etc. Emergency stabilization includes procedures for protecting public safety and natural resources to prevent further immediate damage or degradation.

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 FMO. The IC, coordinating with the RA and as agreed to by the Project Leader, 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 that were altered.
- Remove all flagging, equipment and litter.
- Completely restore camping areas and improved helispots.
- Revegetation to restore sensitive impacted areas due to suppression actions*.

*If revegetation 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, 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 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 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, 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 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/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 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, RA, biologist, and FMO will review all ESR Plans. The final plan will be submitted to the Region for review prior to submission to the Washington Office. 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. The FMO will be responsible for any additional required reports. Reports will be filed at Refuge Headquarters.

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 (2000).

HAZARD FUEL REDUCTION

Hazard fuel is vegetation and woody debris that presents a risk of ignition and sustaining spread of a wildland fire that threatens some value. Hazard fuel reduction is both a fire prevention activity and a wildland fire protection measure. The hazard fuel situation on the Refuge is associated with vegetation growth around structures and incidental woody debris. Pile burning is a fire management tool to reduce hazard fuel accumulation, a fire management objective.

The objectives of hazard fuel reduction are:

- $ Reduce the hazard risk to structures and facilities from an approaching wildland fire.
- $ Reduce the risk of fire spreading to the wildland from a fire originating on Refuge or a Refuge-owned structure or facility.
- $ Provide defensible space and safety to personnel at those facilities during a wildland fire.
- $ Meet any applicable federal, state and local fire hazard reduction ordinances.

Hazard Fuel Reduction Strategies

Strategies include mechanical and herbicide treatment of hazard fuels around Refuge structures. Mechanical treatment is accomplished by mowing and/or discing. Debris must be disposed of to complete the mitigation of the hazard. Debris disposal may be accomplished by discing, scattering, chipping, or pile burning. The quantity of vegetation, diameter, crew availability, and logistical support will dictate the method used. If scattering of cut vegetation is used, an evaluation of the overall fuel loading needs to be considered so as to not add to the hazard fuel problem. Herbicide will likely be used around structures that are affected by heavy growth of vegetation such as Himalayan blackberries. Herbicide will typically be used during late spring to early fall to be most effective.

Pile Burning Guidelines

When planning to dispose of debris by pile burning, specific guidelines must be followed in order to provide for safety and reduce the escape potential. General guidelines for pile burning are the same as for prescribed burning. Service guidelines are found in the USFWS Fire Management Handbook, Section 2. This section of the Fire Management Plan outlines the steps to take when conducting pile burning only. No prescribed burning of standing vegetation will be conducted at The Refuge. References to a burn plan and burn boss are only for the purpose of pile burning.

Pile burning will be used to dispose of cut vegetation resulting from annual hazard reduction around structures or from habitats of the Refuge. Limbs and branches of overhanging trees and brush will need to be trimmed back annually. At times trees may be blown down during storms, which will require debris removal. The most economical and expedient disposal method is burning of the piled vegetation on site. Pile burning is typically rated as complexity level 3 due to the low risk of escape, limited control forces, and time of year conducted. Safety concerns are still present even at the low complexity level. Careful consideration must be given to smoke management, escape potential and resource benefit when planning and rating the pile burn. The complexity of each pile burn will be evaluated using the NWCG Prescribed Fire Complexity Rating System Guide.

PILE BURN PLAN

A Burn Boss will conduct a field reconnaissance of the proposed pile burn location with the Deputy Refuge Manager to discuss objectives, special concerns, and gather all necessary information to write the burn plan. After completing the reconnaissance, a qualified Burn Boss will write the Pile Burn Plan.

All pile burning will have a Pile Burn Plan. The Pile 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 project area, objectives, and constraints will be clearly outlined. No piles will be ignited unless all prescriptions of the plan are met. Fires not within those parameters will be suppressed. Pile Burn Plans will follow the format found in the USFWS Fire Management Handbook, Section 2.2. Pile burning is considered a complexity level 3 prescribed burn (in most cases) and should use the plan format contained in Appendix N. Each burn plan will be reviewed by the Project Leader, Deputy Refuge

Manager, Refuge Biologist, FMO/AFMO, and Burn Boss. The Project Leader has the authority to approve the burn plan.

PILE BURNING STRATEGIES AND PERSONNEL

Pile burning will be executed only by qualified personnel. Pile burning requires a qualified Burn Boss. The 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 pile burn or it will not be initiated. All necessary suppression equipment will be provided by the burn crew conducting the pile burn.

Weather and fuel moisture conditions must be monitored closely in the project area to determine when the prescription criteria are met. A belt weather kit may also be utilized to augment monitoring. Monitoring will be done by authorized burn boss.

The Pile Burn Plan requires the following items to be completed prior to ignition:

- Contingency plan
- Complexity analysis
- Review and approval signatures
- Go/no go checklist
- Spot weather forecast

When pertinent prescription criteria are within the acceptable range, the Burn Boss will select an ignition time based on current and predicted weather forecasts. A thorough briefing will be given by the Burn Boss on the day of the burn 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 re-checked to determine if they 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.

For pile burning (complexity level 3 burns), a qualified Incident Commander Type III will be available within a one-hour response in the event of an escape. If the burn pile 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 pile burn. If the burn exceeds the initial suppression efforts, the burn will be declared a wildland fire and suppressed using guidelines established in the burn 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 as determined on the contingency plan 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 if necessary. Each Pile Burn Plan will detail the contingency plan with identified resources for suppression. This plan will serve as the Incident Action Plan during the initial attack phase of an escape.

MONITORING AND EVALUATION

During pile burns, monitoring can serve as a precursor to invoking suppression action by determining if the burn is in prescription, assessing its overall potential, and determining the effects of the pile burn. Pile burning does not usually require extensive monitoring. Weather, fire behavior, and smoke management are elements that require monitoring. The Burn Boss will assume responsibility for coordinating and implementing this section. Personnel may be assigned specific tasks such as weather monitoring to document these elements and keep the Burn Boss informed of conditions. Special

situations or projects may dictate more extensive monitoring and evaluation. Monitoring forms for fire behavior, smoke, and weather are included as appendices Q, R, S, respectively.

Required Reports
All forms will be completed as outlined by the Pile Burn Plan. Accomplishments, costs, fire report (DI-1202), weather data, and first order fire effects monitoring are the responsibility of the Burn Boss. The Burn Boss may prepare a final report on the project for the Project Leader as requested. Information should include a narrative of the burn operation, a determination of whether objectives were met, weather and fire behavior data, number of work hours, and final cost of the burn.

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. 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 pile burning will be conducted without DSM approval. Approval is obtained by contacting DSM on the morning of a proposed burn. Pile burning will be closely monitored to ensure that weather changes don not result in smoke hazards. In addition to smoke management by DSM, refuge lands are also constrained by Fire Danger Ratings for the area. If the Fire Danger Rating is extreme, then no pile burning will be allowed even when weather conditions are favorable for smoke dispersion.

PUBLIC SAFETY

The Refuge is dedicated to providing for the safety of each visitor and all residents and property adjacent to the Refuge's boundary. Residents adjacent to the Refuge will be notified with as much advance warning possible of any wildfire that poses a threat to burn outside the Refuge boundaries. See Appendix K for a list of adjacent landowners with phone numbers and address for notification purposes. The IC is responsible for informing the appropriate law enforcement agency and requesting the evacuation of the public from potentially dangerous situations. Reduced visibility due to smoke is another public safety concern. The Refuge is currently not open to the public. However, any visitors that may be present in the vicinity of a wildland fire will be evacuated. First-aid kits will be in every vehicle for all fire management activities.

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, or media releases. When deemed necessary, interpretive presentations will address the fire management program and explain the role of fire in the environment. The Refuge will endeavor to educate the public about the natural role of fire, why we are suppressing all fires on the refuge, and why pile burning is necessary

Options for public information program may include:

$

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.

$ Public information outlets of neighboring and cooperating agencies and the Regional Office will be provided with fire management information.

$ The fire management program will be discussed in informal talks with 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 Deputy Refuge Manager will retain a copy for the Refuge files.

Annual Fire Summary Report

The Deputy Refuge Manager 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. If no wildland or structure fires occur on the Refuge an annual report will not be completed.

Annual Fire Management Plan Review

The FMP 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 Project Leader 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, USFWS, Corvallis, OR.

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

James Roberts, Fire Planner, Pacific Region, USFWS, Portland, OR.

APPENDICES

Appendix A: References Cited

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National Wildfire Coordinating Group. 1996. Resource advisor's guide for wildland fire. PMS 313/ NFES 1831.

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, Regional Director, Complex Manager or Project Leader (USFWS); 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. Actions to (1) limit the adverse effects of suppression on soils, watershed, or other values, or (2) mitigate adverse effects of a wildland fire on the vegetation-soil complex, watershed, and other damages.

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

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

Wildfire. An unwanted wildland fire.

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

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

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

Appendix C: NEPA Compliance Documents

UNITED STATES FISH AND WILDLIFE SERVICE
ENVIRONMENTAL ACTION STATEMENT

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

Implementation of the Wildland Fire Management Plan (2002) for Tualatin River NWR.

__x__ Is a categorical exclusion as provided by 516 DM 6 Appendix 1. No further NEPA documentation will be made (Exclusion 1.4 B. (5)00 relating to Fire Management activities, including prevention and restoration measures, when conducted in accordance with departmental and Service procedures).

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

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

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

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

Other supporting documents: ESA-Intra Service Section 7 Consultation.

*_____
Project Leader Date

(1)_____
Initiator Date

*Approving official: Project Leader for Categorical Exclusions; Assistant Regional Director for EA/FONSIs; Regional Director for Environmental Impact Statements.

Categorical Exclusion
for
Implementation of the Wildland Fire Management Plan
Tualatin River National Wildlife Refuge

Objectives
The Fire Management Plan (FMP) for Tualatin River National Wildlife Refuge will help achieve resource management objectives of reducing fuel accumulations to decrease the potential for large wildland fires. The Department of the Interior policy requires that all refuges with vegetation that can sustain fire must have a Fire Management Plan that details fire management policies. At this time, prescribed fire will not be used to obtain management objectives. However, pile burning will be used to reduce fuels in the form of debris collected throughout Refuge lands.

This plan is written as an operational guide for managing the Refuge's wildland fire program. 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).

The FMP outlines procedures for wildland fire suppression. The fire plan furthers the mission of the Refuge by providing increased protection for Refuge resources. Increasing coordination and preparedness to suppress wildland fires will help to ensure quick responses to fires which have the potential to be devastating to Refuge resources, and adjacent private lands.

There is no dedicated fire staff at the Refuge. All wildland fires will be suppressed by local cooperating agencies with the oversight of the Project Leader and Zone Fire Management Officer (FMO).

Recommendations
It is our determination that this project succeeds in fulfilling the U.S. Fish and Wildlife Refuge mission to protect and enhance threatened, endangered, and populations of species of concern through the implementation of preventative wildland fire measures and documentation of fire suppression guidelines to protect important habitat. This Plan qualifies as a Categorical Exclusion because it directly relates to Fire Management activities, including prevention, suppression, and restoration measures, while adhering to departmental and Service procedures.

Appendix D: Request for Cultural Resource Compliance

Project Name:

USFWS Unit:
(Office Name and/or Org Code)

Ecoregion:
(By ARD; CBE, IPE, KCE, NCE)

Program:
(Partners, WSECP, Refuges, Hatcheries, Jobs, Federal Aid, Other)

Location: County: State:
(nearest town)

_____ _____ _____
_____
Township(s) Range(s) Section(s) 7.5' USGS Quad(s): Name, date

Project acres or linear meters/feet:

Date you want to start the project: Date of this request:

USFWS Contact: Phone:

Address: Fax:

Directions to project: *(if not obvious)*

The Undertaking: *Describe the proposed project and means to facilitate it (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 feet of 3 foot high check dam)?*

Attach to this form:
- A project (sketch) map showing the Area of Potential Effect with locations of specific ground altering activities *(required)*.
- A photocopy of the USGS quad clearly marking the project area *(required)*.
- A photocopy of an air photo showing the project may be attached *(if available)*.

☐ Appendix_
of the Prog
☐ 36CFR800.

_____
Cultura

Area of Potential Effect: *Describe where disturbance of the ground will occur. What are the dimensions of the area to be disturbed? How deep will you excavate? How long is the ditch, fence, etc? Where will fill be obtained? Where will spoil be dumped? What tools or equipment will be used? Are you replacing or repairing a structure? Are you 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 versus 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 meters or feet for all elements of the undertaking.*

Environmental Setting: *Describe the environmental setting of the Area of Potential Effect. A) What was the natural habitat prior to modifications, reclamation, agriculture, settlement? B) What is the land-use history? When was it first settled, modified? How deep has it been cultivated? Grazed? etc. C) What is the land-use and habitat today? What natural agents (e.g., sedimentation, or vegetation) 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?*

Return form and direct questions to:
USFWS Region 1 Cultural Resources Team, 20555 SW Gerda Ln, Sherwood, OR 97140
Phone (503) 625-4377
Fax (503) 625-4887

Appendix E: Rare, Threatened, and Endangered Species List.*

Rare, Threatened, and Endangered Species that may be found at the Refuge.

Species	Status	Unit
Bald Eagle *Haliaeetus leucocephalus*	Federally Threatened	Steinborn, Headquarters
Upper Willamette Steelhead *Oncorhynchus mykiss*	Federally Threatened	All
Golden Indian paintbrush *Castilleja levisecta*	Federally Threatened	Not recorded on Refuge
Willamette daisy *Erigeron decumbens* var. *decumbens*	Federally Endangered	Not recorded on Refuge
Howellia *Howellia aquatilis*	Federally Threatened	Not recorded on Refuge
Bradshaw's lomatium *Lomatium bradshawii*	Federally Endangered	Not recorded on Refuge
Kincaid's lupine *Lupinus sulphureus* var. *kincaidii*	Federally Threatened	Not recorded on Refuge
Nelson's checker-mallow *Sidalcea nelsoniana*	Federally Threatened	Not recorded on Refuge
Yellow-billed cuckoo *Coccyzus americanus*	Federal Candidate	Not recorded on Refuge
Streaked horned lark *Eremophila alpestris strigata*	Federal Candidate	Not recorded on Refuge
Oregon spotted frog Rana pretiosa	Federal Candidate	Not recorded on Refuge
Pacific western big-eared bat *Corynorhinus townsendii townsendii*	Species of Concern	Not recorded on Refuge
Silver-haired bat *Lasionycteris noctivagans*	Species of Concern	Not recorded on Refuge
Long-eared myotis *Myotis evotis*	Species of Concern	Not recorded on Refuge
Fringed myotis *Myotis thysanodes*	Species of Concern	Not recorded on Refuge
Long-legged myotis *Myotis volans*	Species of Concern	Not recorded on Refuge
Yuma myotis *Myotis yumanensis*	Species of Concern	Not recorded on Refuge

Species	Status	Unit
Camas pocket gopher *Thomomys bulbivorus*	Species of Concern	Not recorded on Refuge
Band-tailed pigeon *Columba fasciata*	Species of Concern	All
Olive-sided flycatcher *Contopus cooperi*	Species of Concern	All
Yellow-breasted chat *Icteria virens*	Species of Concern	Not recorded on Refuge
Acorn woodpecker *Melanerpes formicivorus*	Species of Concern	Not recorded on Refuge
Oregon vesper sparrow *Pooecetes gramineus affinis*	Species of Concern	Not recorded on Refuge
Purple martin *Progne subis*	Species of Concern	All
Northwestern pond turtle *Clemmys marmorata marmorata*	Species of Concern	Steinborn Unit
Northern red-legged frog *Rana aurora aurora*	Species of Concern	All
Pacific lamprey *Lampetra tridentata*	Species of Concern	Steinborn Unit
Coastal cutthroat trout *Oncorhynchus clarki clarki*	Species of Concern	Not recorded on Refuge
White top aster *Aster curtus*	Species of Concern	Not recorded on Refuge
Pale larkspur *Delphinium leucophaeum*	Species of Concern	Not recorded on Refuge
Peacock larkspur *Delphinium pavonaceum*	Species of Concern	Not recorded on Refuge
Shaggy horkelia *Horkelia congesta* ssp. *congesta*	Species of Concern	Not recorded on Refuge
Thin-leaved peavine *Lathyrus holochlorus*	Species of Concern	Not recorded on Refuge

*Species that are likely to occur on The Refuge. Per Oregon Fish and Wildlife Office, June 14, 2002.

Appendix F: Resources of Concern

Resources of concern at the Refuge.

Resource	Location	Status
Naujock West Barn	Naujock Property, Scholls Unit	Unevaluated; possible historic significance.
Cereghino Onion Barns	Cereghino Property, Onion Flats Unit	Unevaluated; possible historic significance.
Native American Cultural Resource Site	Morand Property, Steinborn Unit	Recorded Cultural Resources site.
Native American Cultural Resource Site	Two on Steinborn Property, Steinborn Unit	Recorded Cultural Resources site.
Bald Eagle	Primarily Steinborn Property, Steinborn Unit	Federally Threatened.
Upper Willamette Steelhead	All Units	Federally Threatened.

Appendix G: Cooperative Agreements

(None at this time)

Appendix H: Weather Analyses

Appendix I:

FIRE DISPATCH PLAN 2002
TUALATIN RIVER NATIONAL WILDLIFE REFUGE

1. Fire Size-Up:

Location of smoke or fire: (plot on map if possible)
Location, name, and telephone # of reporting party:
Estimated size:
Fuel type: (1)Grass (2)Brush (3)Timber (4)Slash
Fire Behavior: (1)Smoldering (2)Creeping (3)Running (4) Torching (5)Crowning
Structures threatened: (1)Yes (2)No
Weather:
Slope: (1)0-25% (2)26-40% (3)41-55% (4)56+%
Potential for spread: (1)Low (2)Moderate (3)High
Additional resources needed for control:

2. Notify Prescribed Fire Specialist:

Brian Gales	Home	503-982-8025
	Cell	541-230-0343
	Office	541-757-7236

3. Notify Project Leader:

Ralph Webber	Home	503-699-2183
	Cell	503-816-1227
	Office	503-590-5811
Alternate:		
Chris Lapp	Home	503-625-0700
	Cell	503-816-1666
	Office	503-590-5811

4. Notify Adjacent landowners if private lands are threatened:

See Appendix K

5. Notify Cooperative Farmers:

Larry Jacobs	503-590-4769
Steve Harvey	503-524-9214

REFUGE FIRE PERSONNEL

There are currently no Refuge fire personnel

Interagency Cooperators Contact Numbers:

Oregon Dept. of Forestry	Office	503-623-8146
Northwest Coordination Center, Portland	Office	503-808-2720
Oregon State Police	Office	800-735-2900
Washington County Sheriff	Office	503-846-2700
Tualatin Valley Fire and Rescue	Office	503-612-7000
Legacy Meridian Park Hospital, Tualatin	Office	503-692-1212
Providence Newberg Hospital, Newberg	Office	503-537-1555

Emergency Fire, Ambulance, Police **911**

USFWS Contacts:

Pam Ensley	Regional Fire Coordinator, Portland	Office	503-231-6174
		Cell	503-731-7978
Andy Anderson	Regional FMO, Portland	Office	503-231-6175
		Cell	503-805-1312
Roddy Bauman	Regional Rx Fire Spec., Portland	Office	541-231-2075
		Cell	503-784-8348

Resource Advisor:

Chris Lapp	Home	503-625-0700
	Cell	503-816-1666
	Office	503-590-5811

Spot Weather Forecast:

NWS Portland	Office	503-326-2420

Established Suppression Guidelines for the Refuge:

Suppression Tactics by FMU.

	Open Habitat Types	Forest Habitat Types
Water/foam	Incident Commander discretion	Incident Commander discretion
Hand line	Incident Commander discretion	Resource Advisor approval*
Dozer line	Resource Advisor approval*	Resource Advisor approval*
Aircraft/retardant	Resource Advisor approval*	Resource Advisor approval*
Off-road travel	Incident Commander discretion	Incident Commander discretion

* Unless there are threats to life, structures, or private property.

A full suppression alternative was selected for this refuge which requires aggressive containment and control of all wildland fires. In some refuge locations, attempts to suppress a wildland fire could potentially have greater ecological impacts than the fire. A Resource Advisor will be requested immediately from the refuge upon notification of a wildland fire on the Refuge. Unless life or property is in imminent risk, the use of heavy equipment requires resource advisor approval on all areas of the refuge EXCEPT agricultural lands. All fires will be suppressed, but MIST tactics should be utilized whenever possible due to the sensitive nature of the resources throughout the Refuge.

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 Forest Type FMU, restored habitats, and refuge historical sites. Third priority are the protection of 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.

Appendix J: Emergency Contact List

Emergency Contact List	
Person/Agency	**Telephone Number**
All Emergency	**911**
Refuge Headquarters	503-590-5811
Ralph Webber, Project Leader	503-590-5811, 503-816-1227 cell, 503-699-2183 home
Chris Lapp, Deputy Refuge Manager	503-590-5811, 503-816-1666 cell, 503-625-0700 home
Peter Schmidt, Wildlife Biologist	503-590-5811, 503-816-2007 cell, 503-925-9022 home
John Schweitzer, Maintenance Worker	503-590-5811, 503-329-8384 cell
Tualatin Valley Fire and Rescue	**911** emergency, 503-612-7000 business
USFWS Law Enforcement, Wilsonville	503-682-6131, 503-682-6171
Washington County Sheriff	**911** emergency, 503-846-2700
City of Sherwood	503-625-5522
Sherwood Police	**911** emergency, 503-629-0111 business
City of King City	503-639-4082
City of Tigard	503-639-4171
City of Tualatin	503-692-2000

Appendix K: Neighboring Landowners Contact List

Appendix L: Government Owned Structures

Government-owned structures at The Refuge.

Structure	Value ($)*		Structure	Value ($)*
Cereghino Storage Barn	86,300		Headquarters Living Quarters 2	89,600
Cereghino Pole Barn	58,700		Headquarters Hay Barn	176,800
Cereghino Packing Barn	6,900		Headquarters Oil Shack	13,900
Cereghino Onion Barn	60,800		Headquarters Pole Barn	86,300
Cereghino Office	297,600		Headquarters Living Quarters 1	90,600
Cereghino Milk Barn	42,300		Naujock Living Quarters	269,600
Cereghino Pump House	104,900		Naujock East Barn	173,400
Harmon Living Quarters	273,800		Naujock Milk House	30,900
Harmon Shop	20,800		Naujock Grainery	30,900
Harmon Wood Shed	800		Naujock Wood Shed	39,400
Harmon Pole Barn	49.400		Naujock Pump House	108,500
Harmon Well	20,600		Naujock West Barn	10,500
Headquarters Equipment Barn	517,500		White Pump House	16,000
Headquarters Shop	485,200		White Barn & Garage	6,700
Headquarters Office Building	635,600			

* Replacement cost per Refuge Property Assessment Report, 5 April 2002.

Appendix M: Refuge Fire Management Unit Maps

Appendix N: Pile Burn Plan

PRESCRIBED FIRE PLAN

Refuge or Station

Unit

Prepared By:_____ Date:
Prescribed Fire Specialist

Reviewed By:_____ Date:
Refuge Biologist

Reviewed By:_____ Date:
Prescribed Fire Burn Boss

Reviewed By:_____ Date:
Fire Management Officer

Reviewed By:_____ Date:
Project Leader

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

Approved By:_____ Date:
Complex Project Leader

PRESCRIBED FIRE PLAN

Refuge:_____ Refuge Burn Number:

Sub Station:_____ Fire Number:

Name of Area:_____ Unit No.

Acres To Be Burned:_____ Perimeter Of Burn:
Legal Description: Lat._____ Long._____ T__R__S
County & State:

Is a Section 7 Consultation being forwarded to Fish and Wildlife Enhancement for review ? Yes__No___ (check one).

(Page 2 of this PFP should be a refuge base map showing the location of the burn on Fish and Wildlife Service land)

The Prescribed Fire Burn Boss/Specialist must participate in the development of this plan.

I. GENERAL DESCRIPTION OF BURN UNIT

Physical Features and Vegetation Cover Types (Species, height, density, etc.):

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

1)

2)

3)

Objectives of Fire (Be specific. These are different than management goals):

1)

2)

3)

Acceptable Range of Results (Area burned vs. unburned, scorch height, percent kill of a species, range of litter removed, etc.):

1)

2)

3)

[*Attach Project Map Here*]

[*Attach Project Pre-Burn Photos Here*]

II. PRE-BURN MONITORING

Vegetation Type	Acres	%	FBPS Fuel Model
	Total		

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

Type of Transects:

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

Other:

III. PLANNING AND ACTIONS

Complexity Analysis Results: (Attach a completed copy of the Complexity Analysis worksheet to this plan.)

Site preparation (What, when, who & how. Should be done with Burn Boss):

Weather information required (who, what, when, where, how, and how much):

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

Special Safety Precautions Needing Attention (Aerial ignition, aircraft, ignition from boat, etc.):

Media Contacts (Radio stations, newspaper, etc., list with telephone numbers):

Special Constraints and Considerations (Should be discussed with Burn Boss):

Communication and Coordination on the Burn (Who will have radios, frequencies to be used, who will coordinate various activities.):

IV. IGNITION, BURNING AND CONTROL

	Planned or Proposed	Actual

Scheduling: Approx. Date(s)

Time of Day

	Acceptable Range		
FBPS Fuel Model:	Low	High	Actual
Temperature			
Relative Humidity			
Wind Speed (20' forecast)			
Wind Speed (mid-flame)			
Wind Direction			
ENVIRONMENTAL CONDITIONS			
Soil Moisture			
1 hr. Fuel Moisture			
10 hr. FM			
100 hr. FM			
Woody Live Fuel Moisture			
Herb. Live Fuel Moisture			
Litter/Duff Moisture			
FIRE BEHAVIOR			
Type of Fire (H,B,F)	B	H	
Rate of Spread (ch/hour)			
Fireline Intensity			
Flame Length			
Energy Release Component NFDRS Fuel Model __L_____			

Note: Attach BEHAVE Runs as an appendix to the end of this plan.

Cumulative effects of weather and drought on fire behavior:

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

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

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

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

V. SMOKE MANAGEMENT

Make any Smoke Management Plan an attachment. Also attach pertinent smoke variances (if any) and all SASEM runs.

Permits required (who, when):

Distance and Direction from Smoke Sensitive Area(s):

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

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

Actions to Reduce Visibility Hazard(s):

Residual Smoke Problems (Measures to reduce problem, i.e., rapid and complete mop-up, mop-up of certain fuels, specific fuel moistures, time of day, etc.):

Particulate emissions in Tons/Acre and how calculated (This should be filled in after the burn so more precise acreage figures can be used):

VI. FUNDING AND PERSONNEL

Activity Code:

Costs

	Equipment & Supplies	Labor	Overtime	Staff Days	Total Cost
Administration (planning, permits, etc.)					
Site Preparation					
Ignition & Control					
Travel/Per Diem					
Total					

VII. BURN-DAY ACTIVITIES

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

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

Crew Briefing Points (Communications, hazards, equipment, water sources, escape fire actions, etc. To be done by Burn Boss. Refer to Safety Considerations in Planning Actions and points listed below):

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

Personnel Escape Plan:

Special Safety Requirements:

Go-No-Go Checklist:

GO-NO-GO CHECKLIST

_____

Unit

_____ Is burn plan complete and approved?

_____ Are all fire prescriptions specifications met?

_____ Are all smoke management prescriptions met?

_____ Is the current and projected fire weather forecast favorable?

_____ Have all air quality considerations and smoke requirements been met?

_____ Have all required cultural resource protection objectives been met?

_____ Are all personnel required in the prescribed burn plan on-site and are they all qualified for their assigned duties?

_____ Have all personnel been briefed on the prescribed burn plan requirements?

_____ Have all personnel been briefed on safety hazards, escape routes, and safety zones?

_____ Is all required equipment in place and in working order?

_____ Are available (including back-up) resources adequate for containment of escapes under the worse-case conditions?

_____ Are answers to all of the above questions “YES”?

_____ In your opinion, can the burn be carried out according to the plan and will the burn meet planned objectives?

_____ Is there an adequate contingency plan developed and proofed?

All 14 questions have been answered “YES”.

_____ _____

Burn Boss Date

_____ _____

Refuge Manager or Designee Date

Holding and Control:

Critical Control Problems:

Water Refill Points:

Other:

Contingency Plan for Escaped Fire (Are there crews standing by to initial attack or will people doing other jobs be called upon to do initial attack, who must be called in case of an escape, what radio frequencies will be used, etc.)

Mop Up and Patrol:

Rehabilitation Needs:

DI 1202 Submission Date:

Special Problems:

VIII. CRITIQUE OF BURN

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

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

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

Problems and general comments:

IX. POST-BURN MONITORING

Date:_____ Refuge Burn Number:

Length of Time after Burn:

Vegetative Transects:

Comments on Habitat Conditions, etc.:

Photo Documentation:

Other:

X. FOLLOW-UP EVALUATION

Date:_____ Refuge Burn Number:

Length of Time after Burn:

Vegetative Transects:

Comments on Habitat Conditions, etc.:

Photo Documentation:

Other:

DAILY FIRE BEHAVIOR MONITORING SHEET

Refuge:
Project Name:_____ RX Fire Number:
Date of Burn:
Ignition Time: Start:_____ Finish:

Weather Observations During Burn:
Time of Weather Observations

Dry Bulb Temp							
Wet Bulb Temp							
RH							
Wind Speed							
Wind Direction							
Cloud Cover %							

Comments Concerning Weather:

Last Live Fuel Moisture Measurement:

1-Hour Fuel Moisture:

10-Hour Fuel Moisture (from fuel stick):
Haines Index:

Test Fire Results:

Firing Pattern:

Fire Behavior Characteristics (Rate of Spread, Flame Length, Fire Spread Direction, etc.):
Acres Treated:

Smoke Dispersal Narrative (venting height, transport wind speed & direction, visibility, holding problems, problem spots, complaints, etc.):

Burn Severity
Effects to Vegetation Narrative:
Ground Char (%):Unburned_____ Light_____ Moderate_____ Deep
Soil Moisture on Day of Burn:

Were Resource Objectives Met? (If burn was successful, what conditions made it possible, *i.e*: low live fuel moisture, high winds, etc.)

Photos of Fire Area: Preburn Yes_____ No
During Burn Yes_____ No
Postburn Yes_____ No

Daily Burn Cost: Vehicles Used:
Personnel Cost: $
Equipment Cost: $
Fuel Cost: $

Total: $
Cost per Acre: $

Burn Organization:

Burn Boss:

Ignition Specialist:_____ Holding Specialist:
Lighting Crew:_____ Holding Crew:

Burn Evaluation Prepared By:_____ Date:

**Attach pertinent Spot Weather Forecast,WIMS/NFDRS, Smoke Mgt Variance, etc. information for burn day to back of sheet.

Appendix O: Delegation of Authority

DELEGATION OF AUTHORITY

Region 1, U.S. Fish and Wildlife Service

Tualatin River National Wildlife Refuge

_____, you are assigned as Incident Commander of the _____ Incident, on the Tualatin River National Wildlife Refuge. You have full authority and responsibility for managing the fire suppression operation on this incident within the framework of legal statute, current policy, broad direction, and the Wildland Fire Situation Analysis (WFSA). Your primary responsibility is to achieve complete control of the fire by organizing and directing the fire suppression organization in an effective, efficient, and economical manner.

You should be guided in your duties by the fire job descriptions relating to Incident Commander, as found in the Fireline Handbook. Strongly consider long-term ecosystem health, and the effects of suppression actions in the development of appropriate suppression responses. These issues are to be addressed and documented in the WFSA.

You are accountable to the Project Leader, Ralph Webber, of the Tualatin River National Wildlife Refuge, who is the Line Officer. _____ may serve as the Line Officer Designee for this incident.

You will immediately notify me in person in the event of:
(1) a serious injury or fatality,
(2) threat to private property,
(3) if the incident exceeds the limits of the selected alternative of the WFSA.

The Tualatin River National Wildlife Refuge is home to Federally Threatened species. Your job as Incident Commander is critical, as you must minimize damage to the habitats, as well as provide for fire fighter safety. Minimum environmental suppression tactics shall be used, commensurate with forecasted and threatened resource values. Unless there are immediate threats to life and/or property, you must receive approval from the Project Leader or Designee to use heavy equipment (dozers, tractors, etc.) or fall any unburned trees greater than eight feet tall.

You are to be guided by the Wildland Fire Situation Analysis, approved by Ralph Webber, Project Leader.

The Resource Advisor assigned to your incident will be _____.

_____ Date: _____
Ralph Webber, Project Leader

Appendix P: Wildland Fire Situation Analysis

WILDLAND FIRE SITUATION

ANALYSIS

Incident Name:
Jurisdiction:

Date and Time Completed:

Section I, WFSA Information Page

A. Jurisdiction(s): Assign the agency or agencies that have or could have fire protection responsibility, e.g., USFWS, BLM, etc.

B. Geographic Area: Assign the recognized "Geographic Coordination Area" the fire is located in, e.g., Northwest, Northern Rockies, etc.

C. Unit(s): Designate the local administrative unit(s), e.g., Hart Mountain Refuge Area, Flathead Indian Reservation, etc.

D. WFSA #: Identify the number assigned to the most recent WFSA for this fire.

E. Fire Name: Self-explanatory.

F. Incident #: Identify the incident number assigned to the fire.

G. Accounting Code: Insert the local unit's accounting code.

H. Date/Time Prepared: Self-explanatory.

I. Attachments: Check here to designate items used to complete the WFSA. "Other could include data or models used in the development of the WFSA. Briefly describe the "other" items used.

I. Wildland Fire Situation Analysis	
To be completed by the Agency Administrator(s)	
A. Jurisdiction(s)	**B. Geographic Area**
C. Unit(s)	**D. WFSA #**
E. Fire Name	**F. Incident #**
G. Accounting Code:	
H. Date/Time Prepared _____@_____	
I. Attachments	

- Complexity Matrix/Analysis *	_____	
- Risk Assessment/Analysis *	_____	
Probability of Success *	_____	
Consequences of Failure *	_____	
- Maps *	_____	
- Decision Tree **	_____	
- Fire Behavior Projections *	_____	
- Calculations of Resource Requirements *	_____	
- Other (specify) * Required ** Required by FWS	_____	

This page is completed by the Agency Administrator(s).
Section II. Objectives and Constraints

A. Objectives: Specify objectives that must be considered in the development of alternatives. Safety objectives for firefighter, aviation, and public must receive the highest priority. Suppression objectives must relate to resource management objectives in the unit resource management plan.

Economic objectives could include closure of all or portions of an area, thus impacting the public, or impacts to transportation, communication, and resource values.

Environmental objectives could include management objectives for airshed, water quality, wildlife, etc.

Social objectives could include any local attitudes toward fire or smoke that might affect decisions on the fire.

Other objectives might include legal or administrative constraints which would have to be considered in the analysis of the fire situation, such as the need to keep the fire off other agency lands, etc.

B. Constraints: List constraints on wildland fire action. These could include constraints to designated wilderness, wilderness study areas, environmentally or culturally sensitive areas, irreparable damage to resources or smoke management/air quality concerns. Economic constraints, such as public and agency cost, could be considered here.

II.	**Objectives and Constraints**
To be Completed by the Agency Administrator(s)	

A. Objectives (Must be specific and measurable)

1. *Safety*

   - Public

   - Firefighter

2. *Economic*

3. *Environmental*

4. *Social*

5. *Other*

B. Constraints

This page is completed by the Fire Manager and/or Incident Commander.

Section III. Alternatives

A. Wildland Fire Management Strategy: Briefly describe the general wildland fire strategies for each alternative. Alternatives must meet resource management plan objectives.

B. Narrative: Briefly describe each alternative with geographic names, locations, etc., that would be used when implementing a wildland fire strategy. For example: "Contain within the Starvation Meadows' watershed by the first burning period."

C. Resources Needed: Resources described must be reasonable to accomplish the tasks described in Section III.B. It is critical to also look at the reality of the availability of these needed resources.

D. Final Fire Size: Estimated final fire size for each alternative at time of containment.

E. Estimated Contain/Control Date: Estimates of each alternative shall be made based on predicted weather, fire behavior, resource availability, and the effects of suppression efforts.

F. Cost: Estimate all incident costs for each alternative. Consider mop-up, rehabilitation, and other costs as necessary.

G. Risk Assessment - Probability of Success/Consequences of Failure: Describe probability as a percentage and list associated consequences for success and failure. Develop this information from models, practical experience, or other acceptable means. Consequences described will include fire size, days to contain, days to control, costs, and other information such as park closures and effect on critical habitat. Include fire behavior and long-term fire weather forecasts to derive this information.

H. Complexity: Assign the complexity rating calculated in "Fire Complexity Analysis" for each alternative, e.g., Type II, Type I.

I. A map for each alternative should be prepared. The map will be based on the "Probability of Success/Consequences of Failure" and include other relative information.

III. Alternatives (To be completed by FMO / IC)

	A	B	C
A. Wildland Fire Strategy			

B. Narrative			
C. Resources needed Handcrews Engines Dozers Airtankers Helicopters			
D. Final Size			
E. Est. Contain/ Control Date			
F. Costs			
G. Risk Assessment - Probability of success - Consequence of failure			
H. Complexity			
I. **Attach maps for each alternative**			

This page is completed by the Agency Administrator(s), FMO and/or Incident Commander.
Section IV. Evaluation of Alternatives

A. Evaluation Process: Conduct an analysis for each element of each objective and each alternative. Objectives shall match those identified in Section II.A. Use the best estimates available and quantify whenever possible. Provide ratings for each alternative and corresponding objective element. Fire effects may be negative, cause no change, or may be positive. Examples are: 1) a system which employs a "-" for negative effect, a "0" for no change, and a "+" for positive effect; 2) a system which uses a numeric factor for importance of the consideration (soils, watershed, political, etc.) and assigns values (such as -1 to +1, - 100 to +100, etc.) to each consideration, then arrives at a weighted average. If you have the ability to estimate dollar amounts for natural resource and cultural values, this data is preferred. Use those methods which are most useful to managers and most appropriate for the situation and agency. To be able to evaluate positive fire effects, the area must be included in the resource management plan and consistent with prescriptions and objectives of the Fire Management Plan.

Sum of Economic Values: Calculate for each element the net effect of the rating system used for each alternative. This could include the balance of:
pluses (+) and minuses (-), numerical rating (-3 and +3), or natural and cultural resource values in dollar amounts. (Again, resource benefits may be used as part of the analysis process when the wildland fire is within a prescription consistent with approved Fire Management Plans and in support of the unit's Resource Management Plan.)

IV. Evaluation of Alternatives			
To be Completed by the Agency Administrator(s) and Fire Manager / Incident Commander			
A. Evaluation Process	**A**	**B**	**C**
Safety Firefighter Aviation Public			
Sum of Safety Values			

Economic Forage Improvements Recreation Timber Water Wilderness Wildlife Other (specify)			
Sum of Economic Values			
Environmental Air Visual Fuels T & E Species Other (specify)			
Sum of Environmental Values			
Social Employment Public Concern Cultural Other (Specify)			
Sum of Social Values			
Other			

This page is completed by the Agency Administrator(s) and Fire Manager and/or Incident Commander.

Section V. Analysis Summary

A. Compliance with Objectives: Prepare narratives that summarize each alternative's effectiveness in meeting each objective. Alternatives that do not comply with objectives are not acceptable. Narrative could be based on effectiveness and efficiency. For example: "most effective and least efficient," "least effective and most efficient," or

"effective and efficient." Or answers could be based on a two-tiered rating system such as "complies with objective" and "fully complies with or exceeds objective." Use a system that best fits the manager's needs.

B. Pertinent Data: Data for this Section has already been presented, and is duplicated here to help the Agency Administrator(s) confirm their selection of an alternative. Final Fire Size is displayed in Section III.D. Complexity is calculated in the attachments and displayed in Section III.H. Costs are displayed on page 4. Probability of Success/Consequences of Failure is calculated in the attachments and displayed in Section III.G.

C. External and Internal Influences: Assign information and data occurring at the time the WFSA is signed. Identify the Preparedness Index (1 through 5) for the National and Geographic levels. If available, indicate the Incident Priority assigned by the MAC Group. Designate the Resource Availability status. This information is available at the Geographic Coordination Center, and is needed to select a viable alternative. Designate "yes," indicating an up-to-date weather forecast has been provided to, and used by, the Agency Administrator(s) to evaluate each alternative. Assign information to the "Other" category as needed by the Agency Administrator(s).

Section IV. Decision

Identify the alternative selected. Must have clear and concise rationale for the decision, and a signature with date and time. Agency Administrator(s) is mandatory.

V. Analysis Summary			
To be Completed by the Agency Administrator(s) and Fire Manager / Incident Commander			
Alternatives	**A**	**B**	**C**
A. Compliance with Objectives Safety Economic Environmental Social Other			

B. Pertinent Data Final Fire Size Complexity Suppression Cost Resource Values Probability of Success Consequences of Failure			

C. External / Internal Influences

National & Geographic Preparedness Level _____

Incident Priority _____

Resource Availability _____

Weather Forecast (long-range) _____

Fire Behavior Projections _____

VI. Decision

The Selected Alternative is: _____

Rationale:

_____ _____

Agency Administrator's Signature Date/Time

This Section is completed by the Agency Administrator(s) or designate.

Section VII. Daily Review

The date, time, and signature of reviewing officials are reported in each column for each day of the incident. The status of Preparedness Level, Incident Priority, Resource Availability, Weather Forecast, and WFSA validity is completed for each day reviewed. Ratings for the Preparedness Level, Incident Priority, Resource Availability, Fire Behavior, and Weather Forecast are addressed in Section V.C. Assign a "yes" under "WFSA Valid" to continue use of this WFSA. A "no" indicates this WFSA is no longer valid and another WFSA must be prepared or the original revised.

Section VIII. Final Review

This Section is completed by the Agency Administrator(s). A signature, date, and time are provided once all conditions of the WFSA are met.

VII. Daily Review
To be completed by the Agency Administrator(s) or Designate

Selected to be reviewed daily to determine if still valid until containment or control									
			PREPAREDNESS LEVEL	INCIDENT PRIORITY	RESOURCE AVAILABILITY	WEATHER FORECAST	FIRE BEHAVIOR PROJECTIONS	WFSA VALID
Date	**Time**	**By**						
If WFSA is no longer valid, a new WFSA will be completed!								

VIII. Final Review

The elements of the selected alternative were met on: _____ _____
Date Time

By:_____
(Agency Administrator(s)

A GUIDE FOR ASSESSING FIRE COMPLEXITY

The following questions are presented as a guide to assist the Agency Administrator(s) and staff in analyzing the complexity or predicted complexity of a wildland fire situation. Because of the time required to assemble or move an Incident Management Team to wildland fire, this checklist should be completed when a wildland fire escapes initial attack and be kept as a part of the fire records. This document is prepared concurrently with the preparation of (and attached to) a new or revised Wildland Fire Situation Analysis. It must be emphasized this analysis should, where possible, be based on predictions to allow adequate time for assembling and transporting the ordered resources.

Use of the Guide:

1. Analyze each element and check the response "yes" or "no."

2. If positive responses exceed, or are equal to, negative responses within any primary factor (A through G), the primary factor should be considered as a positive response.

3. If any three of the primary factors (A through G) are positive responses, this indicates the fire situation is, or is predicted to be, Type I.

4. Factor H should be considered after all the above steps. If more than two of these items are answered "yes," and three or more of the other primary factors are positive responses, a Type I team should be considered. If the composites of H are negative, and there are fewer than three positive responses in the primary factors (A-G), a Type II team should be considered. If the answers to all questions in H are negative, it may be advisable to allow the existing overhead to continue action on the fire.

GLOSSARY OF TERMS

Potential for blow-up conditions - Any combination of fuels, weather, and topography excessively endangering personnel.

Rate or endangered species - Threat to habitat of such species or, in the case of flora, threat to the species itself.

Smoke management - Any situation which creates a significant public response, such as smoke in a metropolitan area or visual pollution in high-use scenic areas.

Extended exposure to unusually hazardous line conditions - Extended burnout or backfire situations, rock slide, cliffs, extremely steep terrain, abnormal fuel situation such as frost killed foliage, etc.

Disputed fire management responsibility - Any wildland fire where responsibility for management is not agreed upon due to lack of agreements or different interpretations, etc.

Disputed fire policy - Differing fire policies between suppression agencies when the fire involves multiple ownership is an example.

Pre-existing controversies - These may or may not be fire management related. Any controversy drawing public attention to an area may present unusual problems to the fire overhead and local management.

Have overhead overextended themselves mentally or physically - This is a critical item that requires judgment by the responsible agency. It is difficult to write guidelines for this judgment because of the wide differences between individuals. If, however, the Agency Administrator feels the existing overhead cannot continue to function efficiently and take safe and aggressive action due to mental or physical reasons, assistance is mandatory.

FIRE COMPLEXITY ANALYSIS

A. FIRE BEHAVIOR: Observed or Predicted **YES/NO**

1. Burning Index (from on-site measurement of weather conditions) predicted to be above the 90% level using the major fuel model In which the fire is burning. _____
2. Potential exists for “blowup” conditions (fuel moisture, winds, etc.) _____
3. Crowning, profuse or long-range spotting. _____
4. Weather forecast indicating no significant relief or worsening conditions. _____

Total _____

B. RESOURCES COMMITTED

1. 200 or more personnel assigned. _____
2. Three or more divisions. _____
3. Wide variety of special support personnel. _____
4. Substantial air operation which is not properly staffed. _____
5. Majority of initial attack resources committed. _____

Total _____

C. RESOURCES THREATENED

1. Urban interface. _____
2. Developments and facilities. _____
3. Restricted, threatened, or endangered species habitat. _____
4. Cultural Sites. _____
5. Unique natural resources, special designation zones, or wilderness. _____
6. Other special resources. _____

Total _____

D. SAFETY **YES/NO**

1. Unusually hazardous fire line conditions. _____
2. Serious accidents or fatalities. _____
3. Threat to safety of visitors from fire and related operations. _____
4. Restricted and/or closures in effect or being considered. _____
5. No night operations in place for safety reasons. _____

Total _____

E. OWNERSHIP

1. Fire burning or threatening more than one jurisdiction. _____
2. Potential for claims (damages). _____
3. Conflicting management objectives. _____
4. Disputes over fire management responsibility. _____
5. Potential for unified command. _____

Total _____

F. EXTERNAL INFLUENCES

1. Controversial wildland fire management policy. _____
2. Pre-existing controversies/relationships. _____
3. Sensitive media relationships. _____
4. Smoke management problems. _____
5. Sensitive political interests. _____
6. Other external influences. _____

Total _____

G. CHANGE IN STRATEGY **YES/NO**

1. Change in strategy to confine/contain to control. _____
2. Large amount of unburned fuel within planned perimeter. _____

3. WFSA invalid or requires updating. _____

Total _____

H. EXISTING OVERHEAD

1. Worked two operational periods without achieving initial objectives. _____
2. Existing management organization ineffective. _____
3. IMT overextended themselves mentally and/or physically. _____
4. Incident action plans, briefings, etc. missing or poorly prepared. _____

Total _____

Signature _____

Date _____ **Time** _____

Appendix Q. Fire Behavior Observations Form

Appendix R. Smoke Observation Form

Appendix S. Weather Observation Form

APPENDIX T. INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

* * * * * * Final ESA Intra-Service Consultation Handbook, March 1998 * * * * * *

Appendix 2

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person: Ralph D. Webber
Telephone Number: 503-590-5811
Date: September 23, 2002

I. Region: R1

II. Service Activity: Tualatin River National Wildlife Refuge Fire Management Plan

III. Pertinent Species and Habitat:

A. Listed species and/or their critical habitat within the action area:
Bald eagle *Haliaeetus leucocephalus*, and upper Willamette steelhead *Oncorhynchus mykiss*.

B. Proposed species and/or proposed critical habitat within the action area: None.

C. Candidate species within the action area: None.

D. Include species/habitat occurrence on a map. Bald eagles occur on Steinborn and Headquarters Units. Upper Willamette steelhead may be present in Tualatin River or perennial streams bisecting Refuge properties. See Figures 1 & 2.

IV. Geographic area or station name and action: Tualatin River National Wildlife Refuge Fire Management Plan.

V. Location: See Figures 1 & 2.

A. Ecoregion Number and Name: North Pacific Coast Ecoregion.

B. County and State: Washington County, Oregon.

C. Section, township, and range: T2S, R1W - R2W, various sections.
Refer to Figure 1.

D. Distance and direction to nearest town: Headquarters is 3 miles northwest of Sherwood, Oregon.

E. Species/habitat occurrence: Bald eagles use wetlands for foraging and trees for day roosts at Steinborn and Headquarters Units. Upper Willamette steelhead may use Tualatin River, Chicken Creek, and Rock Creek within or adjacent all Refuge units.

VI. Description of proposed action: Promulgate actions to be taken in event of wildfire occurring on Refuge lands, and measures to be taken during pile burning operations.

VII. Determination of effects:

A. Explanation of effects of the action on species and critical habitats in items III. A, B, and C: No Effect.

B. Explanation of actions to be implemented to reduce adverse effects: No additional actions to be implemented.

VIII. Effect determination and response requested: [* = optional]

A. Listed species/designated critical habitat:

Determination	**Response requested**
no effect/no adverse modification (species: Bald eagle, upper Willamette steelhead**)**	**____*Concurrence**
may affect, but is not likely to adversely affect species/adversely modify critical habitat (species: None**)**	**____Concurrence**
may affect, and is likely to adversely affect species/adversely modify critical habitat (species: None**)**	**____Formal Consultation**

B. Proposed species/proposed critical habitat:

Determination	**Response requested**
no effect on proposed species/no adverse modification of proposed critical habitat (species: None**)**	**____*Concurrence**
is likely to jeopardize proposed species/ adversely modify proposed critical habitat (species: None**)**	**____Conference**

C. Candidate species:

Determination	**Response requested**
no effect (species: None**)**	**____*Concurrence**
is likely to jeopardize candidate species (species: None**)**	**____Conference**

_____ _____
signature date
Project Leader

IX. Reviewing ESO Evaluation:

A. Concurrence _____ Nonconcurrence _____
B. Formal consultation required _____

C. Conference required _____

D. Informal conference required _____

E. Remarks (attach additional pages as needed):

_____ _____
signature date