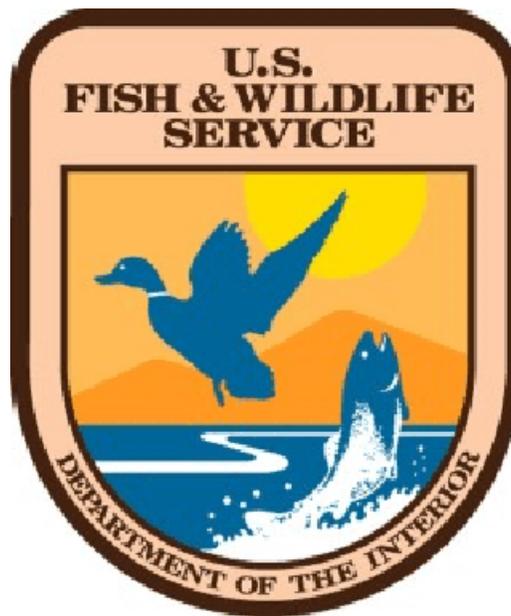


# **WILDLAND FIRE MANAGEMENT PLAN**

**Julia Butler Hansen Refuge for the Columbian White-tailed Deer**

**Lewis and Clark National Wildlife Refuge**

Cathlamet, WA



2004

# 2004 WILDLAND FIRE MANAGEMENT PLAN

Julia Butler Hansen Refuge for the Columbian White-tailed Deer

Lewis and Clark National Wildlife Refuge

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## EXECUTIVE SUMMARY

This document is the Julia Butler Hansen Refuge for the Columbian White-tailed Deer and Lewis and Clark National Wildlife Refuge=s fire management plan. Major components of this plan include:

- § Updated policy for wildfire suppression and prescribed fires at the Julia Butler Hansen and Lewis and Clark National Wildlife Refuges (NWR). This plan updates the last Julia Butler Hansen and Lewis and Clark NWR Fire Management Plans that were completed in 1982.
- § Updated fire management activities based on the Refuge Management Plan (1986) and Julia Butler Hansen and Lewis and Clark Refuge Goals (updated in 1997).
- § Format changes as directed in the Fire Management Handbook.
- § Prescribed burning in the form of pile burning for the purposes of vegetative debris disposal and fuel reduction.

This plan is written to provide guidelines for the suppression and prescribed fire programs at the Julia Butler Hansen and Lewis and Clark NWR. Prescribed fires will consist only of pile burning and may be used to reduce hazardous fuels and dispose of burnable vegetation debris.

## INTRODUCTION

This document will establish a Fire Management Plan for the Julia Butler Hansen Refuge for the Columbian White-tailed Deer (Julia Butler Hansen Refuge) and the Lewis and Clark National Wildlife Refuge (Lewis and Clark NWR). The headquarters for the Julia Butler Hansen Refuge and Lewis and Clark NWR are located 2 miles west of Cathlamet, Washington. Both refuges are part of the Willapa National Wildlife Refuge Complex, which is headquartered on Willapa Bay 10 miles north of Ilwaco, Washington. This Plan meets the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended, the Endangered Species Act (ESA) of 1973, as amended, and the National Historic Preservation Act (NHPA) of 1966, as amended. The described actions and environmental effects of actions resulting from this Plan are categorically excluded from NEPA compliance (Appendix C) under 516 DM 6, Appendix 1, 1.4(4 and 5). Consultation and an intra-service Section 7 biological evaluation of the potential effects of proposed actions on threatened, endangered and candidate species were completed (Appendix D).

This plan is written as an operational guide for managing the refuges' wildland and debris pile burning programs and to comply with a service-wide requirement for refuges with burnable vegetation to develop a fire management plan (620 DM 1). It provides fire management guidance needed to ensure human safety, protect facilities and natural resources, restore habitats and restore fire's natural role in ecosystem processes.

The plan provides guidance for wildland fire suppression and burning piles of debris to restore and maintain wildlife habitats on the refuges.

The Refuges have no full-time fire staff. Fire management oversight will be provided by the Prescribed Fire Specialist at Willamette Valley National Wildlife Refuge Complex, Corvallis, OR, who will also act as the Fire Management Officer. The Project Leader will coordinate with the Prescribed Fire Specialist and is responsible for ensuring all fire management policies are followed. Suppression actions will be initiated by qualified refuge staff, the Washington Department of Natural Resources and the State of Oregon Department of Forestry, in accordance with the interagency Master Cooperative Fire Protection Agreement (Appendix F). Memoranda of Understanding (MOU) are also being developed for suppression actions with the following agencies: the Wahkiakum Fire Protection District # 2, the Knappa-Svensen-Burnside Rural Fire Protection Department, the Astoria Fire Department, and the Westport-Wauna Rural Fire Protection District. Once the MOUs are finalized, these agencies will have authority to conduct wildland/structural fire protection on the both refuges.

## COMPLIANCE WITH US FISH AND WILDLIFE SERVICE POLICY

The Columbian White-tailed Deer National Wildlife Refuge was established in 1971 by Executive Order No. 11636 signed by President Nixon on December 17, 1971, while the Lewis and Clark National Wildlife Refuge was established the following year, April, 19, 1972, by Executive Order 11667. Under Public Law No. 100-446, signed on September 27, 1988, the Columbian White-tailed Deer National Wildlife Refuge's name was changed to Julia Butler Hansen Refuge for the Columbian White Tail Deer (since the refuge's official name incorrectly spelled, it is unofficially referred to as Julia Butler Hansen Refuge for the Columbian White-tailed Deer). Julia Butler Hansen Refuge was also established under authority of the Endangered Species Act of 1973 (16 U.S.C. § 1534) to conserve the endangered Columbian white-tailed deer, and the Refuge Recreation Act (16 U.S.C. § 460 k-1) to acquire lands suitable for incidental fish and wildlife-oriented recreational development, the protection of natural resources, and the conservation of endangered species.

Under the National Wildlife Refuge System Improvement Act of 1997, the purpose of both refuges is to develop, advance, manage, conserve, and protect fish, wildlife, plants and their habitats, to conserve 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.

The specific goals of the Julia Butler Hansen Refuge, as revised in 1997, are to:

- (1) Manage for healthy and balanced populations of Columbian white-tailed deer as outlined in the *Columbian White-tailed Deer Recovery Plan* and to cooperate with others in management of off-refuge deer;
- (2) Maintain a native diversity of wetland habitats for breeding, migratory, and wintering waterfowl and other aquatic migratory birds associated with the Columbia River estuary;
- (3) Maintain a native diversity of habitats for fish and wildlife associated with the Columbia River estuary; and
- (4) Provide opportunities for wildlife and wildland-dependent recreation, education, and research.

The specific goals of the Lewis and Clark NWR, as revised in 1997, are to:

- (1) Manage for conservation and recovery of threatened and endangered animal species in their natural ecosystems;
- (2) Maintain a native diversity of wetland habitats for breeding/migratory/wintering waterfowl and other aquatic migratory birds associated with the Columbia River estuary;
- (3) Maintain a native diversity of habitats for fish and wildlife associated with the Columbia River estuary; and
- (4) Provide opportunities for wildlife/wildlands-dependent recreation, education, and research.

This fire management plan complies with requirements set forth in NEPA, NHPA, and the Endangered Species Act of 1973, as amended. A categorical exclusion addressing fire management activities was completed as part of this FMP (Appendix C). Compliance with NHPA was completed as part of the FMP documentation and project-level compliance will be completed for each prescribed burn. An intra-service Section 7 biological evaluation was prepared in association with this plan (Appendix D). Appropriate action will be taken to identify and protect any rare, threatened, or endangered species from adverse effects resulting from actions proposed in this plan.

Authority and guidance for implementing this fire management plan are found in the:

- < Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C.594): authorizes the Secretary of the Interior to protect from fire, lands under the jurisdiction of the Department directly or in cooperation with other Federal agencies, states, or owners of timber.
- < Economy Act of June 30, 1932: authorizes contracts for services with other Federal agencies.

- < Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856, 1856a and b): authorizes reciprocal fire protection agreements with any fire organization for mutual aid with or without reimbursement and allows for emergency assistance in the vicinity of agency lands in suppressing fires when no agreement exists.
- < Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121): authorizes Federal agencies to assist state and local governments during emergency or major disaster by direction of the President.
- < National Wildlife Refuge System Administrative Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd et seq.: defines the National Wildlife Refuge System as including wildlife refuges, areas for the protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas and waterfowl production areas. It also establishes a conservation mission for the Refuge System, defines guiding principles and directs the Secretary of the Interior to ensure that biological integrity and environmental health of the system are maintained and that growth of the system supports the mission.
- < Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C.2201): provides for reimbursement to state or local fire services for costs of firefighting on federal property.
- < Wildfire Suppression Assistance Act of 1989. (Pub.L. 100-428, as amended by Pub.L 101- 11, April 7, 1989). Departmental Manual (Interior), Part 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 (40 CFR 1500.4(o) and 1506.4): regulations implementing NEPA encourage the combination of environmental comments with other agency documents to reduce duplication and paperwork
- < Clean Air Act (42 United State Code 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 regulates the protection and recovery of federal endangered species.
- < U.S. Fish & Wildlife Service Fire Management Handbook (Updated June 11, 2001): provides general operation guidance for fire management activities in the U.S. Fish and Wildlife Service (USFWS).

The authority for funding normal 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 emergency prevention and suppression of wildland fire expenses.
- < PL 101-121, Department of the Interior and Related Agencies Appropriation Act of 1990, established the funding mechanism for normal year expenditures of funds for fire management purposes.
- < 31 US Code 665(E)(1)(B) provides the authority to exceed appropriations due to wildland fire management activities involving the safety of human life and protection of property.

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

## **FIRE MANAGEMENT OBJECTIVES**

The overall objective for fire management on the refuges is to create a program that provides for firefighter and public safety, reduces the incidence of human-caused fires, ensures appropriate suppression response capability to meet expected wildland fire complexity, and increases the use of prescribed fire.

Specific fire management objectives addressed in this plan are to:

- < Promote firefighter and public safety while managing wildland and prescribed fires;
- < Provide for the protection of life, property, and resources from wildland fires at costs commensurate with resource values at risk;
- < Control all wildland fires while meeting identified resource management objectives;
- < Use appropriate suppression tactics and strategies that minimize long-term impacts of suppression actions on natural resources;
- < Use pile burning on a limited basis to reduce hazard fuel accumulation around structures and dispose of vegetative debris associated with such activities;
- < Use pile burning to assist managers in maintaining vegetation along refuge dikes and roadsides, where appropriate.

## DESCRIPTION OF REFUGES

### GENERAL DESCRIPTION

The Julia Butler Hansen and Lewis and Clark National Wildlife Refuges are located around and within the Columbia River Estuary in southwestern Washington (Wahkiakum County) and in northwestern Oregon (Clatsop and Columbia Counties). The field office that services both refuges is located approximately two miles west of Cathlamet, Washington, along Washington Highway 4, within the Julia Butler Hansen Refuge.

Both refuges are part of the Willapa National Wildlife Refuge Complex. The administrative office for the Complex is located approximately 13 miles north of the town of Ilwaco, in Pacific County, along Washington State Route 101.

The Julia Butler Hansen Refuge contains over 6,000 acres of pastures, forested tidal swamps, brushy woodlots, marshes, and sloughs in both Washington and Oregon (Figure 1). The Refuge is located along the Columbia River from river mile 33 to 50. Virtually all refuge lands were originally intertidal wetlands; some areas were diked, drained, and converted to uplands early in the 20th century. In-holdings owned by Wahkiakum County include two parcels just east of the Mainland Unit and half of Price Island in Washington. At the Westport Unit in Oregon, three small tracts with private ownership totaling less than 18 acres are located between the Westport Slough and the refuge boundary.

The Lewis and Clark NWR boundary encompasses 41,034 acres of the Columbia Estuary, including 18 named islands and numerous sand bars, mud flats, unnamed intertidal marshes, and areas of open water in northern Clatsop County, Oregon (Figure 2). The refuge also includes three small parcels on the Oregon mainland at Tongue Point, Emerald Heights, and Brownsmead. The USFWS and the state of Oregon share ownership within the refuge's land acquisition boundary, with the refuge owning 7,003 acres. At one time the refuge had agreements with the State and County to manage their lands that were within the refuge's acquisition boundary. These agreements have expired, with Clatsop County donating all county lands to the refuge. Negotiations on a new agreement with the state of Oregon are presently underway. There are no private land in-holdings within the refuge.

### JULIA BUTLER HANSEN REFUGE MANAGEMENT UNITS

The Julia Butler Hansen Refuge is divided into seven management units. The Mainland, Hunting Island, and Price Island Units are in Washington. The Tenasillahe Island, Wallace Island, Westport and Crims Island Units are in Oregon.

The **Mainland Unit** contains 2,238 acres and is located along the Columbia River between the towns of Cathlamet and Skamokawa, Washington. The Elochoman River joins the Columbia River in the southeast part of the unit. Most of the unit is diked along the rivers to prevent tidal flooding. Drainage is accomplished by six tidegates, a pump, and a system of ditches and natural sloughs that move water from within the diked area into the rivers and sloughs outside the dikes. The unit's vegetative cover is a mosaic of brushy woodlots, actively managed pastures, and old grass fields. The Mainland Unit also includes approximately 151 acres of forested intertidal swamp and marsh on the east side of the Elochoman River that is not diked.

Figure 1. Julia Butler Hansen Refuge Vicinity Map.

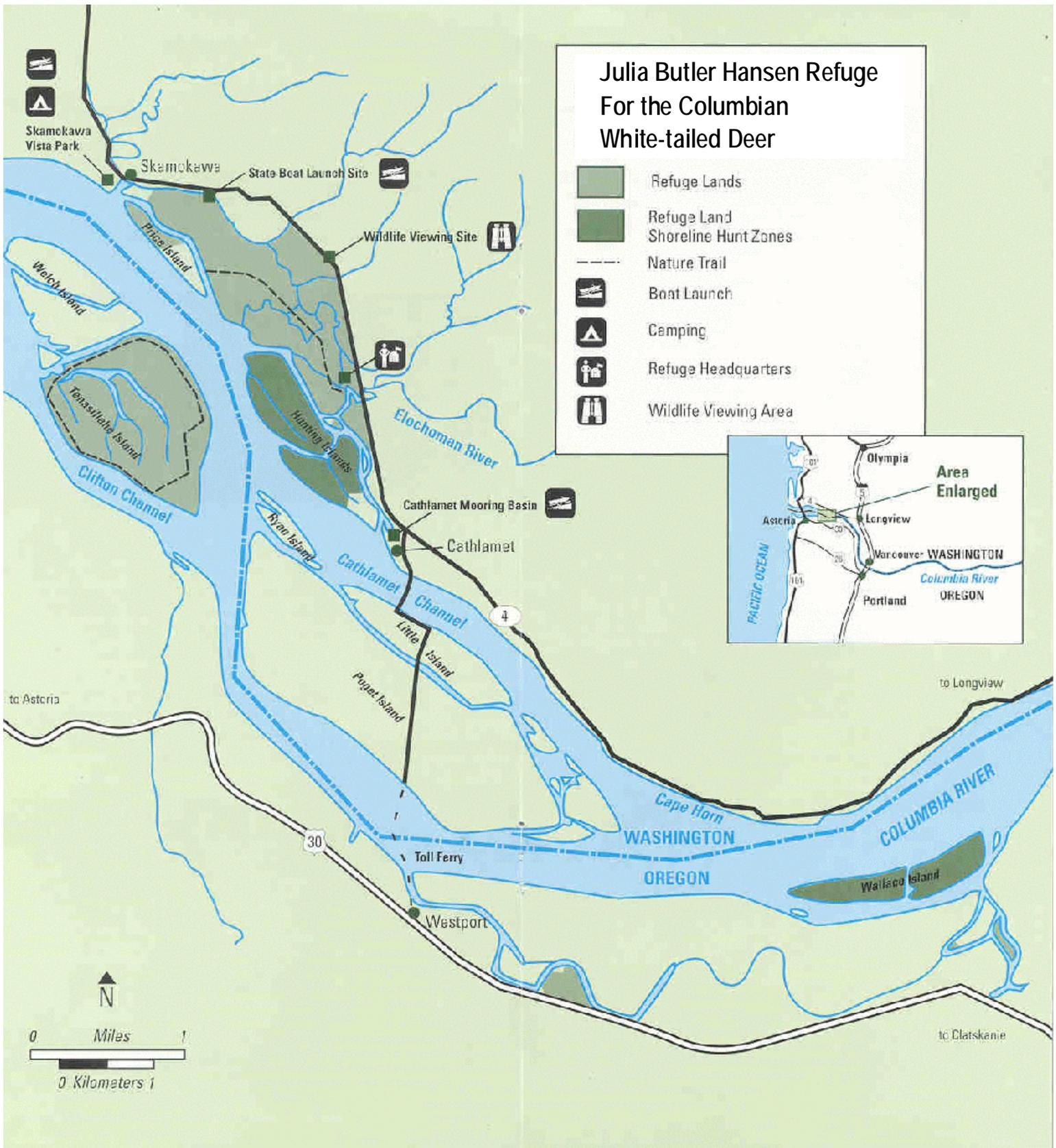
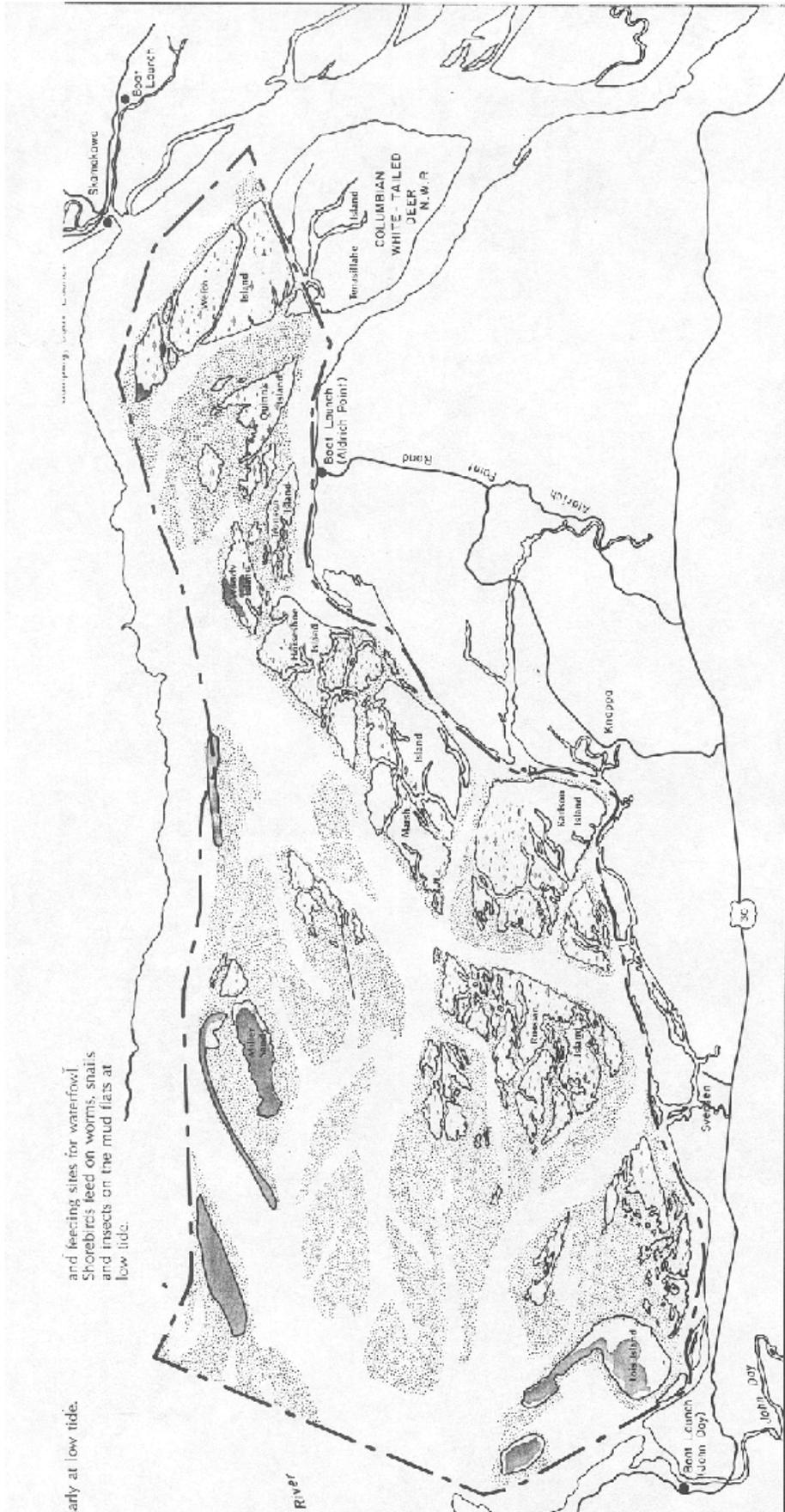


Figure 2. Lewis and Clark NWR Vicinity Map.



The Elochoman River separates the **Hunting Island Unit** from the southwestern edge of the mainland unit. The refuge owns the northern 747 acres of the island, while 150 acres at the southern tip are being held in trust by the Bureau of Indian Affairs. Forested intertidal swamp and shrub/scrub occupy most of the island, although there are a few areas of intertidal marsh totaling perhaps 100 acres.

**Price Island** lies along the northwestern edge of the mainland unit, separated from the mainland by Steamboat Slough. The northern 150 acres are within the refuge, while Wahkiakum County owns approximately 100 acres of the southern end of the island. The island is primarily a Sitka spruce intertidal swamp, although there is a sandy upland of 30 acres that was created by dredge spoil.

**Tenasillahe Island** lies just across the main channel of the Columbia and west of the Mainland, Hunting Island, and Price Island units. The island is 1,950 acres in size, of which 1,700 acres are surrounded by a dike. The diked area is similar to the mainland unit in water drainage and land cover. The interior drainage of the island is accomplished by ditches, sloughs, and four tidegates in two locations. The island's vegetation is a mix of woodlots, brush, pastures, and old grass fields. The southern tip of the island consists of a black cottonwood/Sitka spruce intertidal swamp that encompasses 250 acres and is not diked.

**Wallace Island** is located in the Columbia River between river mile 47 and 50, approximately ten miles upstream (southeast) of the mainland unit. The island is on the south side of the Columbia, at the mouth of the Clatskanie River and is separated from the Oregon mainland by Wallace Slough. The 578-acre island consists almost entirely of a cottonwood/willow intertidal swamp, with two small reed canarygrass dominated meadows. This unit also includes Kinnunen Cut, a 37-acre island located in the lower Clatskanie River one-half mile south of the eastern end of Wallace Island, and 60 acres on adjacent Anunde Island. The remaining 85 acres of Anunde Island are in private ownership. The vegetation on Kinnunen Cut and Anunde Islands is a mix of cottonwood/willow swamp and wet meadows dominated by reed canarygrass.

**Crims Island** is located at the far upstream end of the refuge on the Columbia River between river mile 54 and 56. It is the newest addition to the refuge and consists of a main island and peninsula separated by a slough channel to the north. The island is separated from the Oregon mainland by the Bradbury Slough to the south, and to the north it is separated from the Washington mainland by the Columbia River ship channel. The refuge which owns 451 acres of the island shares ownership with four adjacent owners. Gull Island which is located at the tip of the northern peninsula is separated by a narrow channel to the east from the peninsular portion of Crims Island and by a larger slough channel to the south from the main part of the island. This 750-acre complex Crims-Gull Island Complex is dominated by a large reed canarygrass meadow in its center with, a 90-acre cottonwood/willow intertidal swamp to the west and an accreted spoil site with cottonwoods on the northern peninsula.

The **Westport Unit** is located on the Oregon mainland approximately four miles southeast of the mainland unit and one mile east of the town of Westport. The Westport Unit is 145 acres and bordered on three sides by Westport Slough and on one side by Oregon State Highway 30. The unit's vegetation is dense cottonwood/willow and shrub/scrub swamp. Three small parcels which total less than 18 acres are located between the refuge boundary and the Westport Slough.

#### **LEWIS AND CLARK REFUGE MANAGEMENT UNITS**

There are four management units within the Lewis and Clark NWR: Estuary Islands, Tongue Point, Emerald Heights, and Brownsmead. All of the units are in Clatsop County, Oregon.

The **Estuary Islands Unit** consists of the 41,000 acres of intertidal islands, mud flats, etc., mentioned in the paragraph above. The vegetation consists of cottonwood/willow swamp, shrub/scrub, and herbaceous intertidal marsh dominated by plants such as Lyngby's sedge, tufted hairgrass, and softstem bulrush. The

islands are accessible only by boat and on the forested and shrub/scrub areas the dense understory and numerous tidal channels make travel by foot or machine difficult. A few islands (Miller Sands, Pillar Rock, Fitzpatrick, Lois, and Mott) contain uplands that were created by disposal of sand dredged from the river channel.

The **Tongue Point Unit** comprises 79 acres at the northern tip of the point. The vegetation is mature western hemlock/Sitka spruce/western red alder forest with some Douglas-fir and bigleaf maple. The topography is essentially a hill, with steep to moderate slopes rising from the water to a crest. The west slope has a steep (95%) slope and there are tall cliffs in the northwest corner, where an old rock pit and shooting range were once located. The unit is bordered on the south by the Tongue Point Job Corps Center and a U.S. Coast Guard Navigation Station.

**Emerald Heights** is an 89-acre parcel located just south of Tongue Point and Oregon Highway 30. Elevations range from 50 to 266 feet. The unit is completely forested, with 120 year-old western hemlock being the dominant species. Sitka spruce are scattered throughout the stand. The southwest part of the unit contains a small amount of 65 year-old western hemlock, Sitka spruce, Douglas fir, and western red alder.

The **Brownsmead Unit** is a 48-acre former farm that was used for grazing dairy and beef cattle. The vegetation is primarily pasture grasses, with a few areas of shrubs and small hardwood trees along fence lines. Cattle are presently grazed on the unit to manage the grasses to provide winter forage for Canada geese.

#### CLIMATE

The refuge has a mild marine climate characterized by moderate temperatures, high humidity, copious rainfall, and breezy winds. Unfortunately there are no official weather service reporting stations located within 15 miles of the refuge headquarters. National Weather Service stations in Kelso, Washington and Astoria, Oregon are representative of climate at the extreme easternmost and westernmost portions of the refuge. Both sites carry extensive historical records of temperature, wind, humidity, precipitation, and other climatic data. Two other Remote Automated Weather Stations (RAWS) are located within 12 miles of refuge headquarters but both are situated above 2000 feet in elevation and therefore are not representative of refuge climate. Data for refuge locations between Kelso and Astoria are very limited, however an unofficial weather station which records just precipitation and temperatures has been maintained at refuge headquarters two miles north of Cathlamet Washington since 1980. In addition data from other nearby weather recording sites at Grays River, Naselle, and 6 miles northeast of Cathlamet, Washington are available.

Area temperatures are mild. The average annual temperature recorded at Astoria Oregon is 51 degrees Fahrenheit (EF). The annual average maximum and minimum temperatures for the Astoria area from 1958 to 2003 were 58.3EF and 43.6EF, respectively. Snow is very infrequent throughout the refuge and occurs less than three days per year. More extensive snow and ice storms with more than two or three inches of frozen precipitation occur on average every seven to ten years. Thunderstorms over the area's lower elevations occur on four to eight days each year and over the mountains on seven to 15 days.

Minimum and maximum temperatures and precipitation throughout the refuges is extremely variable. Since 1980, an average of 64 inches of precipitation has fallen each year at refuge headquarters. Other local annual averages include 45 inches at Kelso, Washington and 115 inches at Naselle, Washington. About 75 percent precipitation, occurs from November through March. In the wettest months of November, December and January, precipitation is frequently recorded on 20 to 25 days or more each month. During the driest months of July and August, it is not unusual for two to four weeks to pass with only a few showers. At Astoria, June, July and August are the driest months

Periodic dry weather conditions in late summer and fall typically prompt a temporary fire ban lasting 4 to 8 weeks to be issued by the county. During the winter, rainfall is usually of light to moderate intensity and continuous over a period of time, rather than heavy downpours for brief periods. Thunderstorms are unusual but occur periodically every few years, most often in spring and summer. Fog and drizzle occur year-round and often from October through June. Snowfall occurs almost yearly with an average of 4.1 inches annually at Astoria. Unusual years can bring greater volumes of snow, as in the winter of 1949-50 when over 39 inches fell in the Astoria area.

On-shore westerly winds from the Pacific Ocean are predominant year round at the Julia Butler Hansen and Lewis and Clark refuges. The average annual wind speed at the airport in Astoria, Oregon is 7.9 miles per hour (mph). Average monthly wind speeds in Astoria range from 6.8 mph in October to 9.1 mph in December. The prevailing wind direction in summer is northwest and in winter southwest and west. Drier east and southeasterly winds are uncommon, but occur periodically each year and are often strong. Strong winds usually accompany annual winter storms, which can result in sustained winds of 40 to 65 mph, with gusts from 90 to over 100 mph. Hurricane-force winds (>74 mph) are experienced almost annually and occasionally produce a recognized hurricane. An intense storm, termed “the Columbus Day Storm,” with 120 mph winds occurred on October 12, 1962, and a 100 mph wind storm on November 25 of the same year downed approximately 15 billion board feet of timber in the northwest.

#### **VEGETATION**

The native vegetation of the Julia Butler Hansen Refuge is classified as a tideland spruce community, although this vegetation type is intact only in specific smaller sites such as portions of Hunting Island and on Price Island. Much of the mainland and Tenasillahe Island have been cleared of their forest overstory and consist of pastures separated by woodlots, sloughs and ditches. Where the forest canopy has been removed, openings are occupied by reed canarygrass, or planted varieties of grass such as orchard grass and tall fescue. Unless these grass lands are manipulated in some way, growth is exceptionally heavy. Within wooded areas, the understory consists of various grasses and forbs. Snowberry, rose, blackberry, hazelnut, and dogwood are common understory shrub species.

Forest resources consist primarily of the Sitka spruce, black cottonwood, willow, red alder and western redcedar swamps in the wet lowlands and the Sitka spruce/western red alder forest in the uplands. The primary early-successional species are red alder and willow with later-successional species being Sitka spruce and black cottonwood. In areas of the lower river with significant tidal fluctuations, willow-dominated communities may be considered later-successional. The forest swamps that grow on the Julia Butler Hansen Refuge and Lewis and Clark NWR are specialized plant communities within the Sitka spruce forest zone of western Washington and Oregon. Sitka spruce is indicative of a coastal climate. The forest swamps are very wet most of the year and can have standing water for long periods of time during the wet season. The coastal climatic influence disappears east of Cathlamet, Washington, where the Sitka spruce dominated forests become cottonwood dominated forests.

Managed woodlots have been planted each year since 1999 to supplement the native forest cover on the Julia Butler Hansen Refuge. The managed woodlots have been created on the Mainland and Tenasillahe Units, in areas that were formerly old grass fields. The woodlots are generally comprised of native seedling and sapling trees and shrubs.

On the Lewis and Clark NWR there is a general longitudinal distribution of vegetative types which varies from upstream to downstream. Refuge islands located upriver generally have slightly higher elevations and thus are not be as influenced by the twice-daily tidal inundations, as are the downstream islands. Thus the upriver islands support more shrub species such as willow, red alder, dogwood, spruce, black cottonwood and various grasses and forbs. Those islands in the lower part of the river are made up of

marshlands comprised of hardstem bulrush, cattail, river bulrush, sedges, smartweed, horsetail and reed canarygrass.

The two mainland units located near Astoria, Oregon have more of an upland forest type cover. The Tongue Point Unit is covered with a mixed stand of western hemlock, Sitka spruce, and western red alder, with lesser amounts of Douglas-fir and bigleaf maple. A significant amount of old-growth Douglas-fir is located mainly along the steep west side of the unit and along the ridge top. The remaining conifers average about 100 years old, while some conifers and most of the hardwoods average 44 years old. The old-growth conifers have a significant amount of rot, mistletoe and other defects. The Emerald Heights Unit is predominantly 120 year old western hemlock with a minor amount of Sitka spruce. A small amount of 65 year old western hemlock, Sitka spruce, Douglas-fir, and western red alder is found in the southwest portion of the unit. The conifers contain a heavy amount of mistletoe and butt rot, as well as structural defects.

The refuges' forest types are generally not at risk of burning and usually would not carry a fire well due to their wet condition. The drier uplands forest on the Tongue Point and Emerald Heights Units are the most susceptible to fire during drier periods. Fires in these areas are most likely to be caused by human activities, such as cigarette smoking.

## **FISH AND WILDLIFE**

The variety of wildlife habitats on these refuges provide an abundance of wildlife. More than 200 species of birds, 50 species of mammals, and 12 species of amphibians and reptiles are known to occur in and around the refuges.

### **Mammals**

Mammals that inhabit the forested and pasture areas of the refuges include elk (*Cervus elaphus*), Columbian white-tailed deer (*Odocoileus virginianus leucurus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), porcupine (*Erethizon dorsatum*), striped skunk (*Mephitis mephitis*), snowshoe hare (*Lepus americanus*), long-tailed weasel (*Mustela frenata*), and a variety of small mammals such as bats, mice, voles, moles, and shrews. Black bear (*Ursus americanus*) and mountain lion (*Felis concolor*) occupy the adjacent hills and pass through the refuges occasionally.

Mammals that inhabit the streams, rivers, and associated riparian habitats within the refuge include mink (*Mustela vison*), beaver (*Castor canadensis*), nutria (*Myocastor coypus*), muskrat (*Ondatra zibethicus*), harbor seal (*Phoca vitulina*), California sea lion (*Zalophus californianus*), and river otter (*Lutra canadensis*).

No bat surveys have been conducted on the refuges, although species likely to be present include the little brown myotis (*Myotis lucifugus*), big brown bat (*Eptesicus fuscus*), Yuma myotis (*Myotis yumanensis*), western long-eared myotis (*M. evotis*), long-legged myotis (*M. volans*), California myotis (*M. californicus*), silver-haired bat (*Lasionycteris noctivagans*), and the hoary bat (*Lasiurus cinereus*). Many of these bat species roost and forage in forested areas and may use snags and downed logs as day roosts. Bats undoubtedly forage for insects over the streams and ponds of the refuges.

### **Amphibians and Reptiles**

The Julia Butler Hansen Refuge has at least 12 species of amphibians and reptiles and possibly as many as 15. Long-toed (*Ambystoma macrodactylum*) and northwestern (*A. gracile*) salamanders are abundant and often breed in ditches and shallow managed wetlands. Other salamanders present on the refuge include ensatina (*Ensatina eschscholtzii*), Pacific giant (*Dicamptodon tenebrosus*), western red-backed (*Plethodon vehiculum*) and rough-skinned newt (*Taricha granulosa*). Frogs present include bullfrog

(*Rana catesbeiana*), red-legged frog (*R. Aurora*) and Pacific tree frog (*Pseudacris regilla*). The western toad (*Bufo boreas*) occurs in the general area and may be present on the refuge at times. Reptiles include the northwestern garter snakes (*Thamnophis ordinoides*), common garter snake (*T. sirtalis*), possibly the western terrestrial garter snake (*T. elegans*), northern alligator lizard (*Elgaria coerulea*), and painted turtle (*Chrysemys picta*).

Little is known concerning reptile and amphibian presence on the Estuary Islands Unit of the Lewis and Clark NWR. Most of the terrestrial species of salamanders, frogs, snakes and lizard mentioned above are likely to occur in similar habitats at the Tongue Point, Emerald Heights, and Brownsmead Units.

Amphibian and fish species are particularly susceptible to the toxic effects of chemicals in minute quantities and at particular stages of their life cycle; therefore, fire chemicals should be used with great caution in and around wet and forested areas.

### **Fish**

The Columbia River flows through the refuges and provides a passageway and foraging areas for the salmonids of the watershed. Salmonids in the Columbia River and major sloughs include coho (*Oncorhynchus kisutch*), chinook (*O. tshawytscha*), chum (*O. keta*), sockeye (*O. nerka*) and pink salmon (*O. gorbuscha*), as well as steelhead (*O. mykiss*) and cutthroat trout (*O. clarki clarki*). Several races of these species are listed or candidates for listing. In a typical year, upwards of 750,000 adult and 100,000,000 juvenile salmonids pass through the estuary. Both adults and juveniles are present year-round, although the number of juveniles peaks in spring and early summer. There are no streams within the refuges used by spawning salmon or trout.

Other fish that utilize the estuary to a significant degree include white sturgeon (*Acipenser transmontanus*), green sturgeon (*A. medirostris*), eulachon (*Thaleichthys pacificus*), American shad (*Alosa sapidissima*), Pacific herring (*Clupea pallasii*), surf smelt (*Hypomesus pretiosus*), and starry flounder (*Platichthys stellatus*).

Warm water species, such as largemouth bass (*Micropterus salmoides*), yellow perch (*Perca flavescens*), carp (*Cyprinus carpio*), and crappie (*Pomoxis* sp.), are abundant in sloughs within the Julia Butler Hansen Refuge Mainland and Tenasillahe Units as well as the Brownsmead Unit of the Lewis and Clark NWR. These species also occur in small numbers in the main stem of the Columbia.

## Birds

Both refuges provide important habitat for waterfowl, particularly during the spring and fall migration periods. The refuges are both wintering and migrational resting areas for waterfowl that nest in Alaska and winter in Oregon, Washington, and California. The number of migrating ducks using the refuges is unknown but is likely much higher than 100,000. Waterfowl overwinter on both refuges; however, on the Julia Butler Hansen Refuge the wintering duck use varies widely depending on the degree to which the fields are flooded by winter rains. Duck use at Julia Butler Hansen is increasing because of the construction of shallow managed wetlands. The entire estuary typically supports about 50,000 wintering ducks, with 60-70% of these being found on the two refuges. Duck numbers in the 60,000 to 100,000 range occur regularly for short periods. The most common duck species found at the refuges are mallards (*Anas platyrhynchos*), northern pintail (*A. acuta*), green-winged teal (*A. crecca*), American wigeon (*A. americana*), and greater scaup (*Aythya marila*). In addition, a few thousand resident mallards, cinnamon teal (*Anas cyanoptera*), gadwalls (*A. strepera*), and wood ducks (*Aix sponsa*) nest on the refuges during the spring and summer.

Seven subspecies of wintering Canada geese (*Branta canadensis*) utilize the refuges, including lesser (*B. c. parvipes*), Taverner (*B. c. taverneri*), cackling (*B. c. minima*), dusky (*B. c. occidentalis*), western (*B. c. moffitti*), Vancouver (*B. c. fulva*), and Aleutian (*B. c. leucopareia*). Geese forage in the short grass fields on the Julia Butler Hansen Mainland and Tenasillahe Units. They also roost, loaf, and forage in the Estuary Islands and Brownsmead Unit of the Lewis and Clark NWR. A resident population of western Canada geese nests throughout the estuary. The islands created from dredge spoil (Miller Sands, Pillar Rock, Fitzpatrick) within the Estuary Islands Unit are especially important nesting areas.

Approximately 1,000 tundra swans (*Cygnus columbianus*) winter in the estuary, especially in the Estuary Islands Unit of Lewis and Clark NWR.

Raptors found on both refuges include bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), American kestrel (*F. sparverius*), merlin (*F. columbarius*), white-tailed kite (*Elanus caeruleus*), northern harrier (*Circus cyaneus*), red-tailed hawk (*B. jamaicensis*), rough-legged hawk (*B. lagopus*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*A. cooperii*), osprey (*Pandion haliaetus*), turkey vulture (*Cathartes aura*); and barn (Tyto alba), great horned (*Bubo virginianus*), short-eared (*Asio flammeus*), barred (*Strix varia*), Western screech- (*Otus kennicottii*), northern saw-whet (*Aegolius acadicus*), and northern pygmy (*Glaucidium gnoma*) owls. Bald eagles nest on both refuges. Trees and some tall brush species are used by raptors to perch on while hunting. The loss of tree perches would be detrimental to those raptors who only hunt from perches.

American bitterns (*Botaurus lentiginosus*) and great blue herons (*Ardea herodias*) are abundant. There are heron nesting rookeries in the Estuary Islands (Karlson Island), Price Island, and Hunting Island Units. Bitterns nest in fields in the Mainland and Tenasillahe Island Units. Julia Butler Hansen Refuge provides breeding habitat for relatively large numbers of Virginia rail (*Rallus limicola*) and some sora (*Porzana carolina*). The wet fields are used by hundreds to thousands of snipe (*Gallinago gallinago*) during their migration and in the winter.

Shorebirds forage and rest in mudflats, marshes and wet meadows. It is not unusual for upwards of 50,000 to be present during the peak of spring migration (usually April). Western sandpiper (*Calidris mauri*) and dunlin (*Calidris alpina*) are the most abundant species using the estuary. Other species include dowitcher (*Limnodromus scolopaceus* and *griseus*), yellowlegs (*Tringa melanoleuca* and *flavipes*), least sandpiper (*Calidris minutilla*), killdeer (*Charadrius vociferus*) and most others that migrate along the Pacific coast.

Virtually all neotropical migrant song birds that occur in the region use the refuges for nesting and foraging.

## THREATENED, ENDANGERED AND CANDIDATE SPECIES

There are 19 species found or potentially found on the refuges that are state and/or federally protected as threatened, endangered, or candidate species, including mammals, birds, fish and plants (Table 1).

**Columbian white-tailed deer** are distributed throughout the Julia Butler Hansen Refuge and some areas within Lewis and Clark NWR. Deer numbers vary annually due to a number of factors that affect the population. In 2001, there were an estimated 300 Columbian white-tailed deer at the refuge, with the largest numbers occurring on the Mainland and Tenasillahe Island Units. Small numbers of white-tails are found on the Estuary Islands (especially Welch and Karlson Islands) and Brownsmead Units of the Lewis and Clark NWR.

Trees and shrubs are critical for white-tailed deer survival because these cover types are an important source of food and thermal and hiding cover for the deer. The most important deer forage species are red-osier dogwood, Himalayan blackberry, California blackberry, cutleaf blackberry, grasses, various forbs, willow, Pacific ninebark, and black cottonwood. The Mainland and Tenasillahe Units already have a minimal amount of woody cover. If a significant wildfire destroyed trees and brush on those units, it would be detrimental to the deer's welfare.

**Northern (Stellar) sea lions** (*Eumetopias jubatus*) are a federal threatened species but are not listed under the Oregon Endangered Species Act. Northern sea lions may rarely venture into the Estuary Islands Unit while following runs of salmon and eulachon. Sea lions are unlikely to be affected by any fire activities.

Federal and state (Oregon and Washington) listed bird species that occur on the refuges include the **bald eagle**, **peregrine falcon**, **brown pelican** (*Pelecanus occidentalis*), **marbled murrelet** (*Brachyramphus marmoratus marmoratus*), and **Aleutian Canada goose**. Bald eagles are abundant within the estuary year-round. Numbers peak at approximately 150 during February and March. Thirteen eagle pairs nested within the refuge in 2001 and more than 30 pairs nested nearby. Refuge units with eagle nest sites are Estuary Islands (6 sites), Tongue Point (1 site), Emerald Heights (1 site), Hunting Island (2 sites), Tenasillahe Island (2 sites), Wallace Island (2 sites), and Price Island (1 site). Peregrine falcons use the refuges as they migrate through the area and some winter there. There are no peregrine nest sites within the refuges. Brown pelicans occasionally loaf and forage in the western end of the Estuary Islands Unit; however, most pelican use of the estuary occurs west of the refuges in Baker and Youngs Bays. There is no documentation of marbled murrelets nesting within the refuge; however, the Tongue Point Unit contains large trees in sufficient numbers and with adequate structure to provide suitable nesting habitat. Murrelets may nest there, at least in some years. Aleutian Canada geese are rare within the refuge. There have been a few sightings of Aleutians in mixed flocks of other Canada geese during the migration periods.

**Pileated woodpecker** (*Drycopus pileatus*), **purple martin** (*Progne subis*), **Vaux's swift** (*Chaetura vauxi*), and **streaked horned lark** (*Eremophila alpestris strigata*) are candidates for listing as a threatened species by the State of Washington. These birds utilize most or all refuge units, at least seasonally. Streaked horned lark are known to nest on sparsely covered sand up-river of Puget Island and may possibly nest on dredge spoil islands in the Estuary Islands Unit of the Lewis and Clark Refuge. Pileated woodpecker, purple martin, and Vaux's swift need large dead trees for nesting. A reduction of snags caused by wildfire would be detrimental to these species.

Several listed salmonids pass through the Estuary Islands Unit, both as adults migrating upstream and juveniles moving downstream. **Chinook** (Lower Columbia R., Upper Willamette R., Upper Columbia R., Snake River spring, summer and fall run), **Chum** (Columbia R.), **Sockeye** (Snake River), and **Steelhead** (Upper Columbia R., Snake R. Basin, Lower Columbia R., Upper Willamette R., and Middle Columbia

R.) are listed fish species that occur within the Lewis and Clark NWR. In addition, Lower Columbia River **Coho** (Lower Columbia R.) is a candidate species for listing. The intertidal mudflats and shallow water channels provide a rich foraging area for salmon smolts.

**Bull trout** (*Salvelinus confluentus*) are federally listed as threatened. They may be found in the mainstem Columbia.

Two federally listed plants, **Howellia** (*Howellia aquatilis*) and **Nelson's checker-mallow** (*Sidalcea nelsoniana*), are not known to occur on the refuges, however, the refuges have habitat types similar to those in which the plants do occur.

Table 1. Threatened, Endangered, and Candidate Species.					
Common Name Scientific Name		State Status†‡	Federal Status†	Habitat(s)	Refuge*/Unit
<b>Mammals</b>					
Columbian White-tailed Deer <i>Odocoileus virginianus leucurus</i>		E-WA	E	forest, field, marsh	JBH/all units LC/Estuary Is, Brownsmead
Steller Sea Lion <i>Eumetopias jubatus</i>		T-WA	T	river, sand bars	LC/Estuary Islands
<b>Birds</b>					
Bald Eagle <i>Haliaeetus leucocephalus</i>		T-WA T-OR	T	forest, field, marsh, river	JBH/all units LC/all units
Peregrine Falcon <i>Falco peregrinus</i>		E-WA E-OR		marsh, field	JBH/all units LC/all units
Brown Pelican <i>Pelecanus occidentalis</i>		E-WA E-OR	E	river, sand bars	LC/Estuary Islands
Marbled Murrelet <i>Brachyramphus marmoratus marmoratus</i>		T-WA T-OR	T	mature forest	LC/Tongue Pt, Emerald Hghts
Aleutian Canada Goose <i>Branta canadensis leucopareia</i>		T-WA E-OR		field, marsh	JBH/Mainland LC/Estuary Is., Brownsmead
Pileated Woodpecker <i>Dryocopus pileatus</i>		C-WA		forest	JBH/all units LC/Tongue Pt, Emerald Hghts
Purple Martin <i>Progne subis</i>		C-OR		field, marsh	JBH/all units LC/Estuary Islands
Vaux's Swift <i>Chaetura vauxi</i>		C-WA		mature forest, field, marsh	JBH/all units LC/Tongue Pt, Emerald Hghts
Streaked Horned Lark <i>Eremophila alpestris strigata</i>		C-WA	C	sparsely veg. dredge spoil isl.	LC/Estuary Islands
<b>Fishes</b>					
Chinook Salmon <i>Oncorhynchus tshawytscha</i>		C-WA T-OR	T,E	river, marsh	JBH/all units LC/Estuary Islands

Chum Salmon <i>Oncorhynchus keta</i>	C-WA C-OR	T	river, marsh	JBH/all units LC/Estuary Islands
Coho Salmon <i>Oncorhynchus kisutch</i>	E-OR	C	river, marsh	JBH/all units LC/Estuary Islands
Steelhead <i>Oncorhynchus mykiss</i>	C-OR C-WA	T,E	river, marsh	JBH/all units LC/Estuary Islands
Sockeye Salmon <i>Oncorhynchus nerka</i>	C-WA	E	river, marsh	JBH/all units LC/Estuary Islands
Bull Trout <i>Salvelinus confluentus</i>	C-OR C-WA	T	river	JBH/all units LC/Estuary Islands
<b>Plants</b>				
Howellia <i>Howellia aquatilis</i>		T	wetlands	not likely to occur
Nelson's Checker-mallow <i>Sidalcea nelsoniana</i>	T-OR	T	fields, roadsides	not likely to occur
† T = Threatened; E = Endangered; C = Candidate ‡ OR = Oregon; WA = Washington * JBH = Julia Butler Hansen Refuge for the Columbian White-tailed Deer; LC = Lewis and Clark NWR				

## CULTURAL RESOURCES

**Julia Butler Hansen.** A cultural resource overview and intensive survey of the Julia Butler Hansen Refuge was conducted in 1980 by faculty and staff of Eastern Washington University. Site-specific archaeological surveys have also been conducted by USFWS archaeologists for refuge construction projects on the Mainland and Tenasillahe Island Units. No cultural artifacts have been discovered.

The refuge does have some history of use by Native Americans. The refuge Mainland Unit may have been the site of two small Chinook Native American villages during the early 1800s; however, historical records are unclear about the exact locations. The villages may have been a mile or more east of the present location of the refuge. The sloughs that wind through the Mainland Unit were probably used for Chinook canoe burials. A Chinook village was located on the northeast shoreline of Tenasillahe Island during the 1860s. There were at least two commercial fishing stations on the east shoreline of the island during the same period. The entire refuge was subject to frequent flooding and sedimentation during the period of Chinook occupancy. Cultural artifacts were likely washed away or buried in the sediments.

The Mainland and Tenasillahe Island Units were diked during the 1920s and agriculture became their primary land use. Much of the land was converted to pastures for grazing dairy and beef cattle. Tenasillahe Island was the site of a dairy and cheese factory. All of the farm structures are now gone. The three farm buildings on the Mainland that remain from pre-refuge times are Quarters 36, the old Mainland shop, and the refuge office. The refuge office was extensively remodeled and expanded in 2000. All of these buildings are no more than 60 years old. No historical structures are currently located on the Julia Butler Hansen Refuge.

**Lewis and Clark.** No cultural sites are known to have existed on the Lewis and Clark NWR, since the Estuary Islands Unit is subject to daily tidal flooding and was not suitable for permanent human settlement. Tongue Point was unoccupied until the second world war, when it was used for storage of military artillery materials for the Tongue Point Naval Base. Inactive artillery bunkers are still present on

the Tongue Point Unit. The only known human use of the Emerald Heights Unit was logging. The Brownsmead Unit was a dairy farm in the mid-1900s. The remaining structures on the unit, two barns and a dairy wash room, are quite dilapidated and scheduled for demolition. No historical structures are currently located on the Lewis and Clark NWR.

No further information related to cultural resources was found in the refuge files, although more information may exist at the Regional Archaeologist's office in Portland, Oregon. A cultural resource clearance from a Service Archaeologist must be requested and approved prior to conducting any prescribed burns. A more thorough search of cultural resource data will be performed by a Service archeologist as part of the prescribed fire planning process. The cultural resources clearance request form required for submission to the Regional Archaeologist is located in Appendix E.

## **PHYSICAL RESOURCES**

### **Air Quality**

Areas that have experienced persistent air quality problems have been designated by the U.S. Environmental Protection Agency (EPA) as *non-attainment areas*. The federal Clean Air Act requires additional air pollution controls in these areas. Each non-attainment area is declared as such for a specific pollutant. Additional air pollution controls are required by the federal Clean Air Act to control emissions of problem pollutants. Non-attainment Areas that have a 10-year plan for meeting and maintaining air quality standards and other requirements of the Clean Air Act and that are shown by air quality monitoring to meet health-based air quality standards are redesignated as *maintenance areas*. No areas within either refuge are currently within a non-attainment or maintenance area.

### **Soils and Topography**

Soil on most of the Julia Butler Hansen Refuge is classified as Ocosta silty clay loam with less than 10% slope. It is an alluvial bottomland soil associated with the Columbia River floodplain. Fertility is moderately to high. This fertility coupled with high available moisture contributes to heavy vegetative growth. In the event of a wildfire, high fuel loads could be expected. A smaller soil component of the Julia Butler Hansen Refuge is termed Fluvaquents, tidal. This is a very deep but poorly drained soil type that is typical of soils found on floodplains and deltas. The slope type is 0% to 1% with an elevation of sea level to ten feet. No one single profile is representative of this soil type but one general characteristic is that it has a very dark olive gray very fine sand surface layer about 6 inches thick. Runoff is very slow in this soil type and it is subject to frequent periods of flooding during high tides. A third small soil type found on portions of the river islands are udipsamments, level. This is basically old dredge spoil sites that are well drained with an elevation of 10 to 30 feet and a slope of 0% to 2%. Vegetation on this soil type can vary from none to moderate grass cover and shrub cover.

Although no official soils mapping has been completed for Tenasillahe Island, a soil and water conservation plan completed in 1978 did identify certain soil types on the island. The soils identified were Clatsop silty clay loam, Coquille silt loam, Sauvies clay loam, tidal flats, Made land - pumped dikes and Unnamed silty clay loam. All of these soils are generally very poorly drained and were formed in fine textured alluvium consisting of "tidal mud." These soils with minimal slope are generally used for hay, pasture and wildlife habitat.

Soils on the Lewis and Clark NWR vary significantly depending on the site. At the Brownsmead Unit there are two soil types. One soil is termed Coquille-Clatsop Complex with a 0 to 1% slope. This soil complex generally has inadequate drainage, commonly floods and is susceptible to upper layer compaction. Major uses of the soil are for croplands and wildlife habitat. The second soil is termed Brallier mucky peat with a 0 to 1% slope, and elevation of 5 to 25 feet, with very dark greyish brown to dark brown mucky peat. It is a deep very poorly drained soil with moderate permeability with common

plants consisting of Sitka spruce, red alder, western red cedar, willow, salmonberry, skunkcabbage, sedges, rushes and Douglas spirea.

At the Tongue Point Unit the soil types consist of the Klootchie-Necanicum Complex and the Necanicum-Ascar Complex. The Klootchie-Necanicum Complex consists of 30 to 60 percent slopes, with a good drainage, moderate permeability and rapid runoff of precipitation while the Necanicum-Ascar Complex consists of 60 to 90 percent slopes, good drainage and moderate permeability and very rapid runoff.

On the Emerald Heights Unit two soil types are also present. The Templeton-Ecola silt loam has 30 to 60% slopes and is deep and well drained with moderate permeability with a severe erosion hazard. The major uses of this soil type which has a dark greyish brown coloration is for woodland management and for wildlife habitat. The second soil type is the Templeton silt loam which is basically the same soil minus the Eocla loam characteristics. The main difference is the reduced slope percentage which is from 3 to 30%.

Except for Tenasillahe Island, the soils of the Columbia River islands have not been classified but are they generally consist of a silty loam type of soil with poor drainage. Dredge spoil sites adjacent to some of the natural islands are well drained and generally consist mainly of sandy soils dredged from nearby river bottom sites.

#### **STRUCTURES, FACILITIES, AND ACCESSIBILITY**

Keys for access to refuge owned buildings and locks are stored at the refuge office and copies are issued to refuge employees as warranted. All locked road and field gates and gas storage tanks on the refuge can be opened with combination locks (see Refuge Manager for current combination). Door locks on the main office and its garage can be opened with the same door key. The mainland shop and office pump house each have separate door keys. The biologist's residence (Quarters 40) has a separate door key, as does the temporary quarters (Quarters 36).

Locked road gates exist on the Center Road and in the elk exclusion fence along Hwy 4 on the Mainland and are usually a minimum of 16 feet wide.

**Structures on private lands adjacent to the refuge are shown in the private land owner contact list in Appendix I.**

#### **Mainland Unit**

Refuge structures include the refuge office and garage, two residences (90 Steamboat Slough Road and 169 Brooks Slough Road), a large metal-sided barn that serves as a shop and storage building, and a wildlife viewing site along Highway 4 with a parking lot and kiosks. A new shop will be constructed in FY04 to the south side of Indian Jack slough southeast of the refuge headquarters. At the northwest end of the unit, there is a private residence and commercial flower greenhouse that are separated from the refuge by Steamboat Slough Road. Also at the northwest end, a 100-yard wide strip of privately owned Sitka spruce swamp and Brooks Slough Road separate the refuge from two residences and a commercial building in the town of Skamokawa. The diking district has a small structure with a 25HP pump located on the refuge at the Brooks Slough tidegate.

#### **Tenasillahe Island**

There is a dock along the Clifton channel and another along Multnomah (Red) Slough. There is a new maintenance area which includes a metal shop building and metal sided pole shed with wood framing approximately 300 yards inside the dike in the vicinity of the Clifton Dock Site. An older metal shop building adjacent to the Multnomah Slough Dock is scheduled for removal in the future.

### **Crims Island**

An old pole barn structure is located on this unit.

### **Wallace Island**

At the north end of Anunde Island, there is a private residence and a large building that serves as a commercial fishing station and net drying facility.

### **Westport**

There are not structures in the vicinity of this unit although rail tracks belonging to the Portland and Western Railroad run along the outside boundary of the unit adjacent to highway 30.

### **Brownsmead**

A dilapidated barn and the Brownsmead-Knappa Fire District storage building are located in the unit. An unoccupied barn and residence are located across the road.

### **Emerald Heights**

An apartment complex lies just to the west of this forested unit. The Emerald Heights unit has no existing roads within it. The ground is broken with many small drainages running through it and averages 25% slope. Only 40% of the area is accessible by tractor, due to its broken condition.

### **Tongue Point**

The south side of the unit is bordered by a Coast Guard Station and a Job Corps facility with numerous buildings, including residences, and several piers.

Tongue Point Unit has many old roads running through it that were once used to access the many munitions bunkers throughout the area. The cement bunkers are now empty but remain on-site. The main gravel road around the perimeter is navigable and not overgrown like the roads on the hill above it. Access to the main perimeter road is through two locked chain-linked fence gates. The keys to locks on these gates are controlled by the US Coast Guard at Tongue Point.

### **Estuary Islands**

There are thirty duck shacks, used primarily during waterfowl season within the designated boundaries of the Lewis and Clark NWR. The vast majority of these buildings are located in the water, on floats, 20-30 feet away from adjacent upland islands. Two of these structures, one on Marsh Island and one on Horseshoe Island, are located partially on uplands. All the duck shacks are licensed by the Oregon Department of State Lands however a memorandum of understanding (MOU) has been developed which gives the Service some measure of control over these structures. The two non-floating structure owners have been requested to move off of the uplands sites and are expected to do so in FY04.

### **PUBLIC USE**

**Julia Butler Hansen Refuge.** Public use is restricted to the Steamboat Slough Dike Road, the headquarters area, and seasonally to the Center Road on the mainland unit. Public use at the headquarters includes day use of the public parking lot, restroom, viewing deck and office reception area. Use on Steamboat Slough Road consists of wildlife viewing, fishing, walking, bike riding and photography although uses along the road are not regulated by the refuge since the road is owned by Wahkiakum County. Some camping does occur, both motor home and tent, on the beach shoreline across from the old maintenance shop building. This beach site, called "Hornstra Beach," is in private ownership and has been the site of numerous problems including beer parties, illegal fires, and trash dumping. The Center Road hiking trail is open from June through September to allow visitors to view wildlife outside of their vehicles. Because of disturbance issues with the deer and waterfowl, the remainder of the mainland unit is closed to the public. On Tenasillahe Island public use is restricted to the dike road surrounding the island with all areas interior to the road closed to public entry. The remainder of the Julia Butler Hansen

Refuge river islands, Price, Hunting, Wallace, and Crims and the Westport Unit are open to the public day-use for wildlife-oriented recreation, although activities are generally very limited due to the dense vegetative growth and occur only on the shorelines of these sites. Waterfowl hunting is permitted along the shorelines of both Wallace and Hunting Islands in accordance with state regulations.

**Lewis and Clark Refuge.** Wildlife-oriented public use is allowed on all lands within the Lewis and Clark Refuge except for the Brownsmead, Emerald Heights and Tongue Point areas. Due to the dense vegetation on many of the refuge islands, use is essentially restricted to shoreline locations. The refuge islands of the Columbia River estuary are accessible by boat only. Recreational activities include photography, wildlife observation, fishing, hunting and hiking. Because of the water conditions, access to the islands needs to be planned. Tidal flows and fluctuations, strong winds and wake from ships in the navigation channel can make boating difficult and sometimes dangerous. Deep channels separate most of this islands at high tide but tide tables and navigation charts need to be consulted to avoid grounding on sandbars.

## WILDLAND FIRE MANAGEMENT

### HISTORIC ROLE OF FIRE

#### Pre-settlement Fires

Natural wildland fires and significant fire events may have historically occurred in periods following several years of drought, when fuel conditions were exceptionally dry. High humidity, the level of precipitation and the low occurrence of lightning lead to few natural ignitions in the area. The natural fire return interval for forests types that occur in the area are estimated to range from 80 to 350 years. The high level of precipitation and the low occurrence of lightning lead to few natural ignitions in the area.

#### Post-settlement Fire History

Wildland fire history is very limited for both refuges. There are no know records of fires having occurred in the area prior to establishment of the refuge. However, it is not inconceivable that human-caused fires occurred more likely in the drier sites upriver near Longview rather than the wetter down river sites near Cathlamet or Astoria. The marsh-like habitats on and along the river bottom are less likely to carry fire due to their wetter conditions. Hillsides and slopes away from the river bottom would be more likely to burn due to their drier conditions and topography.

The most likely times for fires would be late summer to early fall, August through September or early October, when periodic offshore winds combine with low humidity and warm temperatures to create high fire danger. A second potential but less likely fire period would be in late winter, when grasses are cured and occasional offshore winds can produce low humidity.

Five wildland fires, all human-caused, are known to have occurred since establishment of both refuges (Table 2). Documented fire history was located in the refuge fire management files. Additional information came from the memory of the station's Wildlife Biologist who has been on-site since 1977, and the 1982 fire management plans for both refuges.

Table 2. Wildland Fire Summary for Julia Butler Hansen and Lewis & Clark NWRs, 1977 - 2003.

Year	Fire Name	Location	Acres	Cause
1987	Lindsey	JBH/Mainland Unit T9N,R6W,S21	0.60	Mowed hay fire accidentally started by permittee

1987	Hunt	JBH/Hunting Island T9N,R6W,S34	0.20	Escaped campfire
1988	Island	JBH/Tenasillahe Island Lat. 46.15E, Long. 123.28E	4.00	Arson (grass fire)
1991	Pillar Rock	Lewis & Clark/Pillar Rock Island Lat. 46.15E, Long. 123.35E	0.10	Abandoned warming fire
2003	Steamboat	Mainland Unit T9N,R8W,S21	0.25	Fireworks

### Prescribed Fire History

Prescribed burning on the refuge has been limited to debris pile burning and one prescribed fire which occurred in 1980.

Table 3. Prescribed Fire Summary for Julia Butler Hansen and Lewis & Clark NWRs, 1972 - 2003.

Year	Fire Type	Location	Acres	Other Information
1980	Prescribed Burn	JBH Mainland Unit Fields 25 and 35a.	60	Purpose was to remove excess canary grass and tall fescue. Fields were not hayed in 1979 so there was much residual vegetation.

Old annual narratives also discuss a planned prescribed burn on Tenasillahe Island. The burn was approved in 1988 with the goal of improving pasture conditions. Inadequate fuel loads postponed the burn in 1988 and the weather never cooperated for burning in 1989 and 1990. Apparently the burn was never completed, as narratives in later years did not include any discussion of prescribed burns at the refuge.

Although no records exist, there was likely some small brush or debris pile burning done in the refuge at least until 1997. Discussions with a former maintenance worker revealed that he had personally obtained county burn permits to burn piles of old wooden debris and grass during the later fall and winter in 1994, 1995 and 1996.

### RESPONSIBILITIES

Julia Butler Hansen and Lewis and Clark NWRs do not have a dedicated fire management position or organization. The Project Leader is responsible for planning and implementing the fire management program on the refuge. The Zone Prescribed Fire Specialist (PFS), located at Willamette Valley NWRC in Corvallis, OR, is responsible for the refuges' fire management program oversight. The Project Leader will assign collateral-duty fire management responsibilities to staff if they possess appropriate training, experience, and incident qualifications. Pre-suppression planning and work will be accomplished by refuge staff in accordance with national and regional fire management direction, under guidance from the Zone PFS. Emergency fire management actions will be handled by FWS staff, according to their training and incident qualifications, and interagency fire suppression cooperators, according to cooperative agreements. The Zone PFS will be immediately notified of all emergency actions. Additional information and direction is included in the Fire Dispatch Plan (Appendix G) and the Annual Operating Plans associated with cooperative agreements.

### Resource Advisor (RA)

The RA is a technical specialist appointed by the Agency Administrator and reports to the Incident Commander or designee to provide guidance for the protection of natural and cultural resource from suppression operations. The RA provides input to the Incident Commander in the development of fire suppression strategies and tactics to minimize or mitigate the expected impacts of 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 break locations and specifications
- \$ Structures and improvements in urban interface impact areas
- \$ Hazardous materials
- < Assists in developing fire maps and identification of areas of concern for fire management plans
- < Determines environmental restrictions commensurate with fire management plan resource protection in the fire area
- < Provides recommendations for fire suppression rehabilitation needs
- < Documents potential and actual suppression and fire related resource impacts and the rationale for the protection of priority areas
- < Provides resource information to local initial attack Incident Commander, dispatchers, or other fire personnel, during preseason training and planning meetings.

The refuge fire management responsibilities have been identified as follows:

### **Project Leader**

- < Is responsible for implementation of all refuge fire management activities within the Complex and will ensure compliance with Department, Service and refuge policies.
- < Selects the appropriate management responses to address wildland fires on the Complex.
- < Coordinates the Complex's programs to ensure personnel and equipment are made available and utilized for fire management activities, including fire suppression, prescribed burning and fire effects monitoring.
- < Ensures that the fire management program has adequate resources and access to the refuges when needed.
- < Ensures that Staff consider the fire management program during Refuge related planning and implementation. refuge related planning and implementation.
- < Approves prescribed burn plans for the refuge.

### **Deputy Project Leader**

- < Integrates biological objectives into fire management planning and implementation.
- < Conducts and coordinates fire management and environmental planning for fire related projects.

### **Refuge Manager**

- < For pre-suppression projects: identifies potential projects, informs the prescribed fire specialist of the projects and its constraints, and ensures that refuge resources are available to accomplish the projects.
- < Ensures specified fire-effects monitoring is implemented.
- < Acts as the primary refuge Resource Advisor or Resource Management Specialist during fire management planning and operations, to provide archeological and cultural resource protection input to the fire program, in absence of Regional archeological staff.
- < Develops and assists the PFS in completing Wildland Urban Interface and hazardous fuels treatment projects.
- < Drafts wildland fire Burned Area Emergency Stabilization and Rehabilitation Plans.
- < Is responsible for posting and enforcing fire restriction regulations.

### **Biologist**

- < Provides biological input for the fire program to the Fire Management Officer and PFS and determines the biological objectives of pre-suppression projects.
- < Acts as the primary refuge Resource Advisor or Resource Management Specialist during fire management planning and operations, to provide biological and natural resource input to the fire program.

- < Assists the PFS in design and implementation of fire-effects monitoring.
- < Participates, when qualified and as requested, in prescribed burning and wildland fire suppression.

**Zone Prescribed Fire Specialist**

- < Responsible for all fire related planning and implementation of the fire management plan for the refuge, including coordination and supervision of all prevention, pre-suppression, detection, wildland fire, prescribed fire, suppression, monitoring, and post-fire activities involving refuge lands.
- < Solicits fire program input from the Project Leader, Deputy Project Leader, Refuge Manager, and Biologist.
- < Supervises prescribed fire planning.
- < Plans, coordinates, and directs preparedness activities for the refuge, including fire training and nomination of personnel to receive fire training; physical fitness testing and Interagency Fire Qualification System data entry; fire cache and equipment inventory accountability, maintenance, and operation; and cooperative fire protection agency coordination.
- < Ensures fire management policies are observed.
- < Develops and coordinates rural fire assistance agreements (memorandums of understanding) and grants to effectively and efficiently provide fire protection services outside the Service's capabilities.
- < Coordinates with cooperative fire protection organizations to ensure adequate resources are available for fire operations when needed.
- < Develops and oversees Wildland Urban Interface and hazardous fuels treatment projects
- < Responsible for preparation of fire reports following the suppression of wildland fires and for prescribed burning projects requiring fire reports
- < Prepares an annual report detailing fire occurrences and pre-suppression activities undertaken in each calendar year. This report will serve as a post-year's fire management activities review, as well as to provide documentation for development of a comprehensive fire history record for the refuge.
- < Submits budget requests for fire funding and monitors FIREBASE funds.
- < Maintains records for all refuge personnel involved in suppression and pre-suppression activities, detailing the individual's qualifications and certifications for such activities.
- < When available, may serve as prescribed fire burn boss, propose prescribed fire projects.
- < Assists in preparation of a refuge fire prevention plan and coordinates fire prevention with other employees
- < Assists in updating the refuge fire management plan, maintains fire records, reviews fire reports (form DI-1202) for accuracy, and enters fire report data into Fire Management Information System

**Incident Commander (IC)**

The Incident Commander, at any level, uses strategies and tactics as directed by the Project Leader and the Wildland Fire Situation Analysis (WFSA) where applicable to implement selected objectives on a particular incident. A specific Limited Delegation of Authority (Appendix L) will be provided to each Incident Commander prior to assuming responsibility for an incident. Major duties of the Incident Commander are given in the National Wildfire Coordinating Group Fire Line Handbook, including:

- < Briefs, directs, and provides work tools for subordinates.
- < Ensures safety standards identified in the Fire Orders, the Watch Out Situations, and agency policies are followed at all times.

- < Personally scouts and communicates with others to be knowledgeable of fire conditions, fire weather, tactical progress, safety concerns and hazards, condition of personnel, and the need for additional resources.
- < Orders resources to implement the management objectives for the fire.
- < Informs appropriate dispatch of current situation and expected needs.
- < Coordinates mobilization and demobilization with dispatch.
- < Performs administrative duties, including approving work hours, completing fire reports for the command period, maintaining property accountability, providing or obtaining medical treatment, and evaluating performance of subordinates.
- < Assures aviation safety is maintained to the highest standards.

### **Initial Attack Teams**

Initial attack teams consist of experienced, qualified, red-carded firefighters, including those on their first fire. A Type 5 or Single Resource Boss is the basic requirement of leadership for an initial attack team. Teams will be prepared and equipped with hand and power tools as needed and will be dispatched with a day's supply of food and water, so they can continue work for 24 hours without additional support.

Employees participating in any wildland fire activity on Service or cooperator managed lands will meet fitness requirements established in PMS 310-1, except where Service-specific fitness requirements apply. Exceptions to fitness requirements on initial attack activity are available from the Regional Fire Management Coordinator per guidelines in Chapter 1.5 of the Fire Management Handbook (USFWS 2000).

### **INTERAGENCY OPERATIONS**

An interagency agreement, between the refuge and the Washington Department of Natural Resources (DNR), was first entered into in 1974, to provide fire protection on forested lands for an annual payment. In October 1998, the Master Cooperative Fire Protection Agreement was executed to improve fire protection efficiency among the cooperating state and federal agencies by facilitating the exchange of personnel, equipment, supplies, services, and funds (Appendix F). DNR continues to provide wildland fire protection for the Julia Butler Hansen Refuge while the Oregon Department of Forestry and rural fire departments provide protection for Westport, Brownsmead, Tongue Point and Emerald Heights portions of the Lewis and Clark Refuge. The islands of the Lewis and Clark Refuge and Julia Butler Hansen Refuge are also covered under this Master Cooperative Agreement, although time frames and specifics such as when and how to get fire crews and equipment to and from the islands have not been identified. Through this cooperative agreement, resources are made available to assist in initial attack efforts and the cost of providing fire protection services is reimbursed according to the agreement. The cooperative agreement provides details on items such as, payment among cooperators, a list of response areas, and radio communication frequencies. The Master Cooperative Fire Protection Agreement is reviewed and updated every five years.

Since structural fire fighting is not the functional responsibility of the Service, the Service will be negotiating a Memorandum of Understanding (MOU) with the Wahkiakum County Fire District # 2 (WCFD #2) (Appendix F) to allow the fire district to respond primarily to structure fires on the JBH Mainland Unit on a cost- reimbursable basis and under similar protocols as in the Master Cooperative Fire Protection Agreement. The MOU will also be reviewed and updated every 5 years. Response to wildland fires in the Mainland Unit may also be given by the WCFD #2 if the district has available resources and the fire is accessible with available equipment. DNR may also respond to wildfires in these areas.

On the four Oregon mainland Units that are not islands (Westport, Brownsmead, Tongue Point and Emerald Heights), the Service will be negotiating a Memorandum of Understanding with nearby rural fire districts (Appendix F) to allow them to assist with wildland fires if ODF is not able to respond. The

nearby districts are Westport-Wauna Rural Fire Protection District (WWRFPD); Brownsmead-Knappa-Svensen-Burnside Rural Fire Protection Department (BKSBRFPD); Tongue Point and Emerald Heights-Astoria Fire Department (AFD).

For the river islands other than Tenasillahe Island, the basic approach will be to let the water areas along the shoreline serve as fire breaks. Mop-up by qualified personnel would then be conducted by extinguishing any vegetation that is burning along the shoreline. This approach seems to be the most practical and is probably the best that can be hoped to be accomplished in most instances. Taking into consideration the detection and reporting time (the time it would take to assemble a crew and reach the island by boat and then the time to set up a portable pump and get a hose to the fire), in most cases the fire will have already gone out. In addition the thick vegetation on many of the islands would preclude any safe human access to areas other than those along the shoreline.

Because of the structural and habitat investments in Tenasillahe Island, interagency plans for control of wildland fires will be similar to the Mainland Unit. The Service will request the services of Oregon Department of Forestry (ODF) crews, which is covered under the Master Cooperative Fire Protection Agreement, to respond primarily to wildland fires and secondarily to structural fires if ODF has available resources. As with the other refuge islands, access is by boat only which limits the number of individuals as well as equipment that can be used to fight a wildland fire.

Julia Butler Hansen and Lewis and Clark NWRs will use the Incident Command System as a guide for fire line organization. Qualifications for individuals will adhere to the Department of the Interior Wildland Fire Qualifications and Certification System, which is part of the National Interagency Incident Management System and the National Wildland Fire Coordination Group Prescribed Fire Qualification Guide. Depending on fire complexity, some positions may be filled by the same person.

## **PROTECTION OF SENSITIVE RESOURCES**

### **Natural Resource Protection**

In order to insure adequate protection of sensitive natural resources from the effects of fire suppression activities the following actions will be taken:

- < Resource Advisor will be required to conduct fire suppression activities on any wildland fire for all refuge lands..
- < Minimum impact fire suppression tactics will be used to the fullest extent possible.
- < If new occurrences of state or federally threatened species are discovered during a wildfire, they will be marked and protected the same as those that are known on the refuge and the Resource Advisor will recommend suppression activity protection measures to the Incident Commander.
- < Resource Advisor approval is required prior to the using heavy equipment to construct *new* fire lines outside of agricultural areas, unless there is an imminent threat to human life and/or structures. When possible, the use of fire chemicals should be used to protect snags from burning.
- < Resource Advisor approval is required prior to the use of all fire chemicals on the refuge. To protect natural resources on the refuge from the harmful effects of fire chemicals, the following restrictions are to be applied:
  - § Fire chemicals will not be applied in or near shorelines, streams, seeps, ponds, marshes or surface water of any type, except to protect human life or property in imminent danger of wildfire. It is standard operating procedure in fire fighting operations not to mix, load or apply these chemicals near water.
  - § Fire chemicals will be cautiously and conservatively used in wildfires and prescribed fires, such as to protect very high value wildlife habitats (e.g. old-growth, large snags used for cavity nesters such as spotted owls and pileated woodpeckers) and to reinforce fire lines.

- § Fire-trol® fire retardant will not be used on the refuge due to its cyanide component and toxicity to aquatic organisms.
- § Silv-ex® and Phos-chek® wildland fire foams will not be used on the refuge, since they are more toxic to aquatic organisms than other types of fire foams. Other foam suppressant chemicals, may be used judiciously on the refuge.

**Cultural Resource Protection**

The Regional Archaeologist and/or his/her staff will work with fire staff, Project Leaders, and Incident Commanders to ensure that cultural resources are protected from fire and fire management activities. The “Request For Cultural Resource Compliance” form (Appendix E) will be used to inform the Regional Archaeologist of impending fire management 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 (36 CFR 800), the Archaeological Resources Protection Act of 1979, as amended, and the Archaeological and Historic Preservation Act of 1974. The NHPA Section 106 clearance will be followed for any fire management activity that may affect historic properties (cultural resources eligible to the National Register of Historic Places); although, no historic properties currently exist on the refuge.

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

The following actions will be taken to protect archaeological and cultural resources, during 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 archaeology staff for more detailed information on cultural resources existing in a particular area and protection advice.
- < Foam suppressant use will be minimized in areas known to harbor surface artifacts.
- < Mechanized equipment (e.g., dozers) 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 protected as necessary and reported to the Regional Archaeologist.
- < Fire rehabilitation plans will address cultural resources impacts and will be submitted to the Regional Archaeologist using the RCRC form.

During prescribed fires:

- < The Refuge Fire staff will submit a completed RCRC form to the Regional Archaeologist and/or his/her staff as soon as the burn area is identified ( i.e., as soon as feasible).
- < Upon receipt of the RCRC form, the Regional Archaeologist and/or his/her staff will be responsible for consulting with the Fire Management Officer 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 Julia Butler Hansen and Lewis and Clark NWR and includes fire prevention, preparedness, emergency preparedness, fire behavior predictions, fire detection, fire suppression, minimum impact suppression, minimum impact rehabilitation, and documentation.

All fires not classified as prescribed fires or debris pile burns are wildland fires and will be appropriately suppressed. DNR, ODF, WCFD #2, WWRFPD, KSBRFPD or AFD would be the first to respond to a wildland fire depending on the fire's location and available resources. DNR engines are stationed off of State Highway 4 approximately 1 mile east of Cathlamet, WA, and WCFD #2 engines are stationed in Skamokawa, WA. In Washington, the refuge is within DNR's Southwest Region that is managed from an office in Castle Rock, WA. In Oregon, the refuge is within ODF's Astoria Region for Clatsop County Units and ODF's Forest Grove region for Columbia County Units. Heavy equipment may also be available from the refuge. Equipment may include tractors with large discs and bulldozers. The appropriate County Sheriff Department (Wahkiakum, Clatsop or Columbia) will also be notified during wildfires or structure fires, as appropriate.

### **FIRE MANAGEMENT STRATEGIES**

Although resource impacts of suppression actions must always be considered in selecting a fire management strategy, appropriate suppression action will be taken to provide for firefighter and public safety first and protection of natural resources second. Critical protection areas, such as structures, facilities, sensitive species habitats, and adjacent private lands, will receive priority consideration in fire control planning efforts. However, the primary concern of fire suppression personnel at all times shall be safety. If needed, all individuals not involved in the suppression effort will be evacuated.

Suppression strategies should be applied so that equipment and tools used to meet the desired fire management objectives are those that create the least impact to 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 and must be approved by the Resource Advisor. Sites impacted by fire suppression activities or by the fire will be rehabilitated as necessary, based on an approved rehabilitation plan for each incident.

Specific fire management strategies for the refuge include those outlined in the Protection of Sensitive Resources section above and the following:

- § All wildland fires will be controlled using an appropriate suppression strategy which considers human safety, personal property, natural resources, and economics.
- § Mechanical treatment will be used to reduce hazardous fuels near structures, on the boundaries of the refuge where wildfires may threaten private land or structures, and land improvements, as needed.
- § Pile burning will be utilized to meet the ecological and fire management needs of the refuge.
- § Known cultural resource areas will be excluded from fire management activities, including fire line construction and fire chemical use.

### **PREPAREDNESS**

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

organization, including cooperators, ready to manage all fire situations likely to occur within the refuge. Preparedness efforts are to be accomplished outside the normal fire season dates from April 15 through October 15.

### **Historical Weather Analysis**

The Julia Butler Hansen and Lewis and Clark refuges are characterized by a mild coastal climate with annual precipitation averaging 45-115 inches. Precipitation occurs mostly in the form of rain during the months of October through April. June, July and August are normally the driest months of the year, averaging 2.4, 1.2, and 1.3 inches per month respectively. Average high and low temperatures during these months are 51.5 EF and 66.8 EF.

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 90<sup>th</sup> and 97<sup>th</sup> percentiles are defined as the points at which 90 and 97 percent of all BI's are less than or equal to this index for the time period calculated. When overlaid with historic fire occurrence, a relationship with fire weather can assist with more accurate preparedness planning.

The refuges' fire season established by DNR and ODF is from April 15 through October 15. Periodic dry summers and easterly winds can desiccate dead fuels and stress live vegetation resulting in a high risk of wildfire. Periods of high fire risk typically occur each year for several weeks in August and September, during which time fires are restricted locally by order of county or DNR or ODF fire officials. Fire danger ratings posted by the refuge will be consistent with those posted by neighboring agencies and cooperators.

No remote area weather stations (RAWS) that meet fire weather analysis standards are currently available in the southeast region of Washington. The closest RAWS is at Mount Abernathy, in Lewis County. Consequently, fire weather data will be collected through the Pacific Northwest Coordination Center intelligence web page for the refuge, or a portable RAWS will be put in place if needed for more site-specific weather data during a wildland fire incident.

### **Fire Prevention**

An active fire prevention program will be conducted as needed and in conjunction with other agencies, to provide for the protection of human life and property, wildlife habitats, and physical facilities.

Although wildfires on the refuges are infrequent, most can be easily prevented through simple fire prevention methods such as education, visitor contacts, posted notices, handouts and interpretive displays or programs used to increase visitor awareness of fire hazards.

During periods of extreme or prolonged fire danger emergency restrictions regarding refuge operations, forest management activities or area closures may become necessary. Such restrictions, when imposed, will be consistent with those implemented by DNR, ODF and local counties and will be authorized by the Project Leader when initiated by the refuges.

### **Hazard Fuel Reduction and Structure Protection**

Burnable structures are present at the refuge headquarters, along Steamboat Slough and Brooks Slough Roads and at the shop yard on Tenasillahe Island. Hazard reduction is conducted to prevent wildland

fires from spreading onto structures owned by the USFWS and private landowners. Most structures do not have roads which encircle them to provide sufficient fire breaks; therefore vegetation around structures will be periodically removed, reduced or kept green. Vegetation found around buildings consists of grass, ornamental shrubs, coniferous trees and ornamental trees. If a fire ignites in these areas, a four foot firebreak is generally sufficient to halt fire spread. To minimize the chance of a wildland fire destroying government owned structures, during the spring and summer firebreaks are mowed around structures. Additionally, herbicides and manual thinning are used on these areas to limit fuel build-up. Residential and office lawns are kept mowed and green all year.

A memorandum of understanding to cover structural fire protection for refuge structures will be sought through the fire districts involved. At a minimum, obtaining structural fire protection for occupied structures, such as the headquarters office, garage, maintenance shop, Quarters 36 and Quarters 40, will be a priority. A draft memorandum of understanding will be developed with WCFD#2 (Appendix F) for the protection of these structures. Because Tenasillahe Island lies in the middle of the Columbia River, limited opportunities for qualified fire protection exists. A floating pump is stored in the Tenasillahe Island shop and available for use by qualified firefighters. Fortunately both the shop building and pole barn on the island are metal-sided, reducing the likelihood of structural fires.

The majority of lands adjacent to the refuges are utilized for agricultural, timber production, residential or recreational purposes. There are several scattered homes and structures on lands adjacent to refuge tracts. A list of land owners that have structures adjacent to the refuge is located in Appendix I and will be updated annually. Roads, rivers, and other land features provide buffers between the refuge and some privately owned structures adjacent to the refuge, as is the case in the mainland, Tenasillahe Island, Wallace Island, and Lewis and Clark Island Units. Other areas such as the Brownsmead, Emerald Heights, Tongue Point, Westport and Crims Island Units have no major fire breaks between refuge lands and adjacent private property.

### **Staffing Priority Levels**

Julia Butler Hansen and Lewis and Clark NWR has no permanent fire staff and does not have a complicated fire prevention program; therefore 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 certain field work. Fire data processing will be done by the PFS and Regional Office fire staff, as needed.

Fire staff limitations on the refuge require that all severity augmentation of staff come from repositioning personnel and equipment to the refuge. All severity actions will follow USFWS Fire Management Handbook direction for wildland fire preparedness in Section 3.1, which gives guidance on when severity action, such as refuge closure/evaluation, 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. Julia Butler Hansen and Lewis and Clark NWRs will conform strictly to the requirements of the wildland fire management qualification and certification system and USFWS guidelines.

Basic wildland fire training refreshers are offered annually for red-carded firefighters and training records are kept in a centralized database. Additional training is available from surrounding agencies in pump and engine operation, power saws, firefighter safety, fire weather and fire behavior, helicopter safety and prescribed fire objectives and activities. On-the-job training is encouraged and will be conducted at the field level. Whenever appropriate, the use of fire qualification task books will be used to document fire

experience of trainees. The Fire Management Officer will coordinate fire training needs with those of other nearby refuges, cooperating agencies, and the RO.

The refuges support the development of individual Incident Command System (ICS) overhead personnel from among qualified and experienced refuge staff for assignment to overhead teams at the local, regional, and national level.

Because fire suppression is an arduous duty and personnel on pile burning duty may be required to shift from implementation and monitoring activities to suppression. Personnel performing fire management duties will maintain a high level of physical fitness. Poor physical condition of crew members can endanger safety and lives during critical situations. This requires successful completion of a fitness pack test. Personnel must complete a three mile hike with a 45 pound pack in less than 45 minutes to qualify for arduous duty. Annual refresher courses are mandatory for all fire qualified personnel and are either completed in-house or in cooperation with other federal and state agencies.

### **Supplies and Equipment**

Julia Butler Hansen and Lewis and Clark NWRs will maintain a three-person fire cache in the mainland maintenance shop and a small cache of fire suppression supplies suitable for initial attack at the Tenasillahe Island shop. The Refuge Manager will be responsible for annually ensuring fire cache equipment and supplies are properly maintained, stored, inventoried, replaced and available for a minimum of a three-person initial attack crew (the Normal Unit Strength or NUS of the refuge). A list of refuge fire equipment (the NUS list) can be found in Appendix J. All NUS items are not to be used for routine refuge operations; therefore items should be stored in a sealed or locked storage area.

Personnel qualified for fire assignments are responsible for maintaining their own personal protection equipment in a state of fire readiness.

Additional equipment and supplies are available through cooperators and the regional and interagency cache systems, and would be ordered through the DNR dispatch office. Requests for additional personnel and equipment are made through the servicing DNR dispatch office for the area.

### **WILDLAND FIRE DETECTION**

Wildland fires on the refuge are generally caused by an escaped or carelessly set recreational use fire, such as a campfire or beach bonfires. Often fires are detected by a refuge visitor or neighboring land owner and reported to the local fire department through the 911 emergency response system, reported to the Washington DNR fire report hotline (1-800-562-6010) or Oregon Department of Forestry (see dispatch plan (Appendix G) for appropriate phone number). Occasionally fires have been detected by refuge personnel working in or patrolling the area.

Fires are generally reported to the refuge office, through organizations on the fire contact list, or by emergency personnel. At present, most fires would be reported to the county, who would then notify refuge personnel. Refuge staff are currently working to improve communication with the local fire departments and DNR in notification of suppression actions on refuge lands.

Fire detection includes a determination of the fire's cause. Moreover, human-caused fires 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 communication systems include a digital radio system, cell phones and personal computers. The radio system includes base stations at the Julia Butler Hansen and Lewis and Clark office, six portable

radios at Julia Butler Hansen and Lewis and Clark NWR, and mobile radios in most boats and vehicles. Joel David, the Refuge Manager at JBH Refuge, is the radio communications officer and programmer for the Complex. Four cellular phones are used on the refuge with limited coverage and ability to reach the refuge office. Three long distance land-based phone lines, a fax machine, and two portable marine VHF radios are available at the refuge office. Marine VHF radios are also aboard some boats. Email and internet communication is available through a DSL connection servicing 4 personal computers at the Julia Butler Hansen and Lewis and Clark headquarters office. The computers are not networked.

Immediate emergency notifications and contacts can be found in the Fire Dispatch Plan (Appendix G). During emergency fire operations, mutually agreed upon command and tactical radio channels will be used. Radio frequencies, call signs and use information are located in Appendix H.

### **PRE-ATTACK PLAN**

Upon discovery of a fire, actions will include the following:

- § The Incident Commander (IC) will locate, size-up, and coordinate suppression actions. The IC will complete the pre-attack planning checklist.
- § Provide for public safety.
- § Considering the current and predicted fire conditions, the Incident Commander will assess the need for additional suppression resources and estimate the final size of the fire. The potential for spread outside of the refuge should be predicted, as well as the total suppression force required to initiate effective containment action at the beginning of each burning period.
- § The Incident Commander will assess the need for law enforcement personnel for traffic control, investigations, evacuations, etc. and make the request to the Fire Management Officer.
- § Document decisions and complete the fire report (DI-1202).
- § Should a wildland fire move into an extended attack, a Delegation of Authority will be invoked to transfer authority for suppression actions between incident management levels. Once a Delegation of Authority has been executed the Incident Commander will make the final decisions pertaining to the fire. The Delegation of Authority form is located in Appendix L.

### **FIRE MANAGEMENT UNITS**

Fire Management Units (FMUs) are areas on a refuge which have common wildland fire management objectives and strategies, are manageable units for wildland fire suppression, and have boundaries that are often based on natural or manmade fuel breaks. FMUs may sometimes coincide with prescribed fire burn blocks or treatment areas or units. On small refuges with similar land types and resources the whole refuge may be treated as a single FMU.

Due to limited staff, the relatively small size of land management parcels, long response times, high resource values, and the resources at risk on neighboring lands, this plan does not recommend that wildland fire be managed solely for resource benefits on any of the fire management units. Therefore, all wildland fires will be suppressed using the appropriate suppression response. Pile burning, will be used to reduce hazardous fuels and to meet resource management objectives.

*There are two FMUs identified on the Julia Butler Hansen and Lewis and Clark NWR . All wildland fires will be suppressed in both FMUs. FMU #1 encompasses the mainland areas both Oregon and Washington, including the Mainland, Westport, Tongue Point, Emerald Heights, and Brownsmead Units. These areas are relatively easily accessible with vehicle access to the majority of sites. Because there are adjacent landowners in this FMU, there is some potential for a fire to move onto adjacent lands. FMU #2 consists of the islands in the Columbia River for both refuges, including the Hunting Island, Price Island, Tenasillahe Island, Wallace Island, Crims Island, and Estuary Islands Units. Because watercraft are required to reach the islands and there is no equipment, vehicles, and pumps, except for Tenasillahe Island, access to these sites are problematic. Water is an especially dominant influence in this FMU with*

regard to fire. The river which surrounds these island make it essentially impossible that a fire would escape beyond the boundaries of the island. Also, much of the habitat is periodically inundated by tides and seasonal fluctuations of the Columbia River.

Upon discovery, wildfire in the FMUs will be monitored by all available refuge firefighters. Refuge firefighters are allowed to perform fire suppression activities to the level of their training and ability; Therefore, qualified refuge personnel may perform initial attack. County fire districts, the Washington Department of Natural Resources or the Oregon Department of Forestry will likely initiate suppression efforts, once the fire is reported to one of these fire management organizations.

A Resource Advisor will be immediately requested for any fire occurring on the refuges. The Resource Advisor should be notified of any cultural resources or federally protected species discovered as a result of suppression actions.

### **Fuel Types**

Fuel types on the refuge include: freshwater marsh, managed pastures, unmanaged pastures, Sitka spruce forest, western hemlock/Sitka Spruce forests, cottonwood forests, willow/shrub community, dredge spoil and developed land containing structures (Table 4). Fuel types were generated from vegetation type descriptions, older fuel maps, and aerial photos. There is no accurate data on the acreages of these fuel models on the refuges.

Freshwater marsh is found in portions of the Mainland Unit, Tenasillahe Island, and throughout the estuary islands unit. Freshwater marsh areas are subject to burning only in late summer and early fall (August – October) when the marsh has been drained and the vegetation is dry. A marsh burn would likely be spotty in nature and depend on the plant moisture in a specific area. The Mainland Unit and Tenasillahe Island wetlands contain a variety of grasses, forbs, shrubs and wetland plants, including twinberry honeysuckle, western dock, American skunk cabbage, Pacific water-parsley, silverweed, starwort spp, broadleaf cattail, common lady fern, sweet vernal grass, slough sedge, colonial bentgrass, orchardgrass, meadow foxtail, and spikerush. Areas with deeper water and better drainage in the wetlands support sedges, water knotweed, annual wildrice, and pondweeds. The dikes and raised areas adjacent to the marshes contain Himalayan blackberry, salmonberry, Pacific crab apple, red elderberry, western red alder, willow species and various grasses and forbs.

<b>Fuel Type</b>	<b>Fuel Model</b>
Sitka Spruce Forest	10
Western Hemlock / Sitka Spruce Forest	8
Cottonwood Forest	9
Willow / Shrub Community	5
Managed Pastures	1
Unmanaged Pastures	3
Freshwater Marsh	3
Dredge Spoil	1
Open Water	–

Administrative Sites	—
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Both managed pastures and unmanaged pastures are found on the Mainland, Browsmead and Tenasillahe Island Units. Unmanaged pastures are also located on a large portion of Crims Island. Managed pastures are composed of various grasses and forbs. All managed pastures on the refuge are either grazed or hayed in summer and fall; therefore, the vegetation in them is usually short (less than 5 inches) during the late summer dry period. Managed pastures contain a mixture of reed canarygrass, orchard grass, ryegrass, colonial bentgrass, white clover, common velvetgrass, and vetch spp, as well as a significant amount of common rush, also called tussock. Unmanaged pastures are composed mainly of reed canary grass. This heavy grass cover excludes most other vegetative types including other grasses, clovers, and brush species. Fires are possible in this cover type only during low humidity, high wind events. During most of the year, high humidity combined with high moisture content of the plant make fires unlikely.

The willow/shrub community covers much of the lower river islands as well as portions of some upriver islands and the Oregon mainland. This habitat type can be very dense with limited grass understory. The main species in these locations are pacific willow, red-osier dogwood, and rose. This vegetation type tends to be more of a young to middle successional stage which can be strongly affected by river flooding, which inhibit succession to a mature Sitka spruce forest. Fire potential is very low in this community due to frequent tidal inundation and high humidity.

Sitka spruce forests are found in various smaller patches, including Hunting Island and Price Island, as well as portions some upriver sites in the Estuary Unit. Larger Sitka spruce and some western redcedar are the dominant species in this fuel type with an understory of willows, shrubs, forbs, ferns and mosses. This vegetation type is considered the late-successional habitat in the lower Columbia River estuary river basin.

From the mainland upriver are the main late-successional cottonwood forested sites. Rainfall and temperature changes in the vicinity of the Mainland Unit most likely result in a changeover from spruce to cottonwood-dominated forests. This fuel type consists mostly of mature black cottonwood with interspersed grasses, willows and dogwood.

Western hemlock/Sitka Spruce dominated forests occur only in the Tongue Point and Emerald Heights Units. These areas are along the river edge and tend to have steep slopes and undulating topography. The Tongue Point Unit is covered in a mixed stand of western hemlock, Sitka spruce and western red alder, with lesser amounts of Douglas-fir and bigleaf maple. A significant amount of old-growth Douglas-fir is located mainly along the steep west side of the unit and along the ridge top. The remaining conifers average about 100 years old, while some conifers and most of the hardwoods average 44 years old. The old growth conifers have a significant amount of rot, mistletoe and other defects. The Emerald Heights Unit is predominantly 120 year old western hemlock with a minor amount of Sitka spruce. A small amount of 65 year old western hemlock, Sitka spruce, Douglas-fir, and western red alder is found in the southwest portion of the unit. The conifers contain a heavy amount of mistletoe and butt rot, as well as structural defects.

Dredge spoil sites are those areas where the river bottom has been dredged up and deposited adjacent to refuge islands. Over time these spoil sites revegetate first with grasses, and then with willows, noxious scotch broom and cottonwoods. Because of the good drainage on these sites the vegetation tends to dry out much quicker than adjacent island habitat types. The dry vegetation, especially grass understory, makes these locations fairly susceptible to wildland fires.

Refuge wetlands and sloughs, open water, paved roads and parking lots, and administrative areas are the only areas on the refuge which do not contain burnable fuels. Fire breaks around the office, residences, and shops are mowed during the summer to reduce fuels and minimize the chances that a fire would spread to the buildings. Dikes are mowed to improve driving conditions, maintain the structure and reduce the risk of fires from vehicle hot engine parts and farm equipment.

### **Fire Behavior**

Grass fuels in pastures will likely burn quickly until the fire reaches a ditch or moist wetland. Grass fires in managed pastures are not expected to produce tall flame lengths, since the grass is usually short during the fire season. Pastures that have not been grazed, mowed, or hayed could have tall grass that would burn rapidly, producing tall flame lengths. The growth stage of the grass, whether the grass is actively growing or cured, would also effect potential fire behavior. A few small, scattered areas of Scotch broom would burn hot and more rapidly than grass and other shrubs in the area, since Scotch broom foliage is highly volatile.

Freshwater marsh vegetation does not burn easily, but if ignited will burn less rapidly and more unevenly than pastures. Vegetation in dry elevated areas will burn more readily than lower moist areas in the marsh and will contain longer burning fuels in the form of shrubs and some trees.

The hemlock-spruce forest areas have a variety of fuel conditions, irregular topography and occasional natural and man-made fire breaks that will influence fire behavior. Typically, fires in unlogged forested areas burn slowly and unevenly on the ground. Fire is generally carried in the surface fuels composed of litter cast by the shrubs, grasses and forbs in the understory. Shrub fires in this area are generally not intense because surface fuel loads are light, many shrubs are evergreen and the native forest shrub species do not have volatile foliage. During severe fire conditions in areas with logging slash or wind throw and dry fine fuels, intense crown fires can develop and progress. These crown fires can be very intense, fueled by large amounts of long-burning fuels on the ground and in the canopy.

### **Fire Effects**

#### ***Vegetation***

Wildland fires are most likely to occur in areas traversed and used by the public, which are primarily the pastures along Steamboat Slough Road in the Mainland Unit, on dredge spoil islands in the river and along the dike road on the Tenasillahe Island Unit. Other less likely areas to have wildland fires are along shorelines of natural river islands. The effects of fires in areas that are likely to have unplanned burns are described below.

Managed pastures in the Mainland and Tenasillahe Island Units are primarily perennial grasses and forbs that are grazed and mowed in early summer and fall. The vegetation is generally short during the fire season. Fire in these pastures would not be harmful to the vegetation in the long term. Vegetation in riparian areas would remain somewhat protected from fire due to moist soil conditions. Unmanaged pastures in these same areas could burn hotter with the increase in the amount of available fuel. However, as in the managed pastures, there would be no long term harm to the vegetation from a fire in this fuel type.

Vegetated dredge spoil islands with cured perennial grasses would likely burn quickly but the vegetation would quickly recover. On areas with interspersed willows or cottonwoods, there may be some temporary setbacks to the succession of the site. Hot burning fires would tend to kill back the noxious scotch broom.

The long fire interval of western hemlock-Sitka spruce forest is indicative of the role fire plays in the ecology of these tree species. Western hemlock has a low degree of fire resistance. It grows in dense

stands and often has lichen-covered branches, which increases its susceptibility to fire damage. Sitka spruce is very susceptible to fire damage due to its thin bark and shallow root system. Western redcedar fire resistance is low to moderate because of its thin bark, shallow root system, low dense branching habit, and highly flammable foliage; however, older trees often survive an infrequent wildfire because of their large size and relatively thick bark. Small to medium height conifers in the stand understory can provide ladder fuels for the fire to reach the tree crowns. Large crown fires are not typical but can be produced under severe drought conditions.

Mature Sitka spruce forests are more protected from stand-replacing crown fires than younger forest of this type; since the trees are very large with fewer lower limbs, the trees are less dense than younger stands, and the understory is less dense and more uneven. The higher density of snags and dead-topped trees in mature forests make it more susceptible to spot fires. The higher density of large downed wood from natural stand thinning and dead trees provides more long-burning fuel at the ground level. A large stand-replacement fire in the old-growth is very unlikely but could occur under unusual weather and fuel conditions.

Red alder is somewhat fire resistant. Red alder bark is thin but will protect the trees from light surface fires. The foliage and litter do not carry fire well. Red alder stands grow on moist sites and do not burn frequently or easily. Red alder can also regenerate easily from seed or suckers following a fire.

Salal, blackberry and salmonberry are all fire resilient. These shrubs are easily top-killed by fire, but regenerate vegetatively from extensive roots and rhizomes. They also quickly establish and re-establish in burned areas and other disturbed sites by either vegetative means and/or stored seed.

## ***Wildlife***

Fire effects on wildlife are variable depending on the vegetation type and the behavior and intensity of the fire. Direct mortality is generally less significant than the effects of habitat changes resulting from the fire. Some species benefit from increased food supplies while others are harmed by changes in vegetation, increased erosion, etc. Fires in grassland, brush, or forest understory generally have less dramatic effects on wildlife populations than forest stand-replacing fires, which are likely to cause major changes in wildlife communities, with some species increasing and others decreasing or even disappearing from the burned area.

Fires usually cause little direct mortality to animals, except during the spring and early summer when mortality of young may be severe. In coastal Washington, fires are rare during the spring and early summer because of the high rainfall and moisture laden pacific air. Adults of large mammals and birds move to avoid the fire, while small mammals, amphibians, and reptiles find refuge underground or in streams. The following discussion will focus on the effects of fire-induced habitat changes.

Grass and Brush Fires. These fires tend to be stand-replacing, i.e., virtually all of the above-ground vegetation is killed and often consumed. Grass fires generally have either no or short-lived effects on wildlife populations because the habitat replaces itself so quickly. There may be a temporary shift in bird communities, but only fires that are very large and/or repeated at short intervals are likely to have a significant impact on any single species. Grassland bird communities often return to pre-burn status within three years following a fire.

Large mammals typically show either a neutral or a positive response to grass fires. Ungulates may be attracted to burned sites where they graze on the new growth of nutritious grasses and forbs. Large predators such as mountain lions follow. Small mammals show a mixed response. Species such as deer mice (*Peromyscus maniculatus*) and ground squirrels often increase following a burn, while voles decrease.

There is little information available on the effects of grass fires on reptiles and amphibians. Presumably, the effects are minor. Marsh fires may increase the amount of open water and enhance vegetative structure preferred by reptiles and amphibians.

Fish are unlikely to be affected by grass fires at Julia Butler Hansen and Lewis and Clark Refuges, because the fires would be relatively small and not result in erosion or excessive nutrient loading of water bodies.

Grass fires could occur in several refuge units, but the greatest potential for a large fire is at the Mainland Unit because of the many acres of dense reed canarygrass, considerable public use, dry summer weather, and typically strong winds. Columbian white-tailed deer would likely not be harmed by grass fires as they could easily move to safer ground. Ground-dwelling birds that nest in shrubs, such as savannah sparrows, would probably decline for a time.

Grass fires could also occur in other refuge units, including Tenasillahe Island and Crims Island. These fires would likely be small (<20 acres) and have minimal effects on wildlife. Fires in the marsh units at the mainland and Tenasillahe Island would probably be irregular and spotty in nature and could benefit waterfowl and amphibians by enhancing the interspersed water and vegetation, as well as reducing undesirable plant species.

Brush fires can have significant effects on bird communities. Shrub-nesting species would lose their nest sites unless unburned patches remained. Ground-nesting species would probably increase in the years following the fire. The effects of brush fires are prolonged because it may require ten years or more for

the vegetative structure to be restored. Shrub/scrub habitat is limited in extent at Julia Butler Hansen and Lewis and Clark, thus any brush fires are likely to be small and of little consequence to wildlife.

Forest Understory Fires. Understory fires burn surface fuels, brush, and small trees beneath the main forest canopy. These fires (or fires of any type) are uncommon in the hemlock-redcedar-Sitka spruce forests of western Washington and Oregon, thus the interval between burns is long. Understory fires are often patchy in nature because of the uneven distribution of surface fuels and brush. This patchiness reduces impacts to wildlife because islands of unburned habitat remain throughout the fire site.

Infrequent understory fires may cause major changes in bird communities. Shrub dwelling species such as hermit thrush (*Catharus guttatus*) and Hammond's flycatcher (*Empidonax hammondi*) may decline significantly. Woodpeckers may increase in response to greater abundance of wood boring insects in fire-killed understory trees. However, these changes will not occur if substantial patches of unburned habitat remain. Canopy dwelling birds are generally not affected by understory fires.

Large mammals tend to be unaffected by understory fires. Ungulates shift their range temporarily, but return when grasses and forbs sprout. Small mammals, such as shrews, decline if the litter and duff on the forest floor is burned away

Terrestrial amphibians and reptiles in forests are associated with woody debris and duff on the forest floor. Understory fires that consume much of the debris would have a negative effect on species such as western red-backed, Dunn's, Van Dyke's and northwestern salamanders, although the effect would be minor if the fire were sufficiently patchy. The more aquatic species such as tailed frogs (*Ascaphus truei*) and Columbia torrent and Cope's giant salamanders would be little affected unless large amounts of ash washed into streams.

The effects of understory fires on fish are not well documented. Presumably, there would be little direct effect because the fire would not be intense enough to overheat the water in small streams. Abrupt changes in water chemistry due to ash deposition are unlikely. Indirect effects such as increased erosion and warming due to loss of riparian cover could occur, although to a lesser extent than would be the case with stand-replacing fires. Increased stream temperature and sedimentation would negatively impact fish eggs and fry.

Forest Stand-Replacing Fires. The fire history of the Julia Butler Hansen and Lewis and Clark NWR is very limited, although given the right conditions it is not inconceivable that there has been infrequent (fire interval of several centuries) stand-replacing forest fires. Crown fires carry readily through dense stands of western hemlock. Julia Butler Hansen and Lewis and Clark NWR units with sensitive resources that are vulnerable to stand-replacing fire include the Tongue Point and Emerald Heights units, forested areas in the mainland and Tenasillahe Island units and much of the Hunting, Price and Wallace Islands units.

Large stand-replacing fires cause major changes in habitats and bird communities. Many of the species present before the fire will be replaced by new species. In general, bark probing insect eaters, raptors, aerial insectivores, ground dwellers, and birds of open spaces will increase; and canopy dwellers and birds that reside in old growth forests with abundant understory will decrease.

The fire-killed trees are attractive to a host of wood boring insects, which in turn attract woodpeckers, swallows, nighthawks, and other birds. Over time, cavities develop in the burned trees and provide nest sites for species such as western bluebirds (*Sialia mexicana*), tree (*Tachycineta bicolor*) and violet-green swallows (*T. thalassina*), wood ducks (*Aix sponsa*), and northern flickers (*Colaptes auratus*). On the other hand, species that utilize the canopy and/or understory will be greatly reduced or even eliminated. Examples include golden-crowned kinglet (*Regulus satrapa*), western tanager (*Piranga ludoviciana*),

yellow-rumped warbler (*Dendroica coronata*), red-breasted nuthatch (*Sitta canadensis*), hermit thrush, Swainson's thrush and Hammond's flycatcher.

Large mammals may avoid the burned area for a time. By the first spring after the fire, deer and elk will be attracted to the lush growth of grasses and forbs in newly shade-free areas. Predators such as mountain lions and coyotes will follow. The emergence of berry-producing shrubs within a few years will create excellent black bear habitat as well as a food resource for beavers.

Small mammals exhibit a varied response to stand replacing fires. Major population declines would be expected for snowshoe hares, chickarees (*Tamiasciurus douglasi*), and northern flying squirrels (*Glaucomys sabrinus*); also shrews if most of the litter and duff on the forest floor has burned. Species that would benefit from the change from arboreal to ground vegetation include deer mice and Townsend chipmunks (*Eutamias townsendi*). We are not aware of studies of the effects on bats of forest stand-replacing fires. At least some species would probably increase in response to the abundant insects associated with the fire-killed wood, although other species may not prefer the open terrain and thus may leave the area.

Amphibians would respond in either a neutral or negative manner, depending on the species and the severity of the burn. As previously discussed, terrestrial salamanders would decrease if a substantial portion of the duff and debris on the forest floor were burned away. A stand-replacing fire would have potential to adversely affect the more aquatic amphibians, including tailed frogs and torrent salamanders, as well. A very intense fire could heat small water bodies to temperatures that are lethal for eggs and larvae. The loss of overhead shade would result in higher summer stream temperatures, perhaps above the maximum tolerable for aquatic amphibians, for several years following the fire.

The impacts of large fires on fish is a relatively new area of research and few results have been published. As was the case with amphibians, increases in water temperature either by direct heating or removal of shade could kill eggs and fry. Detrimental changes in pH and other chemical attributes of the water could result from large amounts of ash washing in.

Forest Mixed Severity Fires. Mixed severity fires typically alternate between understory and stand-replacement with some unburned areas, leaving a patchwork of vegetative structure. The effects on wildlife are a mix of the effects discussed for understory and stand-replacing fires and depend on the extent of each fire type and the distribution of remaining vegetation. Generally, mixed severity fires have the least impact on wildlife populations, because a mixture of pre-fire habitats remains. A large forest fire at Julia Butler Hansen and Lewis and Clark NWR is likely to be a mixed severity fire.

Effects of suppression activities on threatened species are explained in the Section 7 Biological Evaluation in Appendix D.

## **SUPPRESSION TACTICS**

Suppression involves a wide range of possible tactics from the initial attack to final control. All wildland fires will be suppressed. Suppression actions will be conducted in a safe, aggressive, efficient and cost-effective manner to quickly control the fire with minimal resource damage and limited smoke impacts to local communities.

The Incident Commander is responsible for directing suppression actions to be carried out through orders from the Fire Management Officer. The Incident Commander will keep the Project Leader informed of suppression actions. In addition to consulting with the Project Leader or his/her representative, a Resource Advisor should be assigned to the incident from the beginning to document rehabilitation needs and assist with on-the-ground tactical decisions.

Typical initial attacks initiated by the fire suppression personnel will include a fire crew supplied with hand tools. The objective of initial attack is to prevent the escape of wildfires and contain the fire's spread. Adjustments to these dispatch levels may be made at the discretion of the duty officer based on local conditions or initial reports.

All fires will be assessed by the first on-scene Incident Commander and attacked using minimum impact fire suppression tactics for the refuge. Roads and natural barriers will be used as much as possible to reduce fire line construction. Decisions to construct fire line and conduct mop-up through riparian areas and thin soils should include the consideration of long-term damage to vegetation. Tree falling and bucking in mature and over-mature forest should be kept to a minimum and replaced with alternative actions whenever possible (e.g., using fire chemicals to protect snags from burning). Back-fires and burnout operations should consider head fire intensities and attempt to avoid over-heating the soil or allowing the fire to burn into riparian areas. Where wildland fires cross roads, the burned area adjacent to the road should be mopped up and dangerous snags felled. Wetland areas can generally burn without resource damage, and then be suppressed at roadsides or other appropriate locations. Effort will be made to rehabilitate the damages done by suppression activities and the burned area.

Public safety will require coordination between all refuge staff and the IC. Signs and notices should be posted to warn visitors, close trails, and control traffic.

## **Suppression Conditions**

A full suppression alternative was selected for this refuge, which requires containment and control of all wildland fires. Guidelines discussed under Suppression Tactics have been developed to assist with this strategy while protecting the refuges from unnecessary resource damage. The use of heavy equipment and fire chemicals is restricted due to cultural, habitat, and wildlife concerns and requires consultation with the RA prior to their use. At the Annual Operating Plan Review, issues pertaining to restrictions should be discussed with cooperators. Changes in restrictions and areas of concerns should be documented.

The refuges have primary responsibility for all pre-suppression and prevention activities on refuge lands. Refuge personnel may make immediate initial attack on all fires occurring on the refuge only until assistance arrives. All wildland fires will be actively suppressed, but safety will be the first concern in suppression actions.

Fires occurring on refuge islands will require motorboat access. Boat operators will possess the appropriate Department of Interior training certification before piloting any refuge watercraft. Refuge personnel will transport required fire suppression equipment and personnel to the island to provide initial attack. Due to the dangerous and unpredictable nature of the Columbia River, boat transport after sunset

will only be done if approved by the Project Leader/Refuge Manager and then only if the boat operator has the required certification, skills and confidence to complete the assignment.

Fire threatening occupied residences, administrative buildings, shop/storage buildings, and adjacent privately owned structures are to be protected first and controlled at all cost. Structural fire suppression by Service personnel will only be conducted when there is a threat to human life. Service personnel may assist in protecting wildlands around structures, when such actions can be accomplished safely. Second priority suppression areas are recreation facilities, including bathrooms and signs. Protection of cooperator cattle, equipment, and habitat is third priority for suppression.

### **Wildland Fire Situation Analysis**

The purpose of the Wildland Fire Situation Analysis (WFSA) is to analyze alternative methods of controlling an extended action to determine the most appropriate management strategy for the fire. The WFSA format can be found in Appendix M. An extended action is a fire that has not been contained or controlled by the initial action forces within the first burning period and continues either until transition to a higher level incident management team is completed or until the fire has been contained or controlled. Damages from the fire, anticipated suppression costs, safety, resource impacts, the probable character of suppression actions, the probable growth of the fire, and social and political consideration are often important considerations and inclusions in the WFSA. The actions needed to protect special natural and cultural resources and provide for public safety are to be documented in the WFSA. The evaluation of alternatives must clearly identify the point at which the failure of the alternative is imminent. Additional guidance for preparation of a WFSA is contained in the *USFWS Fire Management Handbook*, Chapter 3.4. A WFSA will be prepared by the Project Leader and Fire Management Officer. The Project Leader will be the approving official for the WFSA and any of its revisions.

### **Aircraft Operations**

Aircraft may be used in all phases of fire management operations and must be Office of Aircraft Services (OAS) or Forest Service approved. The use of aircraft is directed according to the OAS Aviation Policy Department Manual which can be provided by the OAS. Only qualified aviation personnel with proper personal protection equipment will be assigned to all flight operations.

Helicopters may be used for reconnaissance, bucket drops and transportation of personnel and equipment. Natural helispots and parking lots are readily available in most cases; therefore, clearing for new helispots should be avoided. New and improved helispots will be rehabilitated following the fire.

### **REHABILITATION AND RESTORATION**

Fire rehabilitation will be conducted for suppression effects, the burn area, and for emergency stabilization. Suppression rehabilitation restores and repairs property and resources from damage caused directly from suppression activities. Suppression rehabilitation may include repairing cut fences, dozer lines, and fire campsites. Burned area rehabilitation restores natural resources and property damaged or impacted by the fire, including burned water lines and denuded hillsides. Stabilization includes efforts to stabilize soil and vegetation from the damaging effects after a fire.

Rehabilitation actions will be directed toward minimizing or eliminating the effects of suppression actions used in controlling the fire, the effects of the fire itself, and the potential hazards caused by the fire. Re-vegetation efforts will use only locally procured native seed and plants. Rehabilitation actions may include: backfilling control lines, scarify, and seed; installing water bars and constructing drain dips on control lines; restoring altered ground contours to their natural form; removing all fire suppression flagging, equipment and litter; restoring fire camp areas and improved helispots; and revegetating sensitive areas impacted by suppression actions.

### **Suppression Rehabilitation**

Rehabilitation of fire suppression damage should be accomplished immediately, generally within 7 days after the fire is controlled, unless the regional fire coordinator grants an extension. Funding for suppression rehabilitation will come from a specific fire cost account established by the Fire Management Officer. The Incident Commander will initiate suppression rehabilitation, after concurrence by the Project Leader. 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 to protect public safety and stabilize and prevent further degradation of cultural and natural resources within the perimeter of the burned area and to protect downstream impact areas from erosion and invasion of undesirable species. Appropriate rehabilitation techniques will also be used to improve natural resources, as stipulated in approved refuge management plans, and to repair or replace minor facilities damaged by the fire.

Total rehabilitation of a burned area cannot be done within the scope of the emergency rehabilitation funding. Emergency rehabilitation funding can be used to begin the rehabilitation process, if other funding is committed to continue the rehabilitation throughout the life of the project (beyond the initial 3 years for which emergency rehabilitation funding can be used). Major facilities must be repaired or replaced through supplemental appropriations or other funding.

### **Burned Area Emergency Stabilization and Rehabilitation Plan**

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

If burned area emergency stabilization and rehabilitation is required to reduce the negative effects of a wildland fire, then the refuge should request appropriate funding through the Burned Area Emergency Stabilization and Rehabilitation (ESR) fund. The Service representative at the National Interagency Fire Center administers the ESR fund. A rehabilitation and restoration survey, plan, and request must be prepared and submitted according to agency guidelines. Smaller incidents may only need simple plans prepared by refuge staff.

Larger incidents with extensive rehabilitation efforts should employ an ESR Team to prepare the ESR plan. An ESR Team is composed of personnel who specialize in key resource management disciplines and are experts in ESR Plan preparation. A formal request for an ESR Team should be made in consultation with the Incident Management Team as soon as it appears damage may be significant enough to require a team, since delays in making a request may hinder funding approval and magnify resource damage. Instructions for ESR Team mobilization can be found in the National Wildfire Coordinating Group mobilization guide. Once an ESR Team is employed, the Project Leader or their representative should provide plan guidance to the ESR team leader. The Project Leader, Biologist, and Fire Management Officer 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 Fire Management Officer will be responsible for any additional required reports.

**FIRE INVESTIGATION**

Prompt and efficient investigation of all suspicious fires will be carried out. Fire management personnel will attempt to locate and protect the fire's probable point of origin and record pertinent information required to determine the cause of the fire. Fire personnel will be alert for possible evidence, protect the scene and report findings to the fire Line supervisor. However, fire management personnel should not question suspects or pursue the fire investigation unless they are qualified to conduct investigations. 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**

The use of prescribed fire in the form of pile burning is a useful vegetation management tool that the refuge would continue to use to economically dispose of vegetation debris generated from road and facility maintenance activities, including hazard fuel reduction. Piles of vegetation debris could also be burned on most areas of the refuge, where dikes, fences and other facilities are maintained.

You cannot burn construction debris under this plan...only natural debris

### **HAZARD FUEL REDUCTION STRATEGIES**

At the Julia Butler Hansen and Lewis and Clark NWR's pile burning will be used only to dispose of vegetation from maintenance activities. All prescribed fire activity will comply with applicable Federal, state, and local air quality and burning laws and regulations.

Debris must be disposed of to complete the mitigation of the hazard. Debris disposal may be accomplished by scattering, chipping or pile burning. The quantity of vegetation, diameter size, 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.

All pile burn projects will have a pile burn plan. Each pile burn plan will be prepared using a systematic decision-making process. The plan will contain measurable objectives and predetermined prescriptions and reference the appropriate environmental compliance documents associated with this Fire Management Plan. Separate NEPA and Section 7 documentation will be required for any projects not covered by this plan and its environmental compliance documents. Compliance with the NHPA will be included with each burn plan.

Pile burns which are to be used to dispose of vegetation debris generated by maintenance activities will be reviewed by the FMO. In most cases, the actual burning duties will be contracted to a third party. Contracts involving the generation or disposal of burnable debris will be developed and conducted in coordination and consultation with a Fire Management Officer. Contracts will specify when and how burnable debris will be disposed. If fire is used to dispose of debris under contract, the refuge FMO must review and approve the contract stipulations related to debris burning. The project/contract must include funding for planning and conducting debris burning and identify the responsible individual(s) for the burning. Burning of hazardous or toxic materials is prohibited.

### **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 FWS Fire Management Handbook, Section 2. This section of the Fire Management Plan is for the purpose of outlining the steps to take when conducting pile burning only. No prescribed burning of standing vegetation will be conducted. 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 refuge activities such as annual hazard reduction around structures. Limbs and branches of overhanging trees and brush will annually need to be trimmed back. At times trees may have been blown down during storms which will require debris removal. The most economical and expedient method is through 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 would 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 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 FWS 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 K. Each burn plan will be reviewed by the Project Leader, 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 only be executed 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.

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.

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 all elements are still within the approved ranges. If all prescription elements are met, a test fire will be ignited to determine on-site fire behavior conditions as affected by current weather. If conditions are not satisfactory, the test fire will be suppressed and the burn will be rescheduled. If conditions are satisfactory, the burn will continue as planned.

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 prescribed 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 based 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.

## **Burn Permits**

A burn permit may be required from local fire districts or agencies to conduct pile burns on refuge lands. Burn permits are issued by Wahkiakum County in Washington and by local fire districts in Oregon.

The Southwest Clean Air Agency (SWCAA) is responsible for enforcing federal, state and local outdoor air quality standards and regulations in the counties of southwest Washington State. See the Air Quality and Smoke Management Guidelines section for more information on those subjects.

In Wahkiakum County burning permits can be obtained from the public works department at 360-795-3301 at no charge to cover burning of small piles of vegetation that measure no greater than 4 ft wide x 4 ft long x 3 ft high. A special burn permit is required for burning piles larger than the size above and must be requested at least 48 hours prior to burning by calling the permit department at (360)795-3067. Burning under any permit is restricted to daylight hours on days with little wind. Piles must be 50 ft from buildings and more than 500 ft from forest slash. Pile burns must be continually attended by a person capable of extinguishing the fire. A shovel and water must be available at the site. Burning piles must be extinguished before leaving them.

In Oregon air quality and burning regulations and are administered by the Oregon Department Of Environmental Quality (DEQ). The DEQ office that has oversight in northwest Oregon is located in Portland at (541) 229-5545. In most rural areas of Columbia and Clatsop Counties permission can be obtained from local fire departments for burn piles (Appendix G) such as wood and other vegetative materials. However, at the Emerald Heights and Tongue Point Units, which are close to the city of Astoria, a DEQ burn permit is required as well as permission from the local fire department.

To qualify for a DEQ open burning letter permit a permit to burn the debris must first be obtained from the local fire department. In addition, the following information must be provided:

- § A listing of alternative material disposal methods other than burning;
- § The approximate cost of each alternative disposal method;
- § The quantity and type of material to be burned;
- § The anticipated amount of time it will take for the material to be completely burned;
- § The methods proposed to ensure a safe, efficient, and complete burn;
- § The location of the proposed burn site;
- § A diagram showing the proposed burning site, structures and facilities near the proposed burn site, and the distances between the structures and facilities at the proposed burn site;
- § If the application is for prescribed burning of vegetation to create or restore a wetland or to promote or enhance habitat for indigenous plants or animal, a statement from a federal or state agency recommending the open burning must be included;
- § The anticipated need to dispose of similar material by burning in the future;
- § Any other information you feel may be relevant in determining the necessity of issuing an open burn permit.

## **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

No past monitoring or evaluation of pile burns has been conducted on the refuges.

**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 Refuge Manager 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 AND SMOKE MANAGEMENT GUIDELINES**

Smoke management associated with outdoor burning in Wahkiakum County is regulated by the Southwest Clean Air Agency (SWCAA), the Washington Department of Ecology's Air Quality Program, the Washington Department of Natural Resources' Smoke Management Program and the Wahkiakum County Fire District #2. SWCAA services Clark, Cowlitz, Lewis, Skamania and Wahkiakum Counties. Open burning is regulated in Oregon by the Oregon Department of Environmental Quality (DEQ) and the local Fire Districts. DEQ is concerned about nuisance and health effects of smoke caused by outdoor burning. To that end, the Department works closely with fire districts to educate people and enforce regulations for household, commercial, construction, demolition, land clearing, agricultural and industrial burning activities.

The refuge must abide by all state and local air pollution control requirements; therefore, burning must be done in compliance with state air quality standards established in section 70.94 of the Revised Code of Washington and section 340-264 of the Oregon Administrative Rules.

No burning permit for air quality purposes is required for the refuge to conduct pile burns outside of fire district boundaries in Washington; however, burning may be banned or restricted when air quality conditions are unsuitable, as determined by the SWCAA. Burning may be banned for air quality reasons at any time of year, but this rarely occurs for any significant periods of time for areas within the county. Pile burns will be conducted in such a way as to keep smoke from unreasonably interfering with neighboring land owners' use and enjoyment of their property, as dictated by Washington and Oregon state law.

## **FIRE RESEARCH**

There has been no past or on-going research on the Julia Butler Hansen and Lewis and Clark NWRs related to fire or fire-dependent species and ecosystems.

No prescribed burning for research purposes is proposed under this Fire Management Plan.

## PUBLIC SAFETY

The Julia Butler Hansen and Lewis and Clark NWRs are dedicated to ensuring the safety of each visitor and to all residents and property adjacent to the refuge's boundary; therefore the following measures will be taken to provide for public safety:

- § Residents adjacent to the refuge will be notified in advance of any prescribed burn and if any fire threatens to burn outside the refuge boundaries towards private land. (See Appendix I for the landowner contact list.)
- § Public notices of prescribed and wildfire activity and burning bans in effect may be posted at the headquarters, bulletin boards, parking areas and/or interpretive signs, as necessary.
- § Refuge areas may be temporarily closed to public entry, when appropriate to protect public safety, during and after a fire. Refuge area closures will be determined by the Project Leader. Closed areas will be appropriately posted and the public will be notified through the media and/or other means.
- § During prescribed burns, at least one burn team member will have completed cardio-pulmonary resuscitation and first aid training.
- § First aid kits will be in every vehicle for all fire management activities.
- § Refuge law enforcement officers will coordinate public safety for prescribed burns requiring specific public safety measures, e.g., burns that may cause smoke to go over a public road or securing the burn unit from public entry.
- § Local law enforcement officials will be notified as necessary regarding wildland fires on refuge lands.

## PUBLIC INFORMATION AND EDUCATION

Educating the public on the value of fire as a natural ecological process is important for increasing public understanding and support for the fire management program. The refuges will use the most appropriate and effective means, for example supplemental handouts, signing, personal contacts, or media releases, to explain the overall fire and smoke management program. When deemed necessary, interpretive presentations will be conducted to address the fire management program and explain the role of fire natural resource management.

The public information program related to fire management will be developed as follows:

- § Concepts of the prescribed burn program will be incorporated, as appropriate, in publications, brochures, and handouts.
- § During periods when prescribed burns are conducted, handouts will be prepared and distributed to all visitors entering areas near fire activity.
- § Discussion about the fire management program may be incorporated into visitor contacts, especially when fires are conspicuous from roads, urban areas or visitor use areas.
- § News releases will be distributed to the media as appropriate.
- § The public information outlets of neighboring and cooperating agencies and the Regional Office will be provided with refuge fire management information.
- § The fire management program will be discussed in informal talks with all employees, volunteers, residents, and neighbors.

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

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

## **FIRE CRITIQUES AND ANNUAL PLAN REVIEW**

### **FIRE CRITIQUES**

Fire reviews will be documented and filed with the final fire report. The FMO and Refuge will retain a copy of the report.

### **ANNUAL FIRE SUMMARY REPORT**

The FMO/PFS will be responsible for completing an annual fire summary report. The report will contain the number of fires by type, acres burned by fuel type, cost summary (pile burns and wildland fires), personnel utilized, and fire effects. A copy of the report will be forwarded to the refuge and will be retained in the main office files.

### **ANNUAL FIRE MANAGEMENT PLAN REVIEW**

This Fire Management Plan will be reviewed annually by the FMO and Refuge Manager. Any recommended additions, deletions, or changes will be reviewed by the Project Leader to determine if proposed alterations warrant re-approval of the plan. Necessary updates or changes to the fire plan will be accomplished prior to the next fire season.

## **CONSULTATION AND COORDINATION**

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

Alan C. Clark, Wildlife Biologist, Julia Butler Hansen Refuge for the Columbian White-tailed Deer, Pacific Region, USFWS, Cathlamet, WA.

Jessica Gonzales, (former) Deputy Project Leader, Julia Butler Hansen and Lewis and Clark NWRC, Pacific Region, USFWS, Ilwaco, WA.

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

Charles Stenvall, Project Leader, Julia Butler Hansen and Lewis and Clark NWRC, Pacific Region, USFWS, Ilwaco, WA.

## APPENDICES

### APPENDIX A: REFERENCES CITED

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## APPENDIX B: DEFINITIONS

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

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

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

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

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

**Bureau.** Bureaus, offices or services of the Department.

**Class of Fire (as to size of wildland fires).**

Class A - ¼ 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.

**Land Clearing Burning.** As stated in WAC 173-425-030, means outdoor burning of trees, stumps, shrubbery, or other natural vegetation from land clearing projects (i.e. projects that clear the land surface so it can be developed, used for a different purpose, or left unused). (RCW 70.94.750(2))

**Late-Successional Forest.** Forest with vegetation composition and characteristics typical of the later stages of ecological development for that site and where the dominant trees in the stand are mature and over-mature or old growth.

**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 natural 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 the US Forest Service at the Northern Forest Fire Laboratory, Missoula, Montana.

**Non-Attainment Area.** A clearly designated geographic area designated by the Environmental Protection Agency which does not meet or contributes to ambient air quality in a nearby area that does not

meet a national ambient air quality standard or standards for one or more of the criteria pollutants, which include carbon monoxide, particulate matter (PM-10 and PM 2.5), sulfur dioxide, nitrogen dioxide, lead, and ozone.

**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) to mitigate adverse effects of a wildland fire on the vegetation-soil complex and watershed, and other damages.

**Silvicultural Burning.** Outdoor burning related to the following activities and conducted for the protection of life or property and/or the public health, safety, and welfare:

- a.) Abating a forest fire hazard;
- b.) Prevention of a forest fire hazard;
- c.) Instruction of public officials in methods of forest fire fighting;
- d.) Any silvicultural operation to improve the forest lands of the state; and
- e.) Silvicultural burning used to improve or maintain fire dependent ecosystems for rare plants or animals within state, federal, and private natural area preserves, natural resource conservation areas, parks, and other wildlife areas (RCW 70.94.660 (1)).

**Scrub.** An area covered in low trees and shrubs.

**Submerged Land.** Land lying below the line of ordinary low water and usually under tidally influenced waters.

**Submersible Land.** Land lying between the line of ordinary high water and the line of ordinary low water in tidally influenced water. Also referred to as tideland.

**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 an undeveloped area.

**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 wildfire that moves between wildland and developed land that threatens or involves structures.

**Woodlot.** An area of planted trees and shrubs managed to produce a forest used for wildlife habitat.

## U.S. Department of the Interior

### U.S. Fish and Wildlife Service

**Julia Butler Hansen Refuge for the Columbian White-Tailed Deer  
Lewis and Clark National Wildlife Refuge  
3888 SR 101, Ilwaco, WA 98624  
360-484-3482**

#### Memorandum

Date: March 3, 2004  
To: Files  
From: Charles Stenvall, Project Leader, Willapa National Wildlife Refuge Complex  
Subject: Categorical Exclusions for Fire Management Actions on the Julia Butler Hansen and Lewis and Clark NWRs

Proposed activities and management guidelines contained in the Fire Management Plan for the Julia Butler Hansen and Lewis and Clark National Wildlife Refuges meet requirements for categorical exclusion under the National Environmental Policy Act revised implementation procedures in the Department of the Interior's Departmental Manual (516 DM 6, Appendix 1, 1.4.B(4,5)). The proposed fire management activities are found to individually or cumulatively have no significant effect on the human environment and to not be of significant public controversy. The Fire Management Plan has been coordinated with affected Federal agencies and State and local governments.

Specific fire management objectives addressed in the Fire Management Plan are to:

- § Promote firefighter and public safety while managing wildland and prescribed fires.
- § Protect life, property, and resources from wildland fires at costs commensurate with resource values at risk.
- § Control all wildland fires while meeting identified resource management objectives.
- § Use appropriate suppression tactics and strategies that minimize long-term impacts of suppression actions on natural resources.
- § Use burn piles to dispose of unwanted vegetation and wood associated with refuge facilities.

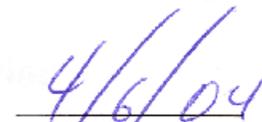
A detailed description of the proposed activities can be found in the Fire Management Plan for the Julia Butler Hansen and Lewis and Clark National Wildlife Refuges, which is kept on file at the Willapa National Wildlife Refuge Complex office in Ilwaco, WA. The proposed actions and their associated departmental manual citations are explained below.

The Fire Management Plan proposes the use of pile burning to dispose of wood and vegetation debris generated from road and facility maintenance activities. These actions are categorically excluded from further NEPA analysis as stated in 516 DM 6, Appendix 1, 1.4.B (4 and 5) below:

- (4) The use of prescribed burning for habitat improvement purposes, when conducted in accordance with local and State ordinances and laws.

- (5) Fire management activities, including prevention and restoration measures, when conducted in accordance with departmental and Service procedures.

  
\_\_\_\_\_  
Charles Stenvall, Project Leader  
Willapa National Wildlife Refuge Complex

  
\_\_\_\_\_  
Date

**APPENDIX D: SECTION 7 BIOLOGICAL EVALUATION AND BIOLOGICAL OPINION**

**Section 7 Biological Evaluation**

Originating Person: Alan Clark  
Telephone: (360)795-3915  
Date: February 2, 2007

I. Region: 1

II. Service Activity (Program):

Wildland Fire Management Plan for Julia Butler Hansen Refuge for the Columbian White-tailed Deer and Lewis and Clark National Wildlife Refuge.

III. A. Listed species and/or their designated critical habitat within the action area:

Columbian White-tailed Deer (*Odocoileus virginianus leucurus*)  
Bald Eagle (*Haliaeetus leucocephalus*)  
California Brown Pelican (*Pelecanus occidentalis californicus*)  
Marbled Murrelet (*Brachyramphus marmoratus marmoratus*)  
Bull Trout (*Salvelinus confluentus*)  
Nelson's checker-mallow (*Sidalcea nelsoniana*)  
Howellia (*Howellia aquatilis*)

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

C. Candidate species within the action area:

Streaked horned lark (*Eremophila alpestris strigata*)

IV. Geographic area or station name and action.

Julia Butler Hansen Refuge for the Columbian White-Tailed Deer, Ilwaco, Washington.  
Lewis and Clark National Wildlife Refuge, Ilwaco, Washington.

The Wildland Fire Management Plan is an operational guide for managing the refuge's wildland fire and pile burning programs and complies with a service-wide requirement for refuges with burnable vegetation to develop a fire management plan (620 DM 1). It defines levels of protection needed to ensure safety, protect facilities and resources, and restore and perpetuate natural processes, given the current understanding of the complex relationships in natural ecosystems.

The plan covers wildland fire suppression and burning piles of natural debris to maintain wildlife habitat on the refuge. The plan sets objectives and describes methodology for using wildland and pile burning to meet the mission and goals of the refuge.

The Refuge has no full-time fire staff. Fire management oversight will be provided by the Prescribed Fire Specialist (PFS) at Willamette Valley NWRC, Corvallis, OR. The Project Leader

will coordinate with the PFS and be responsible for ensuring all policies are followed. Suppression actions will be initiated by qualified Refuge staff and the Washington Department of Natural Resources (DNR) or Oregon Department of Forestry (ODF) in accordance with the interagency Master Cooperative Fire Protection Agreement.

This evaluation addresses aspects of the Wildland Fire Management Plan including wildland fire suppression and pile burning in refuge units.

V. Location (attach map):

- A. County and State: Wahkiakum County, Washington, and Clatsop and Columbia Counties, Oregon.
- B. Latitude and Longitude: Refuge Headquarters is located at lat/long N46°13'57", W123°24'01"
- C. Distance (miles) and direction to nearest town: Cathlamet, Washington, is two miles southeast of the refuge office. Astoria, Oregon, is two miles west of the westernmost boundary of the Lewis and Clark NWR.
- D. Include species/habitat occurrence on a map, if possible: See the Wildland Fire Management Plan.

VI. Description of Proposed Action:

The overall objectives for fire management on the refuge are to create a program that ensures firefighter and public safety, reduces the incidence of human-caused fires, ensures appropriate suppression response capability to meet expected wildland fire complexity, and allows the use of pile burning.

Specific fire management objectives addressed in the Wildland Fire Management Plan are to:

- § Promote firefighter and public safety while managing wildland fires and pile burns.
- § Protect life, property, and resources from wildland fires at costs commensurate with resource values at risk.
- § Control all wildland fires while meeting identified resource management objectives.
- § Use appropriate suppression tactics and strategies that minimize long-term impacts of suppression actions on natural resources.
- § Use pile burning to dispose of unwanted vegetation associated with maintenance of refuge facilities.

VII. Determination of Effects:

- A. Explanation of effects of the action on species and critical habitats in items III.A, B, and C:

**Columbian White-tailed Deer.** Columbian white-tailed deer occur on all units of the Julia Butler Hansen Refuge and on the Estuary Islands (principally Welch and Karlson Islands) and Brownsmead units of the Lewis and Clark NWR. The deer prefer to use forested and brushy areas for resting, foraging and hiding; they radiate out from woody cover to forage in fields and marshes (Gavin *et al.* 1984, Suring and Vohs 1979). The peak of mating occurs in November. Fawns are usually born in June and often use fields of tall grasses and weeds as

hiding places. For the first 1-2 weeks of life, fawns are relatively helpless and respond to potential danger by becoming immobile (“freezing”) to avoid detection. They are therefore vulnerable to being crushed by vehicles that are operated off roads.

The presence and movement of fire fighting personnel and equipment would cause disturbance to deer in the immediate vicinity. The deer most likely would move a few hundred meters away and return when the people and equipment left. There is little probability of wildfire during June and early July, when fawns are most vulnerable, because the water table is high then and the vegetation is green and growing. The negative impacts of disturbance would be more than offset by the beneficial effects of preventing woody vegetation from being destroyed by fire.

Cutting trees and brush to create firebreaks would destroy woody vegetation that is an important component of the deer’s habitat.

**Bald Eagle.** Bald eagles forage and perch on all refuge units year round. Numbers peak in late winter when more than 100 may be present in the estuary (Garrett *et al.* 1988). There are 15 known nest sites on the refuges. Nesting activity may begin as early as January and continue through August (Garrett *et al.* 1988). Fire suppression activities such as personnel and vehicle movements, heavy equipment operation, and low flying aircraft would likely disturb some eagles. Activities near an active nest could affect reproductive success (USFWS 1986).

**California Brown Pelican.** Pelicans occasionally use the downstream portion of the Estuary Islands Unit in spring, summer and fall. The magnitude of use is very small; pelicans are rarely observed in the refuges. There are no roosts within the refuges. Most pelican activity in the estuary occurs downstream of the refuges in Baker and Youngs Bays. Fire suppression activities could cause some temporary disturbance to pelicans if any happened to be in the vicinity.

**Marbled Murrelet.** Murrelets are not known to nest on the refuges. Suitable habitat may occur at the Tongue Point Unit and possibly the Emerald Heights Unit of the Lewis and Clark Refuge. Surveys of Tongue Point by refuge staff in the 1990’s produced no detections. Fire activities such as bulldozing fire lines through stands of mature trees could disturb murrelets if they are present, and even destroy nest trees.

**Bull Trout.** The refuges are located in the bull trout Lower Columbia River Recovery Unit 19. Bull trout are found primarily in upper tributary streams and some lakes and reservoirs (USFWS 2003). These habitats do not exist on the refuges. Bull trout may also migrate downstream from tributaries to the mainstem Columbia (USFWS 2002) which flows through the refuges. The use of fire fighting chemicals in a manner that allowed substantial quantities to wash into the Columbia could pose a hazard to bull trout.

**Nelson’s Checker-mallow.** There are no known occurrences on the refuge. However, Nelson’s checker-mallow has been found in other areas of southwest Washington and northwest Oregon. The preferred habitat of seasonally moist, grassy valley bottoms (USFWS 1998) is similar to habitat at the Julia Butler Hansen Refuge. It is unlikely that fire activities would affect Nelson’s checker-mallow. If the plant is found on the refuge, the location(s) will be mapped and included in the Wildland Fire Management Plan.

**Water Howellia.** There are no known occurrences on the refuge, however, water howellia has been found in freshwater marsh in other areas of southwest Washington. The greatest potential for occurrence is at the Julia Butler Hansen Refuge where fresh water nontidal marsh is common. It is unlikely that fire activities would affect water howellia. If it is found on the refuge, the location(s) will be mapped and included in the Wildland Fire Management Plan.

**Streaked Horned Lark.** Streaked horned larks have been observed in the Estuary Islands Unit of the Lewis and Clark Refuge during early spring (A. Clark, refuge biologist, pers. comm). Their preferred habitat is low, sparse vegetation with abundant bare ground (Rogers 1999, 2000). This habitat is found only on the dredge spoil islands (Rice Island, Miller Sands Spit, and Pillar Rock Island). Horned larks are not known to nest on these islands, but it is possible. No nesting surveys have been conducted. Because of the sparse vegetation on the islands, it is unlikely that wildfire would occur. It is even more unlikely that fire suppression would be attempted because of the remote location of the islands and their relatively small size (a fire would burn itself out before crews could be mobilized).

B. Explanation of actions to be implemented to avoid, minimize, or reduce adverse effects:

**Wildfires.** Measures to minimize impacts of fire suppression activities to sensitive natural resources (including listed and candidate species) are specified in the Wildland Fire Management Plan, Wildlife Fire Management section, under the heading of Natural Resource Protection. These measures are as follows.

- \$ Resource Advisor will be required to conduct fire suppression activities on any wildland fire for all refuge lands.
- \$ Minimum impact fire suppression tactics will be used to the fullest extent possible.
- \$ If new occurrences of state or federally threatened species are discovered during a wildfire, they will be marked and protected the same as those that are known on the refuge and the Resource Advisor will recommend suppression activity protection measures to the Incident Commander.
- \$ Resource Advisor approval is required prior to the using heavy equipment to construct *new* fire lines outside of agricultural areas, unless there is an imminent threat to human life and/or structures. When possible, the use of fire chemicals should be used to protect snags from burning.
- \$ Resource Advisor approval is required prior to the use of all fire chemicals on the refuge. To protect natural resources on the refuge from the harmful effects of fire chemicals, the following restrictions are to be applied:
  - < Fire chemicals will not be applied in or near shorelines, streams, seeps, ponds, marshes or surface water of any type, except to protect human life or property in imminent danger of wildfire. It is standard operating procedure in fire fighting operations not to mix, load or apply these chemicals near water.
  - < Fire chemicals will be cautiously and conservatively used in wildfires and prescribed fires, such as to protect very high value wildlife habitats (e.g. old-growth, large snags used for cavity nesters such as spotted owls and pileated woodpeckers) and to reinforce fire lines.
  - < Fire-trol® fire retardant will not be used on the refuge due to its cyanide component and toxicity to aquatic organisms.
  - < Silv-ex® and Phos-chek® wildland fire foams will not be used on the refuge, since they are more toxic to aquatic organisms than other types of fire foams. Other foam suppressant chemicals, may be used judiciously on the refuge.



**VIII. Effect determination and response requested:**

[\* = optional]

**A. Listed species/designated critical habitat:**

	<u>Determination Requested</u>
<u>Alan Clark</u>	<u>  X  </u> No effect/no adverse
modification	<u>  X  </u> *Concurrence

- Marbled Murrelet (*Brachyramphus marmoratus marmoratus*)
- Bull Trout (*Salvelinus confluentus*)
- Howellia (*Howellia aquatilis*)
- Nelson's Checker-mallow (*Sidalcea nelsoniana*)

<u>  X  </u> May affect, but is not likely to adversely affect species/ adversely modify critical habitat	<u>  X  </u> Concurrence
--	--------------------------

- Columbian White-tailed Deer (*Odocoileus virginianus leucurus*)
- Bald Eagle (*Haliaeetus leucocephalus*)
- California Brown Pelican (*Pelecanus occidentalis californicus*)

<u>      </u> May affect, and is likely to adversely affect species/ adversely modify critical habitat	<u>      </u> Formal Consultation
---	-----------------------------------

**B. Proposed species/proposed critical habitat: None**

**C. Candidate species:**

<u>Determination</u>	<u>Response requested</u>
<u>      </u> No effect	<u>      </u> *Concurrence
<u>  X  </u> Is not likely to jeopardize candidate species	<u>  X  </u> Concurrence
Streaked Horned Lark ( <i>Eremophila alpestris strigata</i> )	
<u>      </u> Is likely to jeopardize candidate species	<u>      </u> Conference

**IX. Reviewing ESO Evaluation:**

Initiating Officer:

\_\_\_\_\_  
Alan Clark, Wildlife Biologist  
Julia Butler Hansen Refuge for the Columbian White-tailed Deer

\_\_\_\_\_  
Date

ESO Evaluation:

4/1/04  
Date

- A. Concurrence   X   Non-concurrence \_\_\_\_\_
- B. Formal consultation required \_\_\_\_\_
- C. Conference required \_\_\_\_\_
- D. Informal conference required \_\_\_\_\_
- E. Remarks (attach additional pages as needed):

\_\_\_\_\_  
Name:  
Title:  
Office:

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name:  
Title:  
Office:

John Galt Sr  
Manager  
Western Washington Fish &  
Wildlife Office

6/4/04  
Date

## LITERATURE CITED

- Garrett, M., R.G. Anthony, J.W. Watson, and K. McGarigal. Ecology of Bald Eagles on the Lower Columbia River. Final Report to U.S. Army Corps of Engineers, Contract No. DACW57-84-C-0071. Oregon Cooperative Wildlife Research Unit, Oregon State University, Corvallis. 189p.
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- Rogers, R.E., Jr. 1999. Natural history: streaked horned lark and land management. Environmental Practice 1(2):77-78.
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- Suring, L.H., and P.A. Vohs, Jr. 1979. Habitat Use By Columbian White-tailed Deer. J. Wildl. Manage. 43(3):610-619.
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- USFWS. 1998. Recovery Plan for the Threatened Nelson's Checker-mallow (*Sidalcea nelsoniana*). U.S. Fish and Wildlife Service, Portland, Or. 61p.
- USFWS. 2002. Bull Trout (*Salvelinus confluentus*) Draft Recovery Plan. Chapter 20, Lower Columbia Recovery Unit, Washington. U.S. Fish and Wildlife Service, Portland, OR.
- USFWS. 2003. Bull Trout Facts. U.S. Fish and Wildlife Service, Portland, OR.



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE



Western Washington Fish and Wildlife Office  
510 Desmond Dr. SE, Suite 102  
Lacey, Washington 98503

In reply Refer to:  
**1-3-04-FWI-0934**

#### Memorandum

To: Project Leader, Willapa National Wildlife Refuge Complex  
Cathlamet, Washington

From: Manager, Western Washington Fish and Wildlife Office  
Lacey, Washington

Subject: Informal Consultation for Wildland Fire Management Plan for Julia Butler Hansen  
Refuge for the Columbian White-tailed Deer and Lewis and Clark National Wildlife Refuge.

This is in response to your request for informal consultation for the Wildland Fire Management Plan for Julia Butler Hansen Refuge for the Columbian White-tailed Deer and Lewis and Clark National Wildlife Refuge received in our office 6 May 2004, and attached Intra-Service Section 7 Biological Evaluation Form (BE). The BE requests our concurrence with your finding that the project “may affect, but is not likely to adversely affect” the Columbian white-tailed deer (*Odocoileus virginianus leucurus*), the bald eagle (*Haliaeetus leucocephalus*), and the California brown pelican (*Pelecanus occidentalis californicus*). Concurrence was also requested for your finding that the project would have “no effect” on the bull trout (*Salvelinus confluentus*), water howellia (*Howellia aquatilis*), and Nelson’s checker-mallow (*Sidalcea nelsoniana*) or adversely modify critical habitat for the marbled murrelet (*Brachyramphus marmoratus marmoratus*). For the candidate streaked horned lark (*Eremophila alpestris strigata*), you have found that the project is “not likely” to jeopardize the continued existence of the species. This request is being submitted in accordance with section 7 of the Endangered Species Act of 1973, as amended.

We concur with your determinations. This concurrence is based on information provided in the BE and the implementation of conservation measures described in the BE. The signed BE is attached.

This concludes informal consultation pursuant to the regulations implementing the Endangered Species Act (50 CFR 402.13). This project should be reanalyzed if new information reveals effects of the action that may affect listed species or critical habitat in a manner, or to an extent, not considered in this consultation. The project should also be reanalyzed if the actions subsequently modified in a manner that causes an affect to a listed species or critical habitat that was not considered in this consultation/or a species is listed or critical habitat is designated that may be affected by this project.

Thank you for your commitment to endangered species conservation. If you have any questions, please contact Ted Thomas at (360) 753-4327 or John Grettenberger at (360) 753-6044, of the Western Washington Fish and Wildlife Office.

Attachment

APPENDIX E: REQUEST FOR CULTURAL RESOURCE COMPLIANCE FORM

REQUEST FOR CULTURAL RESOURCE COMPLIANCE

Project Name:

USFWS Unit: Julia Butler Hansen Refuge for the Columbian White-Tailed Deer; Lewis and Clark National Wildlife Refuge

(Office Name and/or Org Code)

Org Code **13552**

Ecoregion: **North Coast / Pacific Islands Ecoregion**

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

Program: Refuges

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

Location:  
(nearest town)

County: **Pacific**

State: **Washington**

\_\_\_\_\_  
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: **360-484-3482**

Address: **Julia Butler Hansen and Lewis and Clark NWR, 3888 SR 101, Ilwaco WA 98624**  
**3109**

Fax: **360-484-**

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)*.

**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*

**NHPA COMPLIANCE**

Appendix \_\_\_\_\_ Item \_\_\_\_\_ of the Programmatic Agreement applies.

36CFR800.4 to 800.6 applies.

\_\_\_\_\_  
Cultural Resources Team      Date

*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, c/o Tualatin River NWR, 20555 SW Gerda Ln, Sherwood, OR 97140  
(503) 625-4377 Fax (503) 625-4887

**APPENDIX F: INTERAGENCY AGREEMENTS**

The Master Cooperative Fire Protection Agreement for Oregon and Washington is on file at refuge headquarters.

---DRAFT---  
**Memorandum of Understanding**  
**Between**  
**WAHKIAKUM COUNTY FIRE DISTRICT #2**  
**And**  
**U.S. FISH AND WILDLIFE SERVICE**

This agreement is made and entered into by the U.S. Fish and Wildlife Service, **Julia Butler Hansen and Lewis and Clark National Wildlife Refuge**, hereinafter referred to as the Service, and the **Wahkiakum County Fire District #2**, hereinafter referred to as the District.

I. AUTHORITIES

The Service has entered into this memorandum of understanding under the authority of the Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 42 U.S.C. 1856a-d), which allow the Service to enter into reciprocal agreements with state and local government entities.

[enter District authorities, if any]

II. PURPOSE

The purpose of this agreement is to coordinate and provide *cooperative fire protection* between the Service and District, in order to more efficiently and effectively suppress fires on lands managed by the Service. This agreement may serve as a supplement to existing mutual aid or interagency agreements.

Emergency services that may be requested, other than for *cooperative fire protection*, will require negotiation under a separate authority or agreement.

III. RECITALS

Whereas both parties have fire protection responsibilities upon lands of their respective jurisdiction, have intermingled and adjoining fire protection responsibilities, and limited fire protection resources.

Whereas the Service has limited specialized equipment and qualified personnel required to fight structural fires.

Whereas the Service is the *jurisdictional agency* responsible for fire protection on Service managed lands.

Whereas the District can provide a fire engine fleet for fire suppression activities within the District's jurisdiction, including suppression of accessible wildland fires on Service lands within and a short distance outside the District's fire protection boundary.

Whereas the District can provide initial attack capability on fires outside the District's fire protection boundary to support and supplement the Service's and other fire protection cooperator's resources.

IV. DEFINITIONS OF TERMS

- A. Annual Operating Plan. This annual plan, also called a dispatch plan, provides detailed direction and information needed for efficient implementation of this agreement and current reimbursable costs for aiding in fire operations.
- B. Cooperative Fire Protection. Specific fire protection services furnished by one party to the other party on a reimbursable basis pursuant to the *Annual Operating Plan*.
- C. Direct Costs. Costs directly related to the *suppression* effort. These costs do not include dispatch or other administrative costs.
- D. Jurisdictional Agency. Agency which has overall land and resource management and/or protection responsibility as provided by Federal or State law.
- E. Overhead Costs. Costs not directly chargeable to *suppression* efforts, but which are part of the overall cost of operation.
- F. Suppression. All work of confining and extinguishing a fire beginning with its discovery.

V. FIRE PROTECTION AND GENERAL PROVISIONS

**The Service shall:**

- A. Reimburse the District for all reimbursable work performed in the first 48 hours
- B. Payments for reimbursable services under this Agreement shall be made no less frequently than 30 days. When the District performs work or otherwise incurs expenses for which the Service is responsible, the officers-in-charge shall reach agreement on the specific work to be performed. The total cost of such work, including *overhead costs*, will be reimbursed as per the State Marshal Standardized Cost Schedule, Washington Fire Service Mobilization hourly reimbursement rate table, that is updated annually in the Annual Operating Plan. [Is this the correct title of the document for Washington???

**The District shall:**

- C. Make initial attack on wildfires occurring on Service lands identified for *cooperative fire protection* in the *Annual Operating Plan*
- D. Provide resources as current conditions permit. Assistance will only be provided when the resources are available and can be committed without severely impacting the District's ability to protect it's own jurisdiction.
- E. Adhere to the fire *suppression* and mop-up standards of the Service.
- F. Upon discovering or receiving reports of wildfires on Service lands, report such wildfires promptly to the responsible party as described in the *Annual Operating Plan*.
- G. Forward the necessary fire report data to the responsible Service official identified in the Annual Operating Plan, when the District suppresses wildfires burning wholly or in part on Service lands.
- H. Dispatch only personnel who meet or exceed the minimum training requirements of the National Interagency Fire Qualification System, when the District provides reimbursable cooperative fire protection services to the Service.

**Both the Service and District shall:**

- I. Meet annually to discuss and prepare an *Annual Operating Plan* prior to the initiation of fire season. The annual operating plan will identify initial attack areas and include protection area maps for all parties,

current rates for equipment use, a list of principal personnel, dispatching procedures, special use permits needed for fire control purposes and other items needed to efficiently implement this agreement.

J. Waive all claims between and against each other which may arise from the performance of work under his Agreement, including compensation for loss or damage to each other's property and personal injury, including death, of employees, agents and contractors. This waiver shall not apply to intentional torts or acts of violence against such persons or property.

K. Remain responsible for the training of their respective fire *suppression* personnel.

L. Agree that the officer-in-charge who arrives first to a wildfire burning on or near lands of both parties will act as Incident Commander. When representatives of both parties have arrived at a fire, the officers-in-charge for each party will mutually agree to designate an Incident Commander.

M. Consider personnel dispatched by the District, under the terms of the Annual Operating Plan, as employees of the District. The District shall be responsible for the training and welfare of personnel they dispatch, including the treatment of any personal injuries which may result on any fire or en route to or from any fire, as provided by the laws and regulations under which each party operates.

N. Each be responsible for operating, servicing, repairing, and replacing their own equipment, except as agreed to in writing and in advance by both parties.

O. Make employees of the District and Service subject only to the laws, regulations, and rules governing their employer, regardless of an incident's location, and shall not make employees entitled to compensation or benefits of any other agency, other than those specifically provided by the terms of their employment.

## VI. GENERAL PROVISIONS

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

B. Parties shall furnish each other or otherwise make available upon request maps, documents, instructions, and law enforcement reports, which either agency considers necessary to conduct work associated with this agreement.

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

D. Either party, through any of their authorized representatives, may have the right and access to examine all books, papers, or documents related to this Agreement.

E. Modification of this Agreement shall be made by mutual consent of the parties, through the issuance of a written modification that is signed and dated by both parties, prior to any changes being performed or taking effect.

- F. Either party may terminate this Agreement by providing a written notice to the other, 60 days prior to termination.
- G. Unless terminated by written notice this Agreement shall remain in effect for 5 years from the date of execution.

The parties hereto have executed this memorandum of understanding by and through their authorized representatives on the day and year last written below.

\_\_\_\_\_  
Fire Chief  
Wahkiakum County Fire District #2

\_\_\_\_\_  
Date

\_\_\_\_\_  
Pam Ensley  
Regional Fire Management Coordinator  
Pacific Region, U.S. Fish and Wildlife Service

\_\_\_\_\_  
Date

## APPENDIX G: WILDLAND FIRE DISPATCH PLAN

### Wildland Fire Dispatch Plan for Julia Butler Hansen Refuge and Lewis and Clark NWR

Update plan annually; last updated December 2003.

#### **REPORTING A WILDFIRE**

When a report of smoke or fire is received get as much information from the caller to fill out the following list:

##### **Fire's Location**

§ Location of smoke or fire:

##### **Informant**

§ Name and telephone number of caller:

§ Location of caller:

##### **Fire Description**

§ Color of smoke:

§ Size of fire:

§ Type of Fuel:

§ Character of fire (running, creeping, smoldering, spotting, etc.):

§ Anyone trying to tend or suppress the fire?

§ Anyone in the area or vehicles leaving the area?

#### **DISPATCH CHECK LIST**

1. Check map location and ownership/protection status.
2. **If fire is on or threatening refuge** dispatch at least two qualified staff and possibly a small (200 gal.) pumper.  
**If fire is not on or threatening refuge**, notify Washington DNR at 1-800-527-3305 or Oregon Department of Forestry (see contact list for appropriate phone number ) depending on the location of the fire.
3. Notify Washington Department of Natural Resources at 1-800-562-6010 or Oregon Department of Forestry (see contact lists for appropriate phone number), depending on the location of the fire.  
Report the information collected above on the fire.
4. Notify the Project Leader, Deputy Project Leader and Refuge Manager.
5. Notify the Fire Management Officer, Brian Gales.
6. Assign a station dispatcher to maintain a log of all radio and telephone communications.
7. As long as the fire is not contained, have at least one refuge employee remain on duty to dispatch or provide assistance to DNR/ODF fire fighters as needed.

#### **SUPPORT ITEMS**

See Appendix I. Neighboring Land Owners Contact List.

#### **REFUGE PERSONNEL AND FIRE QUALIFICATIONS**

Table 5. Refuge Personnel and Fire Qualifications.

<u>Name</u>	<u>Position</u>	<u>Office Phone</u>	<u>Home Phone</u>	<u>Pager/ Cell Phone</u>	<u>Fire Qualifications</u>
Charles Stenvall	Project Leader (WLP)	360-484-3482	360-484-3650	503-791-6611	
Terri Butler	Deputy Project Leader (WLP)	360-484-3482	360-642-8918	503-791-4840	Firefighter Type II
Angie Chapman	Office Admin. Assistant (WLP)	360-484-3482	360-484-7113	none	
Deanna Wilson	Purchasing Agent (WLP)	360-484-3482	360-484-3159	none	
Kristine Massin	Otdr Rec Planner (WLP)	360-484-3482	360-875-6323	360-751-1662	
David Gonzales	Refuge Manager (WLP)	360-484-3482			
Royce Baxter	Maintenance Worker (WLP)	360-484-3482	360-642-3553	360-751-2251	Firefighter Type II
Shaun Matthews	Eng. Equip. Operator (WLP)	360-484-3482	360-465-2167	360-751-0904	
Jonathan Bates	Eng. Equip. Operator (WLP)	360-484-3482	360-484-7749	360-751-1353	
Don McGuigan	Eng. Equip. Operator (WLP)	360-484-3482	360-423-3868	541-945-8808 pers. cell	
Marie Fernandez	Wildlife Biologist (WLP)	360-484-3482	360-642-5033	360-751-0526	Firefighter Type II
Kirsten Brennan	Wildlife Biologist (WLP)	360-484-3482	360-484-3180	360-751-2252	
Joel David	Refuge Manager (JBH)	360-795-3915	360-795-8008	360-430-9582 pager 360-439-1902	Firefighter Type II
Al Clark	Wildlife Manager (JBH)	360-795-3915	360-795-3905	360-749-3696	
Calvin McFall	Eng. Equip. Operator (JBH)	360-795-3915	509-493-3093	360-749-3155	Firefighter Type II

### **FIRE MANAGEMENT CONTACT LIST**

Table 6. Fire Management Contact List.

■ = Jurisdictions in Oregon

<u>Fire Management Agency</u>	<u>Phone Numbers</u>
<b>Julia Butler Hansen and Lewis and Clark NWR 3888 SR 101, Ilwaco, WA 98624</b>	<b>360-795-3915 360-795-0803 fax</b>
<b>Pam Ensley USFWS, Regional Fire Management Coordinator</b>	<b>503-2316174 Portland</b>

<b>Forest Cameron</b> <b>USFWS, Refuge Supervisor</b>	<b>503-872-2723 Portland</b> <b>503-807-7568 home</b>
<b>Washington Department of Natural Resources</b> <b>Southwest Region</b> <b>601 Board Rd., PO Box 280 Castle Rock, WA</b> <b>98611-0280</b>	<b>1-800-562-6010 to report fires or</b> <b>1-800-527-3305 at this number, Press 0 to</b> <b>report a fire; Press 1 for directory, then 5 for</b> <b>the Southwest Fire Region Office</b> <b>(Southwest Direct Phone: 360-577-2025)</b> <b>Press 2 for industrial fire precaution</b> <b>requirements by region</b>
<b>Washington Department of Natural Resources</b> <b>Fire Regulation &amp; Outdoor Burning Program</b> <b>Coordinator</b> <b>P.O. Box 47037, Olympia, WA 98504-7037</b>	<b>(360) 902-1754</b> <b>fax (360) 902-1757</b>
<b>Oregon Department of Forestry</b> <b>Forest Protection Division</b> <b>2600 State Street</b> <b>Salem OR 97301</b>	<b>Bill Lafferty, Director of Fire Program</b> <b>503-945-7434</b>
<b>Columbia County Zone (ODF)</b> <b>Oregon Department of Forestry</b> <b>Forest Grove District</b> <b>801 Gales Creek Road</b> <b>Forest Grove, Oregon 97116-1199</b>	<b>503-397-2636 Columbia City Office</b> <b>503-357-2191 Forest Grove Office</b>
<b>Clatsop County Zone (ODF)</b> <b>Oregon Department of Forestry</b> <b>Astoria District</b> <b>92219 Hwy 202</b> <b>Astoria OR 97103</b>	<b>Neal Laugle, Forest Fire Protection Supervisor</b> <b>503-325-5451 ext. 394</b> <b>cell phone 503-338-9917</b>
<b>SouthWest Clean Air Agency</b> <b>11815 NE 99<sup>th</sup> St. Suite 1294</b> <b>Vancouver, WA 98682-2454</b>	<b>360-574-3058, 1-800-633-0709</b> <b>FAX: 360-576-0925</b> <b>24hr Burn Line: 360-574-0057</b>
<b>Washington Department of Ecology</b> <b>Air Quality Program</b> <b>P.O. Box 47600, Olympia, WA 98504-7600</b>	<b>360-407-6889</b>
<b>Wahkiakum County Burn Information Line</b>	<b>360-795-3301 (Public Works Dept.)</b>
<b>Cathlamet Fire Department</b>	<b>Report fires by calling 911</b> <b>fax</b>
<b>Astoria Fire Department</b> <b>555 30<sup>th</sup> St.</b> <b>Astoria OR 97103</b>	<b>Lenard Hansen, Fire Chief</b> <b>503-325-4411 (Emergency Number)</b> <b>503-325-2345 (Fire Chief)</b>

<b>Knappa-Svensen-Burnside Rural Fire Protection Department</b> 43114 Hillcrest Loop Astoria OR 97103-9537	Paul Olheiser, Fire Chief 503-458-6610 Fax 503-458-6228 Report fires by calling 911 Radio frequency = 158.955 Mhz
<b>Westport-Wauna Rural Fire Protection District</b> P.O. Box 5149 Westport OR 97016	<b>Jeff Stone, Fire Chief</b> 503-455-0727
<b>Oregon Department Of Environmental Quality</b> Northwest Oregon Region 2020 SW 4 <sup>th</sup> Ave Suite 400 Portland, OR 97201	<b>Phone: (503) 229-5263</b> <b>Fax: (503) 229-6945</b>
<b>Wahkiakum County Fire District #2</b> P.O. Box 145 Skamokawa, WA 98647	<b>360-795-0707 (Business Calls)</b> <b>360-795-3911 (Emergency Information Line)</b> <b>911 (Emergency)</b>
<b>Hospital</b>	
<b>Washington Dept. of Transportation - Raymond</b>	<b>360-942-2092 Report road issues</b>
<b>Wahkiakum PUD #1</b>	<b>360-795-3266 Report electrical issues</b>
<b>Federal Occupational Safety and Health Administration (OSHA)</b>	<b>1-800-321-6742 Report employee fatalities or hospitalization of &gt;3 employees</b>

## APPENDIX H: WILLAPA NWR COMPLEX RADIO FREQUENCIES AND USE POLICY

Revised July 17, 2002

### Radio Assignments

Portable radios are assigned to all permanent field staff. Other staff are assigned radios on an “as needed basis”. Twelve radios are currently assigned to Willapa Refuge and seven to Julia Butler Hansen Refuge. Radios will be moved between refuges for specific projects as needed.

### Base Station Monitoring

The base station at the Willapa Office will be monitored during normal work hours from 7:30 a.m. to 4 p.m. daily. The administrative assistant or a designate will be responsible for monitoring radio traffic. As a backup, the Refuge Manager or a designate at JBH Refuge will, when practical, monitor radio traffic at JBH and Lewis and Clark NWR.

### Frequency Use and Monitoring

“FWS A” will be the standard frequency used for most refuge radio traffic. “FWS D” may be used as a backup or secondary channel to “FWS A”. Both of these are direct (radio to radio) communication frequencies that do not use repeaters. Over longer distances, the “Radar A” repeater channel will be the standard frequency used. Since the “FWS A” and “FWS D” and “Radar A” channels are on different frequencies, all channels should be monitored using the scan feature. “Radar D” will not work until the repeater site is upgraded to a digital format. The Larch Mtn. Repeater, “Larch A”, near Vancouver may be used for communication in the areas upriver of JBH Refuge, including the Wallace, Crimms, Lord and Walker Island areas.

### Radio Programming

The radios can be field programmed by the designated Radio Communications Officer (currently the Refuge Manager at Julia Butler Hansen Refuge). Before programming frequencies of other agencies or organizations into the refuge radios, written permission will need to be obtained from the agency whose frequency is being used.

### Radio Equipment Storage

Radios will be stored in a secure location when not in use. Unassigned radios should be stored in a locked or otherwise secure area. Generally, one area in each maintenance shop and one area in each headquarters should be designated as a centralized radio site. Each centralized site will have radio chargers, extra batteries, and copies of the radio user guides. Programming software, computer programming cable and a cloning cable are located at the JBH Refuge office.

Table 7. Willapa NWRC Radio Call Signs.							
<b>WILLAPA NWR</b>		<b>Revised July 2002</b>		<b>JBH NWR</b>		<b>Revised July 2002</b>	
Base		W30		Base		C40	
Project Leader-Stenvall		W21		Refuge Mgr-David		C41	
Deputy Proj. Ldr-Butler		W22		Maintenance-McFall		C42	
Admin. Officer-Chapman		W23		Maintenance 2- Temp		C43	
Purchasing Agent-Wilson		W24		Maintenance 3- Temp		C44	
Boat Operator-Zavodsky		W25		Temp.		C45	
Boat Operator-McClain		W26		Biologist-Clark		C46	
Refuge Mgr-		W31		Biologist- Temp		C47	
Boat Operator-Bates		W32		<b>Non-Refuge Call Signs:</b>			
Maintenance-McGuigan		W33		USFW Law Enforcement		J225	
Maintenance-Baxter		W34		DNR Sign-off		KE9669	
Maintenance-Shaun Matthews		W35		WDFW-Jay Brightbill		Wildlife 97	
Biologist-Fernandez		W36		WDFW-Pat Miller		Wildlife 900	
Biologist-Brennan		W37		WDFW Law Enf.-Mike Cenci		Wildlife 23	
Rec. Planner-Shine		W38		WDFW Law Enf.-Dan Bolton		Wildlife 201	
YCC Crew Leader-		YCC1		WDFW Terri Ray-Smith		Wildlife 171	
				WDFW Dan Chadwick		Wildlife 170	

Table 8. Willapa NWRC Radio Frequencies.					
<b>USFWS ZONE</b>			<b>Frequency</b>		
<b>Name</b>	<b>Description</b>	<b>Type/Area</b>	<b>TX</b>	<b>RX</b>	<b>TX Tone</b>
FWS A	Refuge Direct	Analog	164.575		164.575
Radar A	Government repeater on Radar Ridge, WA	Analog, Naselle	168.150	168.725	156.7

Radar D	Government repeater on Radar Ridge, WA	Digital, Naselle	(not being used at this time)		
Larch A	Government repeater on Larch Mtn, WA	Analog, Vancouver	164.150	172.275	156.7
Larch D	Government repeater on Larch Mtn, WA	Digital, Vancouver	164.150	172.275	
Captl A	Government repeater on Capitol Pk, WA	Analog, Olympia	151.430	159.285	156.7
Captl D	Government repeater on Capitol Pk, WA	Digital, Olympia			
User 1	Open frequency				
User 2	Open frequency				
Marine 06	Marine safety			156.300	
Marine 16	Marine distress			156.800	
Marine 22	Coast Guard information			157.100	
Marine 68	Cathlamet Marina, WA			156.425	
WX 1	National Weather Service Astoria			164.400	
WX 2	National Weather Service Olympia			164.475	
FWS D	Refuge Direct	Digital	164.575	164.575	
FWSold	Ridgefield Direct, Old complex frequency				
<b><u>STATE ZONE</u></b>			<b>Frequency</b>		
<b>Name</b>	<b>Description</b>	<b>Type/Area</b>	<b>TX</b>	<b>RX</b>	<b>TX Tone</b>
DNRCOM	DNR Direct Channel		154.415	154.414	

STATECOM	State Interagency Channel		155.970	155.970		
DNRABNTY	DNR Repeater	Abernathy Mtn, WA	151.295	159.420	103.5	
DNRNICOL	DNR Repeater	Mt. Nicholai, WA				
		DNRLARCH	DNR Repeater	Larch Mtn., WA		
DNRRADAR	DNR Repeater	Radar Ridge, WA				

COMRADAR	DNR Common Repeater	Radar Ridge, WA	151.295	159.420	118.8
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## **WILLAPA NWR COMPLEX RADIO REPEATER INSTRUCTIONS**

### **RADIO TO RADIO**

1. Turn Scan off and Select **Radar A** or **Larch A** channels.
2. Make certain green transmit light on radio is off before proceeding. ( Note: When the light is on, someone else is transmitting.)
3. Hold transmit button in and press "1" on key pad and then release transmit button.
4. Wait another ½ second and then press transmit button and enter "023" on the key pad and release transmit button.
5. When radio rings press transmit button to stop ringing and call unit number you are trying to reach. After you punch in the "023" be aware that all complex radios will ring. (Note: Any non-refuge unit with the proper frequency will also be able to monitor your radio traffic.)
6. Press the "#" on the key pad to terminate the connection. Listen for 3 beeps which is the termination signal for the repeater.

### **RADIO TO PHONE**

1. Turn Scan off and Select **RADAR A** or **LARCH A** Channel.
2. Make certain green transmit light on radio is off before proceeding. ( Note: When the light is on, it means someone else is transmitting.)
3. Hold transmit button in and press "\*" on key pad; release transmit button and wait for a dial tone.
4. Press transmit button. Enter "9" on key pad; release transmit button and wait for second dial tone.
5. Press transmit button and then dial the local number or a calling card number to dial a long distance. When using a calling card you will need to wait for a tone and then enter a calling card number, wait again, and then enter the long distance number you want to call. (Note: Any non-refuge unit with the proper frequency will be able to monitor your radio/phone traffic.)
6. Press the "#" on the key pad to terminate the connection. Listen for 3 beeps which is the termination signal for the repeater.

### **Note**

- \* Local calls for the 875 prefix cover the Nasalle/South Bend area, including the Willapa NWR Office. Calling the JBH Office is long distance.
- \* You must begin dialing the desired phone number within six seconds.
- \* If you are on hold, key the transmit button every 15 seconds to maintain the connection
- \* The phone connection has an automatic hangup after 10 minutes.
- \* If you get a busy signal or the party you are talking to hangs up before you do, use the "#" button to terminate the call.

### **PHONE TO RADIO**

1. Dial the phone number for the **RADAR RIDGE** or **LARCH MTN REPEATER**.
2. When the tone is heard dial "023". (Note: Any non-refuge unit with the proper frequency will be able to monitor your radio/phone traffic.)
3. After four rings wait five more seconds for the user to answer. The repeater will disconnect automatically if there is no answer.

### **Note**

- \* All Complex Radios will ring when using "023".
- \* The **RADAR A** and **LARCH A** channels should be used to monitor phone calls.

### **APPENDIX I: NEIGHBORING LANDOWNER CONTACT LIST**

Land owners bordering the mainland refuge and within one quarter mile are included in this list. Tract numbers on county assessor's maps are listed in parenthesis. Acres owned show county assessor acres in

parenthesis. The phone number listed for businesses is either for the main office or specifically for reporting fires. Information regarding structures on the property is based on visual observations from public roads and topographic maps; this information has not be verified.

Legal Location	Tract No on Map	Name and Address	Phone Number	Acres Owned	Structures on Property	Neighboring Refuge Unit
T9N, R6W, S35 S½ N½	WM Strong DLC	Cathlamet Timber Company C/O The Campbell Group 1 SW Columbia Suite #1700 Portland, OR 97258		94.22		Mainland
T9N, R6W, S35	Pt Lts 2 & 4 Lts 5 & WM Strong	Cathlamet Chip Corporation C/O The Campbell Group 1 SW Columbia Suite #1700 Portland, OR 97258		30.78		Mainland
T9N, R6W, S27	Lts 9 & 10	Cathlamet Timber Company C/O The Campbell Group 1 SW Columbia Suite #1700 Portland, OR 97258		N/A		Mainland
T9N, R6W, S35 N½	Pt WM Strong	Cathlamet Chip Corporation C/O The Campbell Group 1 SW Columbia Suite #1700 Portland, OR 97258		1.15		Mainland
T9N, R6W, S34	Lts 2 & 5	Cathlamet Timber Company C/O The Campbell Group 1 SW Columbia Suite #1700 Portland, OR 97258		N/A		Mainland
T9, R6, S35 NE¼ NW¼ & N½	Pt Lts 2,4 & Pt WM Strong	Doumit Trust, Elizabeth PO Box 402 Cathlamet WA 98612		157		Mainland
T9, R6, S34	Pt Lt 1 OD Island	Wahkiakum County		8.6		Mainland
T9, R6, S28	Frt Lt 1	Wahkiakum County		N/A		Mainland
T9, R6, S27	Frt Lt 2	Wahkiakum County		N/A		Mainland
T9, R6, S27	Pt Lt 5	Wahkiakum County		1		Mainland
T09, R06, S16	Pt Lt NW4NW4	State Of Washington		1.12		Mainland
T09, R06, S16	Pt Lt Nw4Nw4	Boise Cascade Corp PO Box 83773 Boise, ID 83707		3.6		Mainland
T08, R06, S2	Lts 1 & 2	Bureau of Indian Affairs		91.8		Mainland
T08, R06, S3 NE¼ NE¼	Pt Lt 3	Bureau of Indian Affairs		64.5		Mainland

**APPENDIX J: FIRE SUPPRESSION EQUIPMENT AT JULIA BUTLER HANSEN REFUGE.**

Table 10. Fire Suppression Equipment Inventory for JBH Refuge.				Revised August 2002
Equipment	Qty On Hand	NUS Qty	Location	Notes
rations (MREs)		4		
fire shelters	6	4	Mainland Shop	Age?
hard hats with chin strap	4	4	Mainland Shop	2 on pumper trailer
head lamps	3	4	Mainland Shop	
goggles	5	4	Mainland Shop	
ear plugs		6		
fire pack		4		
first aid kit, individual	1	4	Mainland Shop	
sleeping bags		4		
water bottles (1 quart)		12		
tents		3		
leather gloves, large	pairs	3		
leather gloves, medium	pairs	3		
leather gloves, small		3		
Nomex or Aramid pants	2 waist 30	8	Mainland Shop	To be sized for red-carded individuals
Nomex or Aramid shirt, ylw	3 (med)	9	Mainland Shop	To be sized for red-carded individuals
shovels	2	7	Mainland Shop	2 on pumper trailer
brush axe, sandvic (dbl edge axe)	2	7	Mainland Shop	2 on pumper trailer
Pulaski	2	7	Mainland Shop	2 on pumper trailer
McLeods		7		
fire rake		7		
rippers?		7		
backpack water pump (plastic)	3	2	Mainland Shop	3 on pumper trailer
backpack water pump (metal)		0		
Fold-A-Tank		1		
hose, syn. lined, 1.0" x 100'		9	Mainland Shop	Have 2 -50' hoses

hose, syn. lined, 1.5" x 100'		9		
hose, syn. lined, 2" x 100'	2	0	Mainland Shop	Also have 2 -50' hoses
nozzles, 1" and 1.5" portable pump		3		
wyes		3		
tees		3		
wrenches		3		
relief valves		3		
hose clamps		4		
adapters		2		
reducers		2		
slip-on water pump, on trailer	1			200-gal 4-stage centrifugal pump, 9 hp, w/1" hoses
floating water pumps	2		Mainland Shop, Tensasillahe Shop	Hale Fyr brand?
Husqvarna 61 chainsaw				
chainsaw chaps		1		
ear muffs		1		
face shield		1		
dust mask		3		
radio harness	1			

**APPENDIX K: DEBRIS PILE BURN PLAN**

This plan is intended for burning debris and piles (activity fuels) from refuge operations such as fuel break construction and hazard reduction. This plan format should only be used outside of declared fire season for the area considered. **THIS PLAN IS FOR COMPLEXITY LEVEL 3 PILE BURNING.** This pile burn plan is intended for admin sites, campgrounds, occupancy trespass, etc.

**Refuge:**

**Project Name:** \_\_\_\_\_

**Prepared By:**

**Reviewed By:**

**Refuge Manager Approval:**

**Environmental Assessment Met** (cite document and location):

**Estimated Cost:** \$ **1202:**

**Funding**

**Project Area Description** (Attach Map of Burn Area):

**General Description of Location:**

<b>Location:</b>	Township	Range	Section
	Lat		Long

**Burn Objectives:**

**Number, Plant Species/type of debris, Spacing and Size of Piles** (height, width, length):

**Adjacent Fuel Description:**

**Weather Forecasts:** The Pile Burn Boss is responsible for weather being taken every hour, while burning to ensure prescription compliance. Contact the Emergency Communications Center (ECC) for weather forecasts and burn day designation. Contact ECC by radio when ignition is starting, giving legal description of area burning; and when burning is over, giving number of acres or piles burned.

**Prescription:**

**Season of Burn** (Fall, Spring, Summer, Winter):

Parameter	Acceptable Range	Desired Range
Air Temperature		
Relative Humidity		
Wind Speed		
Fuel Moisture 1 Hour T.L.		

Fuel Moisture 10 Hour T.L.		
Fuel Moisture 100 Hour T.L.		
Adjacent Live Fuel Moisture Low/High		

Wind Direction Preferred	Acceptable:	Unacceptable:
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**Smoke Management**

**Permitting Agency:**

**Total Tons Per Acre Emissions:**

**Distance and Direction from Smoke Sensitive Area(s):**

**Necessary Transport Wind Direction(s):**

**Visibility Hazard(s) (i.e., roads, airports, etc.):**

**Actions to Reduce Visibility Hazard(s):**

**Can Residual Smoke Be a Problem?**

**Other Considerations:**

**Special Constraints/Considerations:**

**Firing Technique:**

**Holding Force Instructions:**

**Mop Up Instructions:**

**Contact Plan**

(Indicate who will notify the following and when):

**Key People:**

**Local Landowners:**

**Private Land Within Proposed Burn (Identify on Map):**

**Fire Protection Agencies:**

**Dispatcher:**

**Public Affairs Officer:**

**News Releases to Local Papers and News Media:**

## **Safety Plan**

All line employees involved in the actual burning of standing and/or piled fuels will have on their person and use as necessary the following protective clothing:

1. Hard hat
2. Goggles
3. Gloves
4. Fire resistant pants
5. Fire resistant shirt
6. Fire shelter
7. Laced boots as used in fire suppression

Employees involved in a project with an assignment not related to actual burning should have with them all of the above safety equipment and be so equipped if their unplanned duties expose them to line work and/or the actual burning.

Each burning plan will designate fire safety responsibility. This designation should include the following considerations:

1. Escape routes
2. Safety areas
3. Closest recognized burn treatment facility and specific methods of travel to burn center or hospital

## **Hospitals**

Burn Center Name and Address:

Travel Time:

Helipad

Air/Ground Phone No.

## **Medical Emergency Procedures**

1. Give First Aid at scene.
2. Contact County Fire Department
3. Make transportation arrangements.

Comments:

## **Debris & Pile Burning Checklists**

1. Is there an EA or other NEPA document done (optional)?
2. Are the resource management objectives documented?

3. Is the pile less than 1 ton per pile and completely dried?
4. Are required minimum resources (equipment & personnel) available?
5. Have weather parameters been established?
6. Is there a low potential for escape? Good clearance?
7. Is it a burn day?
8. Have the necessary permits been obtained?

**Note:**

No fire behavior prediction is required.

Plan can be written to be valid up to 3 years per site, with annual review.

Pile burns must be less than (<) one acre in size and the complexity level should rate as level 3.

**Go/No Go Checklist:**

*A "NO" response to any items below means STOP, do not burn the piles!*

1. Are all fire prescriptions met?
2. Has dispatch been notified?
3. Is it a permissive burn day?
4. Is fire weather forecast favorable?
5. Are all personnel required in the burn plan on site?
6. Have all personnel been briefed on the burn plan requirements?
7. Have all personnel been briefed on safety hazards, escape routes and safety orders?
8. Is all the required equipment in place and in working order?
9. Are all personnel aware of mop up requirements before abandonment?
10. Are all answers to all the above questions "Yes"?

If all ten questions have been answered "Yes", you may proceed with lighting.

**APPENDIX L: INCIDENT COMMANDER LIMITED DELEGATION OF AUTHORITY**

**for  
Julia Butler Hansen Refuge for the Columbian White-tailed Deer  
Lewis and Clark National Wildlife Refuge  
Ilwaco, Washington**

As of <time>, <date>, I have delegated authority to manage the <fire name> fire, number <fire number>, Julia Butler Hansen and Lewis and Clark National Wildlife Refuge, to Incident Commander <commander's name> and his Incident Management Team.

The fire which originated <description of origination, e.g. lightning strike, man caused, etc> occurring on <date>, is burning <general location, e.g. at Leadbetter Point>. My considerations for management of this fire are: <the following are example considerations, edit as needed>

1. Provide for firefighter safety.
2. I would like the fire managed under a full suppression strategy with suppression actions done with as little environmental damage as possible.
3. Key cultural features and facilities requiring priority protection are: <list any>.
4. Key resource considerations are: <list any, including protecting endangered species by <list special measures to be taken>
5. Restricts for suppression actions are no tracked vehicles on <list soil types or areas> except where roads exist and are identified for use, and no retardant will be utilized.
6. Minimum tools for use are Type II/III helicopters, chainsaws, flaps and weed whips.
7. The Fish and Wildlife Service Resource Advisor will be refuge Biologist <person's name>.
8. <list areas of the fire> of the fire borders private property that must be protected if threatened. <person's name> of the <fire district or department name and no> will be the local representative.
9. Managing the fire cost-effectively for the values at risk is a significant concern.
10. Providing training opportunities for <internal personnel and external cooperators> is requested to strengthen our fire organization's capabilities.
11. Minimum disruption of residential access to private property while maintaining public safety.
12. Use of tracked vehicles is authorized to protect <area>.

\_\_\_\_\_  
Charles Stenvall, Project Leader,  
Willapa National Wildlife Refuge Complex

\_\_\_\_\_  
Date

**Amendment to Delegation of Authority**

The Delegation of Authority dated <date of above>, issued to Incident Commander <name> for the management of the <fire name> fire, number <fire number> is hereby amended as follows:

<list amended items>

This amended Delegation of Authority will be effective <time>, <date>.

\_\_\_\_\_  
Charles Stenvall, Project Leader,  
Willapa National Wildlife Refuge Complex

\_\_\_\_\_  
Date

# WILDLAND FIRE SITUATION ANALYSIS

Incident Name: \_\_\_\_\_

Jurisdiction: \_\_\_\_\_

Date and Time Completed: \_\_\_\_\_

<b>I. Wildland Fire Situation Analysis</b>	
To be completed by the Agency Administrator(s)	
<b>A. Jurisdiction(s):</b>	<b>B. Geographic Area:</b>

<b>C. Units:</b>	<b>D. WFSA#:</b>
<b>E. Fire Name:</b>	<b>F. Incident #:</b>

**G. Accounting Code:**

**H. Date and 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)		

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* Required		
** Required by FWS		

**II. Objectives**

To be completed by the Fire Manager and/or Incident Commander

**A. Objectives (must be specific and measurable):**

1. Safety

<p>– Public:</p>   <p>– Firefighter:</p>
2. Economic
3. Environmental
4. Social
5. Other
<b>B. Constraints</b>

<b>III. Alternatives</b>			
To be completed by Agency Administrator(s) and Fire Manager and/or Incident Commander			
<b>Alternatives</b>	<b>A</b>	<b>B</b>	<b>C</b>
<b>A. Wildland Fire Strategy</b>			

<b>B. Narrative</b>			
<b>C. Resources Needed</b> <ul style="list-style-type: none"> <li>– Handcrews</li> <li>– Engines</li> <li>– Dozers</li> <li>– Air Tankers</li> <li>– Helicopters</li> </ul>			
<b>D. Final Size</b>			
<b>E. Est. Control/ Contain Date</b>			
<b>F. Costs</b>			
		<b>G. Risk Assessment</b> <ul style="list-style-type: none"> <li>– Probability of Success</li>   <li>– Consequence of Failure</li> </ul>	
<b>H. Complexity</b>			
<b>I. Attach maps for each alternative</b>			
<b>IV. Evaluation of Alternatives</b>			
To be completed by Agency Administrator(s) and Fire Manager and/or Incident Commander			
<b>A. Evaluation Process</b>	<b>A</b>	<b>B</b>	<b>C</b>
<ul style="list-style-type: none"> <li>– Safety</li> <li>Firefighter</li> <li>Aviation</li> <li>Public</li> </ul>			

<i>Sum of Safety Values</i>			
<ul style="list-style-type: none"> <li>- <b>Economic</b></li> <li>Forage</li> <li>Improvements</li> <li>Recreation</li> <li>Timber</li> <li>Water</li> <li>Wilderness</li> <li>Wildlife</li> <li>Other (specify)</li> </ul>			
<i>Sum of Economic Values</i>			
<ul style="list-style-type: none"> <li>- <b>Environmental</b></li> <li>Air</li> <li>Visual</li> <li>Fuels</li> <li>T &amp; E Species</li> <li>Other (specify)</li> </ul>			
<i>Sum of Environmental Values</i>			
		<ul style="list-style-type: none"> <li>- <b>Social</b></li> <li>Employment</li> <li>Public Concern</li> <li>Cultural</li> <li>Other (specify)</li> </ul>	
<i>Sum of Social Values</i>			
- <b>Other</b>			

<b>V. Analysis Summary</b>			
To be completed by the Agency Administrator(s) and Fire Manager and/or Incident Commander			
<b>Alternatives</b>	<b>A</b>	<b>B</b>	<b>C</b>
<b>A. Compliance with Objectives</b> <ul style="list-style-type: none"> <li>- Safety</li> <li>- Economic</li> <li>- Environmental</li> <li>- Social</li> <li>- Other</li> </ul>			

<b>B. Pertinent Data</b> – Final Fire Size – Complexity – Suppression Cost – Resource Values – Probability of Success – Consequences of Failure			
<b>C. External/Internal Influences</b> – National and Geographic Preparedness Level – Incident Priority – Resource Availability – Weather Forecast (long range) – Fire Behavior Projections			

<b>VI. Decision</b>	
To be completed by Agency Administrator(s) or Designate	
<b>The Selected Alternative Is:</b>	
<b>Rationale:</b>	
<b>Agency Administrator's Signature</b>	<b>Date/Time</b>

<b>VII. Daily Review</b>
To be completed by the Agency Administrator(s) or Designate Selected to be reviewed daily until containment or control to determine if still valid

			P R E P A R E D N E S S  L E V E L	I N C I D E N T  P R I O R I T Y	R E S O U R C E  A V A I L A B I L I T Y	W E A T H E R  F O R E C A S T	F I R E  B E H A V I O R  P R O J E C T I O N S	W F S A  V A L I D
Date	Time	By						


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**IF WFSA IS NO LONGER VALID, A NEW WFSA WILL BE COMPLETED!**

## VIII. Final Review

The elements of the selected alternative were met on \_\_\_\_\_ at \_\_\_\_\_  
Date Time

By: \_\_\_\_\_ (Agency Administrator)

## INSTRUCTIONS

### 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.

### 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.

### **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.

### **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.)

### **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 WFSAs are 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.

**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 WFSAs 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 "WFSAs Valid" to continue use of this WFSAs. A "no" indicates this WFSAs is no longer valid and another WFSAs 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 WFSAs are met.

## **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**

**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:** \_\_\_\_\_  
**Name and Title**

**Date and Time**