

# WILDLAND FIRE MANAGEMENT PLAN MID-COLUMBIA RIVER COMPLEX



2001

Cold Springs National Wildlife Refuge  
and  
McKay Creek National Wildlife Refuge  
in  
Umatilla County, Oregon

McNary National Wildlife Refuge  
in  
Walla Walla County, Washington/Umatilla County, Oregon

Umatilla National Wildlife Refuge  
on both  
Morrow County, Oregon  
and  
Benton County, Washington

Toppenish National Wildlife Refuge  
in  
Yakima County, Washington



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## EXECUTIVE SUMMARY

This plan is written to provide guidelines for appropriate wildland fire suppression and prescribed fire programs on the five refuges of the Mid-Columbia River National Wildlife Refuge Complex. The plan provides a conceptual framework under which more specific prescribed fire plans can be written. As such, this plan is not intended to provide precise prescriptions for individual burn units for the refuges, thus allowing for the flexibility needed to address unanticipated changes in conditions.

The plan will allow the general public to better understand the objectives, rationale and direction of fire management on the refuge and will improve the cooperation and communication among various programs within the refuge as well as cooperators. The plan is intended to guide management of the refuges for the next ten years, although revisions to the FMP that do not change strategies (e.g., updating phone numbers) will be made annually. Major changes in fire management strategies related to changes in wildlife populations, vegetative conditions, or administrative policies will require a reinitiation of the Plan.

All Refuges of the complex are located in arid, north-central Oregon and south-central Washington. All units have a history of annual wildland fires. The complex also averages twenty prescribed fires annually. The complex will continue an active program to suppress all wildland fires which occur on the refuges to protect private and public lands and facilities. The Service will also continue an active prescribed fire program to reduce hazardous fuel loadings, restore natural processes and vitality, reduce non-native species, conduct research, and manage wildlife habitats.

## INTRODUCTION

This document is the Fire Management Plan for the lands managed by the Fish and Wildlife Service (FWS) at the Mid-Columbia River National Wildlife Refuge Complex, hereafter referred to as the Complex (Figure 1). The Complex office is located in Pasco, Washington. Five refuges comprise the Complex: Cold Springs National Wildlife Refuge and McKay Creek National Wildlife Refuge are located entirely in Oregon, Toppenish National Wildlife Refuge is located entirely in Washington, and McNary National Wildlife Refuge and Umatilla National Wildlife Refuge are located in both states. This plan meets the requirements of the National Environmental Protection Act (NEPA) and the National Historic Preservation Act. An Environmental Assessment for this plan was issued on March 1, 2001 (Appendix I). Both the Ecological Services Branch of the FWS and the National Marine Fisheries Service concurred on informal Section 7 consultations that this plan would not adversely impact endangered species (Appendix I). A Finding of No Significant Impact (FONSI) is in appendix I.

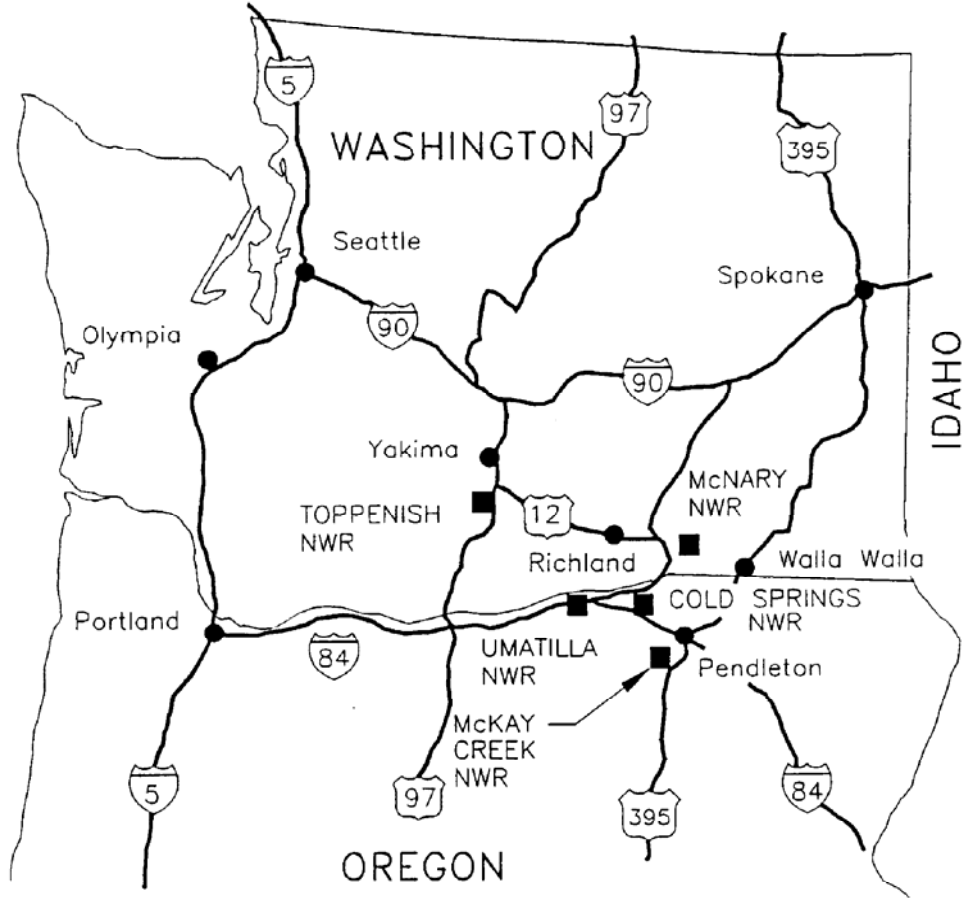
This plan is an operational guide for managing both the Complex's wildland and prescribed fire programs. The plan defines levels of protection needed to promote safety, protect facilities and resources, and restore and perpetuate natural processes, given current understanding of the complex relationships in natural ecosystems. The plan complies with a Service-wide requirement that refuges with burnable vegetation develop a fire management plan (620 DM 1).

This plan details both wildland fire suppression and prescribed fire application on the Complex. The Complex will suppress all wildland fires using appropriate management strategies. Prescribed fire will reduce hazardous fuels and/or improve wildlife habitat through the preparation of prescribed fire plans.

The Complex relies upon interagency cooperation from other FWS offices, the signatory agencies to cooperative agreements, and the state and federal agencies available from the Pendleton Interagency Communication Center.



Figure 1: Mid-Columbia River Refuges



## COMPLIANCE WITH USFWS POLICY

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

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

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

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

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

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

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

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

The authority for FIREBASE funding (normal fire year programming) and all emergency fire accounts is found in the following authorities:

- Section 102 of the General Provisions of the Department of Interior's annual Appropriations Bill provides the authority under which appropriated monies can be expended or transferred to fund expenditures arising from the emergency prevention and suppression of wildland fire.
- P.L. 101-121, Department of the Interior and Related Agencies Appropriation Act of 1990, established the funding mechanism for normal year expenditures of funds for fire management purposes.
- 31 US Code 665(E)(1)(B) provides the authority to exceed appropriations due to wildland fire management activities involving the safety of human life and protection of property.

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

The Reciprocal Fire Protection Act of May 27, 1955 (42 USC 815a; 69Stat 66) provides Authorities to enter into agreements with other Federal bureaus and agencies; with state, county, and municipal governments; and with private companies, groups, corporations, and individuals regarding fire activities.

Authority for interagency agreements is found in “Interagency Agreement between the Bureau of Land Management, Bureau of Indian Affairs, National Park Service, US Fish and Wildlife Service of the United States Department of the Interior and the Forest Service of the United States Department of Agriculture” (1996).

The statutory authorities for fire management on FWS lands or lands adjacent thereto are as follows:

The Protection Act of September 20, 1922 (42 Stat. 857;16 USC 594), which authorizes the Secretary of the Interior not only to protect Departmental land from fire, but also to cooperate with both Federal and state agencies, as well as private land-owners.

The Economy Act of June 30, 1932 (47 Stat. 417; 31 U.S.C. 1535), which authorizes Federal agencies to enter into contracts and agreements for services with each other.

The Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856a) as amended by The Wildfire Suppression Assistance Act of 1989 (102 Stat. 1615), which 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 facilities in extinguishing fires when no agreement exists.

The National Wildlife Refuge System Administration Act of 1966, as amended by The National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd-668ee), which governs the administration and use of the National Wildlife Refuge System.

Disaster Relief Act of May 22, 1974 (88 Stat.143; 42 U.S.C. 5121), which authorizes Federal agencies to assist State and local governments during emergency or major disaster by direction of the President.

Federal Fire Prevention and Control Act of October 19, 1974 et seq. (88 Stat. 1535; 15 U.S.C. 2201) as amended, which authorizes reimbursement to State and local fire services for costs incurred in firefighting on Federal Property.

Federal Grants and Cooperative Act of 1977 (Pub. L. 95-244, as amended by Pub. L. 97-258, September 13, 1982. 96 Stat. 1003; 31 U.S.C. 6301-6308), which eliminates unnecessary administrative requirements on recipients of Government awards by characterizing the relationship between executive agencies and contractors, States and local governments and other recipients in acquiring property and services in providing U. S. Government assistance.

Supplemental Appropriation Act of September 10, 1982 (96 Stat. 837), which authorizes both the Secretary of the Interior and the Secretary of Agriculture to enter into contracts with State and local government entities, including local fire districts, for procurement of services in pre-suppression, detection and suppression of fires on any unit within their jurisdiction.

Authorities for establishment and management for each of the Refuges in the complex are as follows:

President Theodore Roosevelt established Cold Springs Refuge on February 25, 1909 with Executive Order 1032, "...as a preserve and breeding ground for native birds." President William Taft enlarged it on November 25, 1911 through Executive Order No. 1439. The name was changed to Cold Springs National Wildlife Refuge on March 21, 1940 by Executive Order No. 8380 (Franklin Roosevelt). An additional 280 acres were added on March 4, 1955 by withdrawal from public domain (PLO 1083).

McKay Creek Refuge was established in 1927 by Executive Order #4662 as a refuge and breeding ground for birds. The Refuge is managed under a Memorandum of Understanding between the Bureau of Reclamation and the FWS.

Umatilla Refuge was established as mitigation for the impacts to wildlife through the construction of the John Day Lock and Dam Project (Lake Umatilla). The Refuge protects the nesting islands and brooding areas for Great Basin Canada geese through a cooperative agreement between the Department of Army and the Department of Interior, July 3<sup>rd</sup> 1969 and Public Law 89-297 and Section 204 of 89-289 Rivers and Harbors Act of 1965 (Fish and Wildlife Coordination Act – U.S.C. 664).

McNary Refuge was established by a cooperative agreement dated December 29<sup>th</sup>, 1955 with the U.S. Army Corps of Engineers as mitigation for the wildlife habitat losses caused by the flooding of the Columbia River corridor with the completion of the McNary Dam. "For use as an inviolate sanctuary, for any other management purpose, for migratory birds." 1 U.S.C. § 715d (Migratory Bird Conservation Act). The agreement stated that the Refuge, "shall be administered by [the Secretary of the Interior] directly or in accordance with cooperative agreements... and in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife, resources thereof, and its habitat thereon..." (Fish and Wildlife Coordination Act). In August 1999, jurisdiction over the Refuge transferred from the Army Corps of Engineers to the Service (H.R. 1480 Section 340, Water Resources Development Act of 1999). A cooperative agreement between the Army Corps of Engineers and the FWS added approximately 12,500 acres of land to McNary Refuge. This cooperative agreement extends the Refuge down the Columbia River into Oregon, in addition to lands at the mouth of the Walla Walla river.

Toppenish Refuge was established in 1964 to provide resting areas and food for wintering waterfowl. The U.S. Fish and Wildlife Service hold Refuge lands in fee title ownership. "...Suitable for—(1) incidental fish and wildlife-oriented recreation development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species..." 16 U.S.C. § 460k-1 (Refuge Recreation Act). "for use as an inviolate sanctuary, for any other management purpose, for migratory birds." 1 U.S.C. § 715d (Migratory Bird Conservation Act).

Strategies from DM 1.6:

A. Within the framework of land use objectives and plans, overall wildland fire benefits will be maximized and damages minimized giving full consideration to the following within each appropriate management response:

- (1) Firefighter and public safety. No wildland fire situation, with the possible exception of threat to human survival, requires the exposure of firefighters to life-threatening situations.
- (2) Implementing a protective and effective wildland fire education/prevention/trespass program.
- (3) Prudent expenditure of public funds.
- (4) Impact on natural and cultural resources and the environment.
- (5) Integrating cooperative wildland fire management actions with other bureaus or with other qualified wildland fire management organizations.
- (6) Timely emergency fire rehabilitation/burned area emergency rehabilitation (EFR/BAER) and repair of fire suppression activity damage is performed within acceptable practices consistent with bureau policies and guidelines.

B. Wildland fires, whether on or adjacent to lands administered by the Department, which threaten life, improvements, or are determined to be a threat to natural and cultural resources or improvements under the Department's jurisdiction, will be considered emergencies and their suppression given priority over other Departmental programs.

C. In all cases where wildland fires could cross boundaries between lands administered by more than one agency or landowner, appropriate cooperative documents will be prepared.

D. If a wildland fire escapes initial management action or a prescribed fire should exceed prescription, further actions will be determined to achieve land and fire management objectives through an analysis of alternative management strategies using the Wildland Fire Situation Analysis (WFSA).

E. Bureaus shall cooperate in the development of interagency preparedness plans to ensure timely recognition of approaching critical wildland fire situations; to establish processes for analyzing situations and establishing priorities, and for implementing appropriate management responses to these situations.

F. The agency administrator certifies daily that the selected management actions are appropriate and the necessary resources are available. If management actions become inappropriate or necessary resources are not available, a new appropriate management strategy will be implemented.

A review and update of the 1995 Federal wildland fire management policy issued in January 2001 states, "Firefighter and public safety is the first priority [of fire management activities]....Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be based on the values to be protected, human health and safety, and the costs of protection (pp 22-23)."

## **FIRE MANAGEMENT OBJECTIVES**

The Department of the Interior manual (620 DM 1) lists the following wildland fire management objectives:

- Provide for firefighter and public safety in every fire management activity.
- Make full use of wildland fire and prescribed fire both as a natural process and as a tool and incorporate the role of wildland fire as an essential ecological process and natural change agent into the planning process. Fire may also be used as a tool to maintain and restore cultural landscapes or to dispose of vegetation and debris.
- Develop fire management plans, programs, and activities which are based on the best available science; that incorporate public health and environmental quality considerations; and support bureau land, natural, and cultural resource management goals and objectives.
- Ensure economically viable fire management programs and activities are based on values to be protected; cost effectiveness; risk management; and land, natural, and cultural resource management objectives.
- Initiate and maintain full international, Federal, Tribal, State, and local interagency coordination, with the involvement of all parties, to insure cooperation, and collaboration.
- Standardize policies and procedures among Federal agencies and Tribes.
- In cooperation with other wildland fire management agencies, develop and implement prevention strategies at the local, regional and national levels.

The Service manual (621 FWS 1) makes the following additions to these Departmental policies.

- The Service will use only trained and certifiably qualified personnel to participate in the fire management program.
- The Service will integrate fire, as an ecological process, into resource management plans, based upon the best available science.
- The service will employ prescribed fire for managing resources and protecting against unwanted wildland fire whenever it threatens human life, property, and both natural and cultural resources.
- Once people are committed to an incident, the human resources become the highest value to receive protection.
- When the need arises to prioritize between property and natural/cultural resources, the Service will base the decision on relative protection values, commensurate with the fire management costs.
- The Service will provide safe, cost-effective fire management programs in support of land, natural and cultural resource management plans.

Specific Fire Management Objectives for the Complex include:

Objective 1: Reduce the incidence and extent of human-caused fires:

- Prevent unplanned human-caused ignitions through a cooperative fire prevention program aimed at the Refuge visitor, staff and neighbors.
- Minimize the occurrence of unwanted (human-caused) fires through reduction of hazard fuels by prescribed fire and/or mechanical treatment in and around developed areas and along Refuge boundaries.

Objective 2: Restore fire as a natural ecological process:

- Use fire in areas where fire is necessary to further natural ecological processes and the fuel load

and vegetative composition are within the range of natural variability.

- As funding allows, reconstruct Refuge fire history for use in future fire and resource management decision-making.

Objective 3: Use fire to meet management objectives:

- Where applicable, restore fuel loads, plant community structure, species composition and processes of native ecological communities and ecosystems to ranges of natural variability using prescribed fire.
- Minimize the occurrence of unnaturally intense fire through reduction of hazard fuels by prescribed burning.
- Minimize prescribed fire use that would reduce air quality in the surrounding communities by planning burns to minimize smoke impacts on surrounding communities.
- Train Refuge staff and cooperators to conduct safe, objective oriented prescribed fires and fire use consistent with USFWS policy.
- Provide opportunities for public understanding of fire ecology principles, smoke management, and wildland fire program objectives.
- Monitor and evaluate the effectiveness of the fire program.
- Use prescribed fire to enhance wildlife and plant species populations, reduce hazardous fuels, eliminate exotic or alien species, promote biological diversity, preserve endangered species, and dispose of vegetative waste and debris.
- Manage fire to minimize impact on Threatened and Endangered Species by identifying their location and ensuring that incident objectives include protecting those locations.
- Minimize impact on landscape by doing initial attack with aircraft using water and retardant and/or engines using water, foam and handtools for containment and by restricting the use of ground breaking equipment such as dozers and graders.

Objective 4: Protect life, property, and Refuge resources from the effects of unwanted fire:

- Provide for the safety of Refuge visitors, neighbors, and employees during all phases of wildland fire management operations.
- Suppress all unwanted fires in the Refuge and in the interagency mutual aid zone.
- Cooperate extensively with adjacent landowners through Memoranda of Understanding to facilitate safe and prompt suppression of wildland fires.
- Suppress all wildland fires while considering environmental and cultural resource impacts.
- Provide opportunities for public understanding of the wildland urban interface problem.
- Reduce the extent of human-caused fires by maintaining fire breaks and implementing fire restrictions when necessary.

Objective 5: Prevent the adverse impact from fire suppression:

- Suppress wildland fires utilizing strategies that consider potential impacts to natural and cultural resources.
- Use minimum impact fire suppression techniques and rehabilitate disturbed areas to protect natural, cultural, wilderness and scenic resources from adverse impacts attributable to fire suppression activities.
- Engender the understanding among Refuge staff and firefighters about the impacts of fire suppression on sensitive Refuge resources.
- Ensure that a resource advisor is present on all major suppression actions.

- Minimize the reduction of critical shrub-steppe habitat and the potential to damage cultural sites by minimizing acreage burned.

Fire is an essential part of the natural Columbia Basin ecosystem, and a primary tool available to resource managers for vegetation and habitat management. Proper use of adaptive management for the Complex's habitats is essential in meeting Refuge goals and objectives and Service bio-diversity mandates.

Fire can also have negative effects upon Complex programs when uncontrolled. Wildland fires can burn vegetation that was projected as use for wildlife forage or habitat for certain species. Wildland fires may also cause damage to improvements and sensitive areas. While the short-term damage from a wildland fire to the Complex could be serious, the long term effect upon Complex resources would most likely be negligible or positive. That is not true for adjacent ranches, communities and urban interface areas where fires can cause disastrous economic consequences. Since the area economy is dominated by farming, fire protection is a high priority. Fires escaping from the Complex could have considerable negative economic and political implications. Therefore, all wildland fires will be fully suppressed to minimize damage, and prescribed fire will be used to maximize benefits.



## DESCRIPTION OF REFUGE COMPLEX

### LOCATION

Five National Wildlife Refuges situated in north-central Oregon and south-central Washington comprise the Complex (Figure 1). Two of the five Refuges are located in Oregon. Cold Springs National Wildlife Refuge is located in Umatilla County Oregon. This 3,117 acre Refuge is approximately 15 miles northwest of Pendleton, Oregon, and 7 miles northeast of Hermiston, Oregon, with the Columbia River ten miles to the north. McKay Creek Refuge lies adjacent to the plains and Blue Mountains of arid northeast Oregon; the 1,837 acre Refuge is located 8 miles south of the town of Pendleton.

Two of the five Refuges are located in Washington and Oregon. McNary Refuge lies primarily along the Columbia River beginning at the confluence with the Snake River in Franklin and Walla Walla Counties, Washington and extends southward into Umatilla County, Oregon. The 15,600 acre Refuge consists of riverine, riparian, wetland, cropland, shrub-steppe, and basalt cliff habitats located within or adjacent to the the Snake, Columbia, and Walla Walla Rivers. Umatilla Refuge is located in Morrow County, Oregon and Benton County, Washington within and adjacent to the Columbia River downstream of the McNary Dam. This Refuge is the largest Refuge of the complex. Located between Irrigon, Oregon and Crow Butte State Park, Washington; the Refuge consists of approximately 29,370 acres of riverine, riparian, wetland, cropland, shrub-steppe, and basalt cliff habitats.

Toppenish Refuge is located in Yakima County, Washington. This 1,978 acre Refuge lies in the southern portion of the Yakima Valley floor, between the Rattlesnake Hills to the north and the Toppenish Ridge to the south.

### PHYSICAL RESOURCES

#### Climate

The climate of the Mid-Columbia River Basin is semi-arid, characterized by low annual precipitation and large interseasonal temperature fluctuations (Table 1). Hot summers and mild winters characterize the area. Precipitation for the region averages six to eight inches except McKay Refuge, adjacent to the Blue Mountains, that receives twelve inches annually. The diversified physiography of the area, with associated variety of relief features, permits a wide variation in temperature and precipitation over relatively short distances.

Portions of the basin are subject to violent convective storms of limited aerial extent in summer months. Lightning laden storms with little precipitation are a regular occurrence, particularly during the summer and account for a number of fires in the area. Vegetation begins to dry in early May, and summer rains are a rare occurrence. Daily high temperatures are often above 80° from mid-April into early September, and there are usually three weeks of the summer when temperatures reach above 100°. Afternoon winds are a regular occurrence during the spring and summer, and can build to high intensities throughout the day. Gusts of 40 miles per hour are common.

An inflow of air from the Pacific Ocean keeps the winters in the southern Columbia Basin generally mild. This air typically moves across the Cascade Mountains or through the Columbia Gorge. At times, this airflow is impeded by slow-moving high-pressure systems over the interior of the continent. Precipitation for the region is primarily caused by storms moving in from the Pacific Ocean. These storms reach their greatest intensity and frequency from October through April. The resultant winters in this area are dominated by stagnant atmospheric conditions involving low wind speeds, fog, and precipitation. Generally, this precipitation occurs as rain. However, there are periods when cold air produces light snow

at the lower elevations and relatively mild temperatures associated with the Pacific airflow at the higher elevations.

Table 1: Climatic Data: McNary Dam, Wahington (NWS station 455231), period of record monthly climate summary. Period of record: 10/1/1954 to 9/30/1998 shows the normal mean monthly maximum and minimum temperatures, precipitation and snowfall at the U.S. Weather Station at the McNary Dam centrally located within the complex on the Columbia River a mile east of complex headquarters.

MONTH	AVERAGE MAX. TEMP.	AVERAGE MIN. TEMP	AVERAGE TOTAL PRECIP. (in.)	AVERAGE TOTAL SNOWFALL (in.)
JANUARY	40.0	28	1.05"	1.5"
FEBRUARY	46.8	31.3	0.74"	0.7"
MARCH	55.7	35.7	0.71"	0.0"
APRIL	64.2	41.6	0.59"	0.0"
MAY	73.0	48.5	0.63"	0.0"
JUNE	80.8	55.1	0.42"	0.0"
JULY	88.9	60.9	0.22"	0.0"
AUGUST	87.8	60.6	0.33"	0.0"
SEPTEMBER	78.	52.8	0.36"	0.0"
OCTOBER	65.3	43.3	0.61"	0.
NOVEMBER	50.2	35.6	1.11"	0.3"
DECEMBER	41.6	30.1	1.14"	0.9"
ANNUAL	64.4	43.6	7.91"	3.4"

### Topography, Geology, and Soils

The Mid-Columbia River Refuges Complex lies within the Columbia Plateau. The underlying rock unit of the entire plateau is Columbia River basalt. It consists of accordingly layered, dark basalt lava from the Miocene and early Pliocene periods, with some imbedded materials. The Columbia Basalt consists of successive flows of lava that covered approximately 100,000 square miles in Washington, Oregon, and Idaho. The landform now ranges from river bottomland (with an elevation of 230 feet) to the rugged slopes of Toppenish Ridge (with an elevation of 1,600 feet). These lands are marked by river, creek and erosion drainages. Land slopes gently up from the rivers with portions of the river banks moderate to steep (slopes range generally from flat to 20%).

Three major geological units include Columbia River basalt of the Miocene and Pliocene age, windblown materials of the Ringold formations from the Pleistocene age, and Pasco gravels/sediments from the late Pleistocene age. Columbia River basalt is generally more than 100 feet below the surface. Silt, sand, clay and some gravel/sediments consist of sand beds together with pebble-sized gravels at the surface.

Soils in the area are very deep to shallow over gravel, lacustrine material, or basalt bedrock. They are formed in windblown lacustrine material alluvium. The soils are characterized by somewhat poorly drained moderately fine texture formed in alluvium, to fine sandy loams that are moderately deep, well

drained and formed in alluvial sand derived from basalt and quartzite material. These soils consist of wind worked association formed in sediments, on hilly uplands, underlain locally by gravels. The hazard of soil erosion by wind is considered moderate because of the fine surface layers and frequent strong winds.

## **VEGETATION**

The Complex contains four major terrestrial habitat types, croplands, shrub-steppe, wetlands, and riparian. The native vegetation mosaic of the region is made up of fairly large, contiguous areas of steppe and shrub-steppe types. It is an area dominated by annual grass, bunchgrass and shrub communities (see species list in Appendix D). Two dominant zonal associations are present: sagebrush-bluebunch wheatgrass, and bluebunch wheatgrass-Idaho fescue. Minor differentiations due to variations in temperature, seasonal (and total) distribution of precipitation, and soil type occur within each of these associations. In general, the zone of demarcation between the sagebrush-bluebunch wheatgrass association lies at varying distances from the Columbia River and reflects topographic, soil, and climatic differences between the dry uplands and the relatively moist lowlands. However, due to past fire and other man-caused disturbances, large portions of the original sagebrush-bluebunch wheatgrass community on the Complex and adjacent lands have been converted to annual grasses and rabbitbrush.

### **Shrub-steppe**

The native sagebrush-bluebunch wheatgrass association is encountered adjacent to the Columbia River and its tributaries in loose, coarsely textured soils; it may extend inland as far as the 750-foot contour. Plants capable of tolerating the summer drought characterize this community, including an overstory of shrubs, particularly sagebrush, and an understory of perennial bunchgrass. At least three layers within this association are evident: A shrub layer composed of big sagebrush with smaller amounts of lesser shrubs such as rabbitbrush, and antelope bitterbrush; a layer of perennial grasses dominated by bluebunch wheatgrass (*Psuedoroegneria spicata*) with varying lesser amounts of needle and thread grass (*Stipa comata*), bottlebrush (*Sitanion hystrix*), Indian ricegrass (*Oryzopsis hymenoides*), and a thin layer of Sandberg's bluegrass (*Poa secunda*). The shrubs remain active throughout the summer by tapping permanent moisture in the subsoil. Perturbations by grazing, cultivation, or fire initiate successional changes in this association. This particular community is associated with the more sandy soil groupings of the region.

Another important component of the shrub-steppe community is a layer of mosses and lichens known as the cryptogam layer located in the bitterbrush community. (Daubenmire 1970). This assemblage of bryophytes forms a microbiotic crust covering the area's fine soils and minimizing wind erosion. Disturbance of the cryptogam crust leaves shrub-steppe communities vulnerable to invasion by exotics; consequently, native plant species tend to be more prevalent in areas where this layer is intact within this steppe-type mosaic.

The historic fire regime for the shrub-steppe was relatively infrequent with a fire return interval of 32-70 years (Wright et al. 1979). These fires were probably low intensity and small since the fuel continuity was limited. The invasion of cheatgrass (*Bromus tectorum*) has altered the fire regime. Cheatgrass is an annual grass that produces prolific amounts of seed. These seeds invade openings and the mature plants are highly flammable. The seeds are cast onto the surface and often survive fires. Therefore, the size of contemporary fires is larger than historic fires and the intensity is greater due to increased available fuel. Various successional stages exist in this association responding to perturbations by grazing, cultivation, or fire. Fire effects by species are listed in Appendix D.

Several showy species of wildflowers, such as balsamorhiza (*Balsamorhiza spp.*), evening primrose (*Oenothera spp.*), yarrow (*Achillea spp.*), and brodiaea (*Brodiaea spp.*) are evident due to locally unusual soil and climatic properties. Significant to the region, the association is found on sandy, gravelly soils in the drier portions and dominated by needle and thread grass and small growth sagebrushes.

### **Wetlands and emergent marsh**

Wetlands and/or riparian communities occur in all units of the Complex. The emergent vegetation of the Complex's marshes is dominated by bulrushes (*Scirpus spp.*) and cattails (*Typha spp.*), accompanied by smartweeds (*Polygonum spp.*) growing on exposed mudflats, as well as sedges (*Carex spp.*) and rushes (*Juncus spp.*). Submergent species such as sago (*Potamogeton pectinatus*), curlyleaf (*P. crispus*) and other pondweeds are found in the protected backwaters. Emergent marsh is fire adapted and readily rebounds after fire. Prescribed fire may be used after drawdown to set back succession to maintain ideal conditions to meet resource management objectives. This habitat type is rarely damaged by fire. Perennating tissues are usually either under water or below the soil surface.

### **Riparian woodlands**

Riparian woodlands are restricted to a linear fringe along the shorelines of the rivers, backwaters and ponds. Black cottonwood (*Populus trichocarpa*) and several species of willows comprise the native component. However, much of the cottonwood on the Complex is Eastern cottonwood (*Populus deltoides*), which was introduced by early settlers. Extensive growth of exotic Russian olive and false indigo bush (*Baptisia australis*) is evident and expanding on some areas of the Refuge complex. Prescribed fire may occasionally be used in these areas for control of these exotic plants. Most trees species that grow in riparian areas do not tolerate fire occurrence. These species often have thin bark that does not protect the cambium from the heat of fires. Therefore, prescribed fire will be used sparingly in these areas and managed to target only exotic species.

### **Croplands**

Cooperators farm about 600 acres at McNary and about 1,500 acres at Umatilla Refuges. The main crops are wheat, corn, alfalfa, buckwheat and peas. These fields are managed for food use by migratory birds. Fire may be used in the croplands to remove crop stubble in preparation for planting or following harvest.

### **FIRE ECOLOGY**

Most fires in the area occur during the summer months with the majority of ignitions in June, July, August, and September. Although precipitation free months are rare, these months are generally hot and dry. There are an average of 65 days of 90° F or above during the summer, and the average precipitation during these months is only 0.3 inches per month.

While fire has played an integral role in the history of the shrub-steppe environment, the region's historical fire regime has been greatly altered from socio-political and economic factors. Coupled with the arrival of invasive species and noxious weeds, this has weakened the natural recovery processes of the shrub steppe ecosystem from disturbance events such as fire. The Fire Effects Information Service describes the autecology of the major species in the shrub-steppe. Sagebrush is easily top-killed by fire. Native grasses are burned, but not killed by fire. Because the grasses offer the availability to carry a fire and because the native grasses are either short in height (Sandberg's bluegrass) or clumpy (bluebunch wheatgrass), the pre-settlement fires were probably small. Thus, the fire regime for the pre-settlement era was probably small, high intensity fires with a long fire return interval (32-70 years).

After the 1900's, human activities interrupted the natural fire interval and patterns of burning. Agricultural development and livestock grazing reduced the light fuels that would normally carry a fire. Livestock grazing also had the effect of suppressing native bunch grasses and allowing sagebrush densities to increase. From 1906 through the present, fire exclusion has resulted in increased sagebrush stand density. This allows for hotter, more destructive fires, due to the closer proximity of each individual plant, which allows fires to spread within the shrub canopy.

Rangeland improvements also brought in a variety of non-native grasses, either as purposeful introductions to provide forage enhancement, or as accidental introductions within seed/pasture mixes. Plants such as cheatgrass, and other annual plants altered native plant community structure. The discontinuous fuel that native bunch grasses provided were invaded by thick, continuous fuels (e.g., cheatgrass) that would carry fires over large areas. Cheatgrass also cures into dry fuel earlier in the fire season than native grasses providing a longer fire season. High mortality of perennial grasses may occur if fire burns in cured litter of annual grasses while perennials are still actively growing. The invasion of cheatgrass has changed the community appearance and altered the fire regime because of an abundance of available and continuous fuel.

The fire frequency has increased due to an increase in human caused ignitions, and the fire size has increased due to changes in fuel structure. The contemporary fire regime is large, high intensity fires with a shorter fire return interval. This has led to a decrease in the fire intolerant sagebrush and a commensurate increase in exotic species, primarily cheatgrass.

## **FISH AND WILDLIFE**

In the arid environment of central Oregon and Washington, wetland and riparian habitats are limited in extent. Riparian zones and wetlands form the interface between terrestrial and aquatic environments; thus they are used by both upland and aquatic species. For these reasons, riparian and wetland habitats, especially those located in arid regions, support high biological diversity and large concentration of animals (Kadlec and Smith 1989; O'Connell et al. 1993). Because the Complex encompasses upland shrub-steppe as well as riparian habitats and wetlands, it supports diverse wildlife species. Some of these animals depend on habitats provided by the Complex, while others inhabit a broader range of environments.

### **Fish and Aquatic Invertebrates**

The Columbia River and its backwaters are inhabited by a variety of native fish, such as salmon (*Onchorhynchus spp.*), steelhead (*Onchorhynchus mykiss*), white sturgeon (*Acipenser transmontanus*), and northern pikeminnow (*Ptychocheilus oregonensis*).

Several salmon and steelhead stocks have been listed as threatened or endangered under the Endangered Species Act (16 USC 1531-1543) including Snake River spring/summer and fall chinook salmon (*Onchorhynchus tshawytscha*) (threatened), Upper Columbia River spring-run chinook (endangered), Snake River sockeye salmon (*Onchorhynchus nerka*) (endangered), Snake River and Mid-Columbia River steelhead (threatened), and Upper Columbia River steelhead (endangered). All of these stocks travel through portions of the Complex during their migrations to and from spawning areas. In addition some of these stocks may use Refuge Complex areas for foraging and juvenile rearing.

Exotic gamefish such as walleye (*Stizotiedion vitreum*), crappie (*Promoxis nigromaculatus*),

smallmouth and largemouth bass (*Micropterus dolomieu* and *M. salmoides*, respectively) now occur in the Columbia River along with rough fish such as common carp (*Cyprinus carpio*). In addition, freshwater mussels, snails and other invertebrates contribute to the complexity of the aquatic community.

### **Reptiles and Amphibians**

The most commonly encountered reptiles on the complex are the painted turtle (*Chrysemys picta*), gopher snake (*Pituophis catenifer*), common garter snake (*Thamnophis sirtalis*) and sagebrush lizard (*Sceloporus graciosus*). In addition western rattlesnakes (*Crotalus viridis*), racers (*Coluber constrictor*), short-horned lizards (*Phrynosoma douglassi*), Great Basin spadefoot toads (*Scaphiopus intermountanus*) and Woodhouse's toads (*Bufo woodhousei*) are occasionally observed. The nonnative bullfrog (*Rana catesbeiana*) has been found on parts of the Complex.

### **Birds**

Birds are the most common conspicuous animals on the Refuge. One hundred ninety-six species of birds have been reported within the complex. Numerous bald eagles (*Haliaeetus leucocephalus*) (listed threatened) spend the winter on parts of the complex. In addition, several federal candidate species and species of concern occur on the Refuge, as well as a number of species considered to have special status by state wildlife agencies of Oregon or Washington.

The Complex serves as a migrating and wintering area for large numbers of waterfowl, songbirds and raptors. The most abundant species of waterfowl in the complex during migration is the mallard (*Anas platyrhynchos*); other common species include American wigeon (*A. americana*), gadwall (*A. strepera*), pintail (*A. acuta*), green-winged teal (*A. crecca*), northern shoveler (*A. clypeata*), wood duck (*Aix sponsa*), lesser scaup (*Aythya affinis*), and canvasback (*Aythya valisineria*) are also common. The Canada goose (*Branta canadensis*) is the most common wintering goose on the Refuge. In addition snow geese (*Chen caerulescens*) and white-fronted geese (*Anser albifrons*) are sometimes sighted during migration. Numerous species of shorebirds use shallow wetlands and exposed mud flats on the Complex during migration between northern breeding areas and winter areas. In addition, Refuge Complex wetlands support a variety of breeding birds including mallard, cinnamon teal (*Anas cyanoptera*), gadwall, northern shoveler, blue-winged teal, wood duck, American coot (*Fulica americana*), pied-billed grebe (*Podilymbus podiceps*), black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), marsh wren (*Cistothorus palustris*), red-winged blackbird (*Agelaius phoeniceus*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*). Island habitats within the complex support breeding colonies of American white pelicans (*Pelecanus erythrorhynchos*, perhaps the only colony in the state of Washington), Caspian terns (*Sterna caspia*), Forrester's terns (*Sterna forsteri*), ring-billed gulls (*Larus delawarensis*), California gulls (*Larus californicus*), double-crested cormorants (*Phalacrocorax auritus*), great blue herons (*Ardea herodias*), and black-crowned night herons (*Nycticorax nycticorax*).

Riparian woodlands along the Columbia River provide wintering habitat for northern populations of American Robin (*Turdus migratorius*), dark-eyed junco (*Junco hyemalis*), yellow-rumped warbler (*Dendroica coronata*), and white-crowned sparrow (*Zonotrichia leucophrys*), as well as other passerines. Numerous species breed and nest in riparian areas including song sparrow (*Melospiza melodia*), Bewick's wren (*Thryomanes bewickii*), black-capped chickadee (*Poecile*

*atricapillus*), northern oriole (*Icterus bullockii*), northern flicker (*Colaptes auratus*), black-headed grosbeak (*Pheucticus melanocephalus*), mourning dove (*Zenaida macroura*), willow flycatcher (*Empidonax traillii*), and yellow warbler (*Dendroica petechia*). Complex riparian areas serve as migration stopovers during spring and fall for species such as ruby-crowned kinglet (*Regulus calendula*), orange-crowned warbler (*Vermivora celata*), Wilson's warbler (*Wilsonia pusilla*), yellow warbler, Macgillivray's warbler (*Oporornis tolmiei*), warbling vireo (*Vireo gilvus*), western tanager (*Piranga ludoviciana*), and empidonax flycatchers (*Empidonax* spp.)

Shrub-steppe uplands provide habitat for species such as long-billed curlew (*Numenius americanus*), burrowing owl (*Athene cunicularia*), savannah sparrow (*Passerculus sandwichensis*), western kingbird (*Tyrannus verticalis*), western meadowlark (*Sturnella neglecta*), ring-necked pheasant (*Phasianus colchicus*), and California quail (*Callipepla californica*).

In addition to bald eagles, many other birds of prey can be seen within the complex, including red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus*), Swainson's hawk (*Buteo swainsoni*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), Northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), Peregrine falcon (*Falco peregrinus*) and osprey (*Pandion. haliaetus*) A variety of owls such as the barn (*Tyto alba*), great-horned (*Bubo virginianus*), western screech (*Otus kennicottii*), long-eared (*Asio otus*), short-eared (*A. flammeus*) and the burrowing owl are also present.

### **Mammals**

The complex includes populations of several conspicuous mammals, including mule deer (*Odocoileus hemionus*), black tailed jackrabbits (*Lepus californicus*) and marmots (*Marmota flaviventris*). Nocturnal mammals such as Ord's Kangaroo rat (*Dipodomys ordii*), deer mice (*Peromyscus maniculatus*) and voles (*Microtus* spp.) are infrequently observed. Predators such as coyotes (*Canis latrans*), badgers (*Taxidea taxus*), mink (*Mustela vison*), river otter (*Lutra canadensis*), racoon (*Procyon lotor*), and skunk (*Mephitis mephitis*) are present on the complex. Signs of porcupine (*Erethizon dorsatum*), beaver (*Castor canadensis*), and muskrat (*Ondatra zibethicus*) are also encountered.

### **WATER RESOURCES**

The Columbia River, draining an area of over a quarter of a million square miles and extending from the Canadian Rockies to the Pacific Ocean, flows through the area and is the dominant water resource feature. Within the local area, four major rivers join the Columbia: the Yakima, Snake, Walla Walla and Umatilla. In addition to these, numerous lesser rivers and streams play an important water resource role.

Local water features are oriented to four principal rivers: the Yakima river drains the entire watershed from near Snoqualmie Pass to the Tri-Cities area and is a major source of irrigation water for farms along its banks. The Snake River, with controlled flow through a series of major dams, is navigable for many miles upstream. It provides irrigation to adjacent farmlands and drains a wide area in Washington extending east northeasterly from the Tri-Cities. The Walla Walla and Umatilla rivers provide drainage for a large area from the Blue Mountains west and northwest to the Columbia River.

### **CULTURAL RESOURCES**

Fire management activities within the Complex will be implemented in accordance with the regulations and directions governing the protection of cultural resources (519 DM, 36 CFR 800), the Archeological Resources Protection Act of 1979, and the Archeological and Historic Preservation Act of 1974. National

Historic Preservation Act of 1996 section 106 clearance will be followed for any fire management activity that may affect historic structures or archeological resources.

The five Refuges that make up the Complex have had archeological surveys conducted. Refuge lands were used extensively by Native Americans as seasonal and permanent resident and food gathering sites for thousands of years. Evidence of early habitation can be found along the shore and uplands of the Umatilla and McNary Refuges, although most of the river shoreline sites were inundated with the filling of the John Day and McNary pools following dam construction. Telegraph Island is a registered historic site for its Native American petroglyphs, while Strawberry Island is registered as the site of a late period aboriginal village. Umatilla also has a historic traveler's stop building in the southwest corner of the McCormack unit, which was constructed in more recent times.



## WILDLAND FIRE MANAGEMENT SITUATION

### HISTORIC ROLE OF FIRE

The historic fire regime was a 32 to 70 year fire return interval (Quigley and Arbelbide 1997) of small, high-intensity fires that removed small patches of the fire-intolerant shrub overstory . The bunchgrass component of the native shrub-steppe is a discontinuous fuel bed that prevented many large fires (Paige and Ritter 1999). The introduction of cheatgrass changed this regime by providing a continuous layer of available fuel. Fires that start in cheatgrass stands often spread to surrounding habitats, resulting in the loss of shrubs from adjacent communities. The recovery of sagebrush in these communities may be very slow. Although wind can disperse sagebrush seeds up to 90 feet (30 m), most seeds fall within 3 feet (1 m) of the canopy (Meyer 1994 *in* Paige and Ritter 1999). An increase in fire size results in fire impacting specific locations more frequently. Thus the current fire regime is a short fire return interval of large, high-intensity fires that remove large patches of the fire-intolerant shrub overstory.

### Post-settlement Fire History

Organized fire suppression organizations developed in the early twentieth century nationwide. The organized suppression of wildland fires probably coincided with the development of the area for agricultural use, which both fragmented the shrub-steppe and reduced fuels through grazing. The presence of extensive stands of fire-intolerant sagebrush stands indicates there has been a long fire free-interval. Similarly, the extensive stands of exotics that invade disturbed areas indicate the size of recent fire perturbations.

From the inception of the Refuges within the Complex, fire management has pursued a policy of full and immediate suppression of all observed fires. The recorded, observed numbers of fires does not include all fires occurring on any lands bordering Refuge boundaries; although the Refuge has formal agreements with local fire districts to assist on fires occurring on such land. Table 2 shows the most recent decade of fire occurrence on the complex.

Table 2: Fire records based on fire reports in the Shared Application Computer System.

	Cold Sprg.		McKay Crk.		McNary		Toppenish		Umatilla		
	#	acres	#	acres	#	acre	#	acres	#	acres	Complex totals
1991									3	30.1	3
1992	3	320			3	2			5	250	11
1993									2	750	2
1994	1	103			1	3			3	213	5
1995	2	.7	5	202.2			2	3	9	721	18
1996	3	18	1	1	1	1	1	.5	3	35.1	9
1997	1	.1	1	1	1	.5	1	2.5	7	554.1	11
1998	1	250							6	114.7	7
1999									3	212.5	3
2000	4	4.1	2	138.1	16	610.	2	5.25	9	2360.1	33
Total	14	695.9	9	342.3	22	616.	6	11.25	50	5240.6	<b>101</b>

### Prescribed fire history

The complex has used prescribed fire to reduce hazardous fuel loading for habitat/vegetative rehabilitation projects, to stimulate plant vigor, to allow for pest plant control projects, etc. The primary season for prescribed burning is October through March. Table 3 summarizes prescribed fire projects on the Complex since 1995.

Table 3: Prescribed fire records based on fire reports in the Shared Application Computer System.

	C o l d S p r i n g	M c K a y C r e k	M c N a r y	T o p p e n i s h	U m a t i l l a	Complex Total	
						Year	