

CHAPTER 12 TERRESTRIAL WILDLIFE SPECIES AND HABITAT

INTRODUCTION

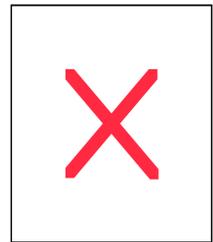
The Upper Sprague River subbasin is noteworthy from a wildlife perspective because it contains a high diversity of species and because it is home to many species that have been classified as rare or deserving of special conservation status. Both of these factors are due, at least in part, to the location of this subbasin at the intersection of five different ecological regions.

In particular, riparian areas and wetlands provide for diversity of wildlife species. Conservation and restoration of these areas will have disproportionately large benefits to wildlife. Key issues that limit wildlife diversity include a reduction in vegetation complexity (multiple vegetation layers, including large trees), scarcity of snags and down logs, and increasing abundance of noxious invasive plants.

Overall biotic condition is reflected in the condition, health, and viability of populations of all native species within the watershed. Characterizing and monitoring all species is not possible from a practical standpoint, however. Resource managers therefore focus attention on species whose presence or absence reflects the health of the ecosystem, on Aspecial status@ species, such as Threatened and Endangered species, and on game species.

Because the Upper Sprague River subbasin lies near the intersection of five different ecoregions, it is not surprising that the area supports a wealth of animal diversity. It is estimated that 314 species of vertebrates occur in, or have been extirpated from, the assessment area ORNHIC 2005). Table 12-1 summarizes the number of species “closely” or “generally” associated with major habitat types in the assessment area.

**Many landowners
manage their
property for
wildlife.**



Bob and Roberta Valladao shared that “the land has been managed in a way that improves the riparian area and increases wildlife habitat. As we irrigate pasture, it brings in birds. The calving pasture promotes eagles, and deer are attracted to the alfalfa. We fenced our riparian area, which promoted perennials and increased bird populations. Coyote management has promoted diversity in other species. We recently saw our first river otter.”

Roberta shares that she likes watching wildlife. That is one of the reasons they came to the Sprague River Valley (pers. comm. December 22, 2007).

FORESTS AND WOODLANDS

Wildlife Diversity and Function

The composition and structure of forests and woodlands in the Upper Sprague River subbasin are highly variable as a result of variations in topography, climate, elevation, and patterns of natural disturbance. Some “generalist” species of wildlife can be found throughout many forest types in

the assessment area, whereas other “indicator species” have a narrow ecological tolerance for certain types or successional stages. For example, Townsend’s warbler is only associated with subalpine parklands, whereas red crossbill is found in virtually every forest type of the assessment area. However, the distribution and abundance of most species is more influenced by vegetation structure than generalized vegetation type.

Table 12-1. Comparison of vertebrate species richness among ten habitat types in the Upper Sprague River subbasin. Note: many species are associated with more than one habitat type. Data are based on species-habitat relationships reported in O’Neil et al. 2001

Habitat Type	Vertebrate Class				Total
	Amphibians	Reptiles	Birds	Mammals	
Subalpine Parkland	3	1	48	27	79
Eastside Mixed Conifer Forest	5	6	80	42	133
Ponderosa Pine Forest/Woodland	5	9	101	34	149
Lodgepole Pine Forest & Woodlands	4	9	49	31	93
Western Juniper Woodlands	5	11	60	25	101
Shrub-Steppe	5	12	53	36	106
Eastside Riparian-Wetlands	5	6	114	41	166
Herbaceous Wetlands	5	3	103	34	145
Open Water	5	0	84	18	107
Agriculture/Mixed Environs	3	6	109	28	146

In a review of wildlife-habitat associations in eastside forests of Oregon and Washington, Sallabanks et al. (2001) reported that snags are an important element for 33% of vertebrate species inhabiting eastside forests, and downed logs are used by 29% of forest wildlife species. Eastside late successional forests (“old-growth”) have fewer closely associated wildlife species (4) than Westside old-growth forests (75; Sallabanks et al. 2001). In contrast, many species dwelling in eastside forests are closely associated with early-successional stages (Sallabanks et al. 2001).

Management Issues

The increasing severity of forest health problems in eastern Oregon results from a number of interacting causes. These include drought, insect reproduction cycles, and the effects of past forest management practices and fire suppression. Changes to vegetation structure and composition caused by these stressors will affect wildlife communities in a variety of ways, but the response of wildlife assemblages to forest health problems has not been well researched. It is known that some species are well adapted to forests with high volumes of dead wood (e.g., black-backed woodpecker) and are likely to

thrive in stands dying from insect outbreaks or disease. In addition, much of the wildlife diversity in the assessment area is associated with early-seral conditions and semi-open canopy forests (Sallabanks et al. 2001), which are less common now than under the natural fire regime. In recent years, forest management by both the US Forest Service and private timber companies has been modified to focus more heavily on improving wildlife habitat.

SHRUBLANDS AND WESTERN JUNIPER WOODLANDS

Shrub-steppe and western juniper woodlands provide habitat for a variety of wildlife species. These arid habitats share many commonalities, but there are some important structural differences. A lack of trees is a defining characteristic of the shrub-steppe vegetation type. This results in fewer vegetation layers and associated habitat strata, which combine with lower water availability to produce a corresponding decrease in wildlife diversity, as compared with ponderosa pine or mixed conifer forest. The presence of scattered trees in an open-canopy juniper woodland provides an additional structural element that functions as thermal cover for land animals and roosting habitat for birds.

Wildlife Diversity and Function

There are 106 vertebrate species present in the assessment area that are considered to be associated with shrub-steppe habitats and 101 species associated with western juniper woodlands (Table 12-1). There is considerable overlap in the species composition of these two arid habitat types. Some species that are unique to arid shrublands and juniper woodlands include:

- Striped whipsnake (*Masticophis taeniatus*)
- Merriam's shrew (*Sorex merriami*)
- Great Basin pocket mouse (*Perognathus parvus*)
- Sagebrush vole (*Lagurus curtatus*)
- Kit fox (*Vulpes macrotis*)

Two taxonomic groups are particularly noteworthy for their ecological importance in arid shrublands and juniper woodlands: 1) reptiles and 2) ground squirrels of the genus *Spermophilus*. Of the 28 native reptile species in Oregon, 21 occur in shrub-steppe habitats (Vander Haegen et al. 2001). This habitat type provides for a greater diversity of reptiles than any other habitat type in the state. Because of their successful adaptation to the environmental extremes that are characteristic of shrub-steppe communities, reptiles can occur in high densities and contribute significantly to the overall biomass available to other trophic levels (Vander Haegen et al. 2001).

Although considered a pest by many ranchers, ground squirrels (i.e., *Spermophilus beldingi*, *S. lateralis*, *S. townsendii*), serve several important ecological roles. Ground squirrels provide an important prey base for many snakes, raptors, and mammalian carnivores. Furthermore, burrows that are excavated by ground squirrels provide a crucial refuge for a large number of other wildlife species. Finally, soil mixing that results from the burrowing activity of ground squirrels (as well as the badgers pursuing them) improves aeration and water infiltration (Vander Haegen et al. 2001). In Idaho, ground squirrel activity was found to increase the productivity of native bunchgrasses by 20% (Laundré 1998). However, sheet runoff during spring melt can result in sediment deposition to streams from ground squirrel deposits (C. Sokol, pers. comm., November 2005).

Management Issues

In some cases irrigated pastures result in benefits to certain species by providing additional vegetation for a longer period during the year. In other cases, grazing can diminish habitat quality for wildlife that depend upon the vegetation structure of shrubs or feed upon the associated plant species. Research conducted in eastern Oregon by Irwin et al. (1994) has demonstrated that plots exposed to grazing by livestock and elk have, on average, 75% less shrub cover than was estimated on plots excluded from grazing. Also, soil disturbance can foster the establishment of cheatgrass and other noxious weeds, decreasing the availability of native plants that wildlife use for cover and forage (Vander Haegen et al. 2001). The wildlife species richness in annual grasslands (such as stands of cheatgrass) is estimated to be only 55% of that in native shrub-steppe habitats (Vander Haegen et al. 2001).

It should be noted, however, that some shrub-steppe species do benefit from at least three components of agricultural operations. First, buildings and farm structures are used as shelter by many species of wildlife. Second, edges, fencerows, and odd areas are used as feeding sites, nesting habitat, and movement corridors by many species. Finally, irrigated fields and reservoirs developed for farms increase water availability, an important life requisite for all wildlife and a limiting factor for many species in arid habitat types. Most non-native animal species that inhabit the assessment area (e.g., Bullfrog [*Rana catesbeiana*], European starling [*Sturnus vulgaris*], English sparrow [*Passer domesticus*], Virginia opossum [*Didelphis virginiana*]) are strongly associated with disturbed habitats.

Open woodland of western juniper has been an important habitat for wildlife through at least the Holocene epoch (Present to 10,000 years ago). Indeed, the Townsend's solitaire, American robin, and other frugivores are the primary agents of seed dispersal for western juniper (Bedell et al. 1993). However, the expansion of dense stands of juniper into shrub and grassland communities (particularly those habitats formerly dominated by *Artemisia tridentata* var. *vaseyana*) represents an important threat to wildlife associated with shrub-steppe vegetation. The Prineville District of the Bureau of Land

Management (BLM) estimates that open juniper woodlands support 146 species of wildlife, but species richness declines to 71 species when canopy closure excludes shrubs and grasses (Bedell et al. 1993).

RIPARIAN AREAS AND WETLANDS

Wildlife Diversity and Function

Riparian areas and wetlands are characterized by numerous physical and ecological attributes that foster a high degree of animal diversity. The proximity to water, nutrient deposition via stream or slope, and vegetation heterogeneity all combine to create a variety of ecological niches that wildlife communities are able to exploit. Of the 314 vertebrate species estimated to occur in the assessment area, 166 species are strongly associated with riparian areas and 145 are associated with herbaceous-type wetlands (Table 12-1). Riparian areas and wetlands provide the following primary habitat functions:

- Food and water—Riparian areas and wetlands offer an abundance and variety of food for wildlife. The well-developed vertical stratification that is typical of riparian areas in forests offers feeding habitat for understory and canopy foragers. Only a small number of wildlife species can satisfy their entire requirement for water from what is available in their food. Therefore, a large number of upland species regularly visit streams and wetlands to drink.
- Resting/thermal/hiding cover—Vegetation density and complexity of landforms offer many species of wildlife cover from predators and climatic extremes, allowing them to conserve energy. The abundance of downed logs in forested riparian areas provides an important refuge for many amphibians, reptiles, and small mammals.
- Breeding and rearing areas—Habitat elements essential to reproduction are often among the most limiting factors to population abundance and long-term persistence. Aquatic habitats, tree cavities, large trees, and shrubs are some examples of habitat elements essential for a number of species, including waterfowl and wading birds, to breed. These features tend to be aggregated in riparian areas and wetlands to a greater extent than in surrounding forests and rangelands.

Management Issues

Human land uses tend to be concentrated near streams, wetlands and on floodplains because of the resources found in these habitats, including water supply, productive sites for crops, and transportation routes, to mention a few. Riparian areas and wetlands are vulnerable to natural and man-made disturbances because of their susceptibility to upslope and upstream events.

Forestry practices can have a number of impacts on streamside and wetland environments. Clearcut harvesting in riparian areas can lead to increased air and stream temperatures (Fowler et al. 1988, Brown and Krygier 1970) and promote overland transport of sediment into streams under some conditions (Beschta 1978). Research has indicated a number of serious effects on fish, amphibian, and small mammal populations as a consequence of these actions (Bunnell et al. 1997). The most serious impacts to forested riparian areas and wetlands are now limited by state forest protection rules for private lands and by BLM and Fremont-Winema National Forest resource management plans for federal lands. Forestry practices can also be used for positive effect such as improving riparian buffers, retaining corridors for habitat connectivity, and reforestation following fires.

While proper grazing can provide habitat benefits, uncontrolled grazing in riparian areas and wetlands can eliminate desirable native plants and alter the habitat structure to which wildlife are adapted (Oakley et al. 1985). Heavy grazing in riparian areas and wetlands can also lead to changes in channel morphology and lowered water tables (Oakley et al. 1985). Increasingly however, managed grazing programs and riparian or wetland exclusion fences are serving to minimize and eliminate these problems.

BIG GAME

Four species classified by the Oregon Department of Fish and Wildlife (ODFW) as big game mammals regularly occur in the Upper Sprague River subbasin: Rocky Mountain mule deer (*Odocoileus hemionus hemionus*), Rocky Mountain elk (*Cervus elaphus nelsoni*), black bear (*Ursus americanus*), and cougar (*Puma concolor*). Pronghorn (*Antilocapra americana*) may occasionally use the watershed, but there is not a significant population documented as breeding in the assessment area. ODFW establishes hunting seasons, harvest quotas, and other game regulations for each of 70 wildlife units across the state. Portions of four wildlife units (i.e., Interstate, Silver Lake, Sprague, and Klamath Falls) encompass the assessment area.

Goods and services purchased by recreational hunters can have a significant, positive impact on regional and local communities. For example, studies conducted in eastern Oregon and elsewhere indicate a net economic value of \$40-\$60 per hunter per day for elk hunting (ODFW 2003). In ODFW wildlife units that encompass the assessment area, there were approximately 4,439 hunter days during the 2003 archery and rifle seasons for elk (ODFW 2003).

Mule Deer

Rocky Mountain mule deer occupy a variety of habitat types, including sagebrush steppe, juniper woodland, and semi-open conifer forest. Population densities have fluctuated greatly since Euro-American settlement.

Pioneers arriving in eastern Oregon during the early 19th century reported a paucity of deer (Verts and Carraway 1998). However, 50 to 75 years later, miners found deer to be abundant (Verts and Carraway 1998). During the 1960s the total statewide population ranged between 510,000 and 570,000 deer (Verts and Carraway 1998). In 2004, the state mule deer population was estimated to be 247,350 (ODFW 2005). In the assessment area, the causes of recent mule deer population declines are believed to be increased closed forest cover and a corresponding decrease in foraging habitat, greater mortality due to predators, encroachment by developments, stress-related diseases, and increased roadkill (T. Collom pers. comm., 2006). Population estimates specific to the assessment area are not available, but the population in the Interstate Wildlife Unit was believed to be about 7,400 mule deer during spring 2005, much lower than the ODFW management objective for the unit of 14,000 deer (T. Collom pers. comm., 2006).

Elk

Elk require landscapes composed of forested cover and forage-producing openings such as prairies, clearcuts, or hayfields. Local forestry and agricultural practices can lead to improved or diminished habitat conditions for elk, depending upon the resulting changes to vegetation patterns (ODFW 2003). Elk strongly avoid humans (except in certain areas where they have become habituated to human presence), so hunters, snowmobiles, and other forest recreation can greatly increase elk movement, decrease foraging time and lower survival rates (ODFW 2003). Chronic wasting disease (CWD) is a serious threat to wild elk populations in certain Rocky Mountain and Midwestern States, but the disease has never been detected in Oregon herds since ODFW began surveillance testing in 1996 (ODFW 2003).

ODFW has established general rifle and archery hunts for elk that allow one animal to be harvested per tag (bulls only may be taken by rifle during the general season). There is also a controlled hunt for either sex in a portion of the Interstate Wildlife Unit. ODFW does not conduct systematic surveys for elk, but records observations of the species during annual mule deer surveys (T. Collom pers. comm., 2006). Population estimates specific to the assessment area are not available, but the Interstate Wildlife Unit is believed to contain approximately 300 elk (T. Collom pers. comm., 2006).

Black Bear

Black bears (*Ursus americanus*) are habitat generalists, using many types of forested habitats. Bears tend to shift their activities according to seasonal food availability. Brushy clearcuts are often preferred because of the berry and fruit-producing shrubs that are common in these areas (Verts and Carraway 1998). In eastern Oregon, many black bears are coated in shades of brown, causing a number of mistaken reports of grizzly bears (*Ursus arctos*)

each year (ODFW 2005). The last grizzly bear documented in Oregon was killed in Wallowa County on September 14, 1931 (Verts and Carraway 1998).

Open general hunting season in eastern Oregon for black bears is from August through November. Hunters are limited to one bear per tag. There is also a controlled spring hunt for black bears in some ODFW management units, but in 2005 no spring hunts were allowed in the assessment area. ODFW does not conduct regular surveys because of the difficulty of detecting bears (ODFW 2005). Instead, the department relies on voluntary cooperation by hunters to submit samples of teeth and reproductive tracts from harvested animals for purposes of population analysis (ODFW 2005). Black bear populations are believed to be increasing across the state (ODFW 2005). A total of 308 black bears were harvested from ODFW management units east of the Cascade crest in 2003 (most recent data available), although none were taken in the assessment area (ODFW 2005).

Cougar

Optimum cougar habitat east of the Cascades is characterized by a mosaic of mixed conifer forest, juniper woodland, and riparian areas (Verts and Carraway 1998). Steep terrain is usually preferred over more gentle topography. The density of cougar populations is largely determined by the abundance of major prey species, especially deer and elk.

Since 1994, ODFW has allowed unlimited tags for a year-round, statewide cougar hunting season (ODFW 2005). ODFW has established a system of cougar hunting zones with quotas, and hunting is closed in a zone for the remainder of the year when the harvest quota is attained (ODFW 2005). ODFW does not conduct annual surveys for cougars, but does require hunters to have animals they have taken be inspected by ODFW staff so they may record sex and age data. Based on this information, increased animal damage reports, and road-related cougar mortalities, ODFW believes cougar populations have significantly expanded since 1980 (ODFW 2005). Harvests during 2001-2003 in the Southeastern Cascades cougar hunt zone (which encompasses all of the Upper Sprague River subbasin) has averaged 16.3 cougars taken per year (minimum = 12 cougars, maximum = 21 cougars).

THREATENED, ENDANGERED, AND SENSITIVE ANIMAL SPECIES

Table 12-2 lists species with special conservation status that may be likely to occur in the assessment area. A short description of each species is provided below.

Invertebrates

No listed or candidate species are known to occur in the assessment area.

Table 12-2. Animal species that have special conservation status and are likely to occur in the Upper Sprague River subbasin.

Class	Scientific Name	Common Name	Federal Status ¹	State Status ²	
Amphibians	<i>Bufo boreas</i>	Western toad		SV	
	<i>Rana pretiosa</i>	Oregon spotted frog	C	C	
Reptiles	<i>Phrynosoma platyrhinos</i>	Desert horned lizard		SV	
	<i>Sceloporus graciosus graciosus</i>	Northern sagebrush lizard	SOC	SV	
Birds	<i>Plegadis chibi</i>	White-faced ibis	SOC		
	<i>Accipiter gentilis</i>	Northern goshawk	SOC	SC	
	<i>Buteo swainsoni</i>	Swainson's hawk		SV	
	<i>Haliaeetus leucocephalus</i>	Bald eagle	LT	LT	
	<i>Coturnicops noveboracensis</i>	Yellow rail	SOC	SC	
	<i>Grus canadensis tabida</i>	Greater sandhill crane		SV	
	<i>Bartramia longicauda</i>	Upland sandpiper	SOC	SC	
	<i>Chlidonias niger</i>	Black tern	SOC		
	<i>Melanerpes lewis</i>	Lewis' woodpecker	SOC	SC	
	<i>Picoides albolarvatus</i>	White-headed woodpecker	SOC	SC	
	<i>Contopus cooperi</i>	Olive-sided flycatcher		SV	
	<i>Empidonax traillii adastus</i>	Willow flycatcher		SU	
	<i>Progne subis</i>	Purple martin	SOC	SC	
	Mammals	<i>Antrozous pallidus</i>	Pallid bat	SOC	SV
		<i>Lasionycteris noctivagans</i>	Silver-haired bat	SOC	SU
<i>Martes americana</i>		American marten		SV	
<i>Myotis ciliolabrum</i>		Western small-footed myotis	SOC	SU	
<i>Myotis evotis</i>		Long-eared myotis	SOC	SU	
<i>Myotis thysanodes</i>		Fringed myotis	SOC	SV	
<i>Myotis volans</i>		Long-legged myotis	SOC	SU	
<i>Myotis yumanensis</i>		Yuma myotis	SOC		
<i>Sorex preblei</i>		Preble's shrew	SOC		
	<i>Vulpes macrotis</i>	Kit fox		LT	

¹ Federal Status: LT=Listed ESA Threatened; C=Candidate for Listing; SOC=Species of Concern

² State Status: LT=Listed State Threatened; SC= Sensitive-critical; SV=Sensitive-vulnerable; SU=Sensitive-undetermined.

Amphibians

Western Toad (*Bufo boreas*)—Adult toads are primarily terrestrial, spending most of their time in underground burrows or buried under forest litter. Breeding occurs in marshes, stock ponds, and high-elevation lakes. The

reasons for declining western toad populations are unclear, but increased atmospheric UV-B radiation and a fungus normally found in fish have been implicated (Marshall et al. 1996). Western toads are present in the assessment area (Nussbaum et al. 1983).

Oregon Spotted Frog (*Rana pretiosa*)—The Oregon spotted frog is a highly aquatic species associated with emergent vegetation and floating algae in lakes, marshes, and river side channels. The species has completely disappeared from large areas of its previous geographic range. Predation by non-native bullfrogs and fish are believed to be the primary causes of population decline (Marshall et al. 1996). Spotted frogs have been previously documented in the Upper Sprague River (Nussbaum et al. 1983), but it is unknown whether the species is still present.

Reptiles

Desert Horned Lizard (*Phrynosoma platyrhinos*)—This species is easily confused with the more common short-horned lizard (*P. dougassi*) and both species occur in the vicinity of the assessment area (Nussbaum et al. 1983). The desert horned lizard is associated with areas having sandy, loose soil and sparse shrub cover. It is very rarely found near forests or woodlands. Desert horned lizards are easily captured and illegal collection is believed to threaten the persistence of the species.

Northern Sagebrush Lizard (*Sceloporus graciosus graciosus*)—As the name suggests, the northern sagebrush lizard can be quite common in sagebrush-steppe habitats, but also uses pine and western juniper woodlands. No specific threats to northern sagebrush lizard populations have been identified, but the species may be at risk in certain localities because of habitat degradation on rangelands (NatureServe Explorer 2005).

Birds

White-Faced Ibis (*Plegadis chibi*)—White-faced ibis is a colonial species that uses wetlands and flooded agricultural fields. The species was negatively impacted by over-hunting during the 19th century, but has recovered and is expanding its geographic range. White-faced ibis may still be at risk from cattle grazing on nesting sites and pesticide use on agricultural lands, particularly on wintering grounds in Mexico (Marshall et al. 2003). A flock of white-faced ibis was observed at Sycan Marsh in 1994 (ORNHIC 2005).

Northern Goshawk (*Accipiter gentilis*)—The northern goshawk is a large, aggressive hawk that usually nests and rears young in late-successional forests with relatively open understories. However, goshawks also nest in aspen stands in shrub-steppe environments. The species is believed to be sensitive to the loss of mature and old-growth forests (Marshall et al. 2003). Goshawks have been known to nest in the assessment area (USFS 1995).

Swainson's Hawk (*Buteo swainsoni*)—A hawk of the bunchgrass prairies, Swainson's hawk is most common in the Blue and Willowa mountains, but occasionally range into Lake and Klamath Counties (Marshall et al. 2003). Once the most common hawk in eastern Oregon, Swainson's hawk populations have undergone precipitous declines during the 20th century. Reported threats to the continued persistence of the species include pesticide-related mortality on wintering grounds in Argentina and loss of bunchgrass prairie habitat in the western U.S. (Marshall et al. 2003).

Bald Eagle (*Haliaeetus leucocephalus*)—Usually associated with large bodies of water such as estuaries, lakes, and large rivers, bald eagles nest in large trees or snags, usually within one mile of water (Anthony and Isaacs 1989). Eagle surveys have been conducted every year in Oregon since 1978 (Marshall et al. 2003). Surveys indicate that nesting pairs have increased from a low of 56 to a recent estimate of 393 pairs (Isaacs and Anthony 2001). Bald eagles are known to have recently nested at six different sites along the Sprague and Sycan rivers (ORNHIC 2005).

Yellow Rail (*Coturnicops noveboracensis*)—The yellow rail is a rare, secretive bird that nests in flooded wetlands dominated by sedges. There were no reported sightings of yellow rails in Oregon from 1926 until 1983 (Marshall et al. 2003). Since then, the species has been observed only rarely in Oregon. Most sightings are from Klamath and Lake counties. Yellow rails have been recently observed at Sycan Marsh and several sites in the Sprague River Valley (Marshall et al. 2003). Threats to the species include agricultural practices that lead to wetland loss (e.g. ditching, diking) and intensive grazing that reduces vegetation cover (Marshall et al. 2003).

Greater Sandhill Crane (*Grus canadensis tabida*)—Sandhill cranes forage in wet meadows and agricultural fields. Floating nests are constructed in marshes. Sandhill cranes that breed in Sycan Marsh migrate in winter to the Butte Sinks Basin in northern California. Surveys conducted in Sycan Marsh indicate that the population has been relatively stable (113-135 pairs) between 1983 and 2000 (Marshall et al. 2003). Predation by coyotes occasionally causes significant loss of nests and juveniles (Marshall et al. 2003).

Upland Sandpiper (*Bartramia longicauda*)—Upland sandpiper nesting sites are usually located in montane meadows surrounded by ponderosa or lodgepole pine forests (Marshall et al. 2003). The upland sandpiper is one of the rarest breeding birds in the western U.S. However, the species has been seen several times at Sycan Marsh since 1981 (ORNHIC 2005). Threats to the species include trampling of nests by cattle and changes to vegetation composition in meadows (Marshall et al. 2003).

Black Tern (*Chlidonias niger*)—The black tern is a colonial species that is associated with marshes having abundant emergent vegetation. Sycan Marsh supports a major population of black terns; 778 individuals were banded there between 1982 and 1984 (Stern 1987). Black tern populations declined

throughout the period 1966 to 1996 because of habitat loss and degradation, but now may be increasing (Marshall et al. 2003).

Lewis's Woodpecker (*Melanerpes lewis*)—Associated with open canopy woodlands, especially ponderosa pine-Oregon white oak communities, Lewis's woodpeckers nest in tree cavities excavated by other woodpecker species. Once common on the east side of the Cascades and portions of western Oregon, Lewis' woodpecker populations have declined dramatically since the 1940s. Factors causing population declines are thought to be the loss of oak woodland and savanna habitat, as well as nest site competition from European starlings (Marshall et al. 2003).

White-headed Woodpecker (*Picoides albolarvatus*)—The white-headed woodpecker is strongly associated with open-canopy ponderosa pine woodlands, but is occasionally found in mixed-conifer forests. White-headed woodpeckers prefer stands composed of large-diameter trees. Nests are excavated in large snags, usually >25-in diameter breast height (Marshall et al. 2003). Logging of old-growth ponderosa pine forests and fire suppression are reported to have reduced habitat availability for the species.

Olive-sided Flycatcher (*Contopus cooperi*)—The olive-sided flycatcher occurs mostly in open canopy conifer forest or near forest edges. Prominent trees and snags are an important habitat element. It has been estimated that Oregon populations decreased 5.1% from 1966 to 1996 (Marshall et al. 2003). The principal threat to olive-side flycatcher populations is believed to be habitat loss in South American wintering areas, although fire suppression and loss of late-successional forests in the western U.S. may contribute to declines (Marshall et al. 2003).

Willow Flycatcher (*Empidonax traillii adastus*)—In eastern Oregon, willow flycatchers occur almost exclusively in shrubby riparian areas. The principal threat to the species is believed to be degradation of riparian habitat due to over grazing and altered hydrological regimes (Marshall et al. 2003). Nest parasitism by brown-headed cowbirds may contribute to lower population recruitment (Marshall et al. 2003).

Purple Martin (*Progne subis*)—The purple martin is a colonial nester that uses snags and man-made nest boxes. The species is most frequently found near large rivers, lakes, and estuaries. Purple martins are extremely rare east of the Cascades in Oregon, but have been observed along Alder Creek near the Sprague River (ORNHIC 2005). Reasons given for population declines are the reduction of large snags on managed forestlands and nest site competition from European starlings (Marshall et al. 2003).

Mammals

Preble's Shrew (*Sorex preblei*)—Very little is known about the biology of Preble's shrew. It has usually been captured in sagebrush-bunchgrass habitats

or marshes. There are no observations of Preble's shrew documented from the Upper Sprague River subbasin, but the geographic range of the species does overlap the assessment area (Verts and Carraway 1998).

Myotis Bat Species (*Myotis evotis*, *M. thysanodes*, *M. volans*, *M. yumanensis*, *M. ciliolabrum*)—Although all five of these *Myotis* species exhibit differences in behavior, diet, and reproduction, all of these bats are primarily associated with conifer forests and are often captured at the same sites. *Myotis* bats use a variety of natural (caves, rock crevices, tree cavities) and man-made (mines, abandoned barns, bridges) structures for roosting and maternity colonies. They are thought to be at risk because of the loss of old-growth forests, human disturbance at roosts and hibernacula, and pesticide use (Marshall et al. 1996). All five of these *Myotis* species have been captured within the assessment area (ORNHIC 2005).

Silver-Haired Bat (*Lasiorycteris noctivagans*)—Associated with conifer forests, including western juniper woodlands, silver-haired bats usually roost in tree cavities and under peeling bark, but will use caves and mines if available. The species strongly prefers late-successional forests to younger stands (Perkins and Cross 1988), and therefore is thought to be vulnerable to the loss of old growth forest. Silver-haired bats have been captured at several springs and stock ponds in the assessment area (ORNHIC 2005).

Pallid Bat (*Antrozous pallidus*)—In central and southeastern Oregon, the pallid bat inhabits shrublands and western juniper woodlands. Day roosts used by the species include caves, mine shafts, rock crevices, and tree cavities. Pallid bat populations have declined, mainly because of human disturbance at roosts and limited habitat (Marshall et al. 1996). Pallid bats have been observed in the assessment area (ORNHIC 2005).

American Marten (*Martes americana*)—American martens are extremely rare throughout Oregon. Most observations have been at high elevations in the Cascades and Blue mountains; however it was estimated that the Fremont National Forest supported between 240 and 330 martens during the period 1929 to 1945 (USFS 1999). One specimen was collected from within the assessment area (Verts and Carraway 1998). Martens use a variety of forest habitats including lodgepole pine forests, mixed conifer forests, and western juniper woodlands. The species prefers late-successional forests that have an abundance of large trees, snags, and downed logs (Marshall et al. 1996). The loss of old-growth forest is thought to be the primary cause for the decline in American marten populations (Marshall et al. 1996).

Kit Fox (*Vulpes macrotis*)—The kit fox is associated with shrub-steppe and desert habitats. The diet of kit foxes includes jackrabbits, cottontails, and kangaroo rats. Motor vehicle mortality is thought to be a significant limiting factor to kit fox populations (Verts and Carraway 1998). It is unclear whether predator control programs harm or benefit the species (Verts and Carraway 1995). The Upper Sprague River subbasin lies near the western boundary of the geographic range of the kit fox (Verts and Carraway 1998).

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