Wildlife-Habitat Relationships of the Grande Ronde River

by Aryn E. Hayden

ABSTRACT

In selecting habitat animal species require food, water and adequate cover. When these criteria are taken into account it appears that habitats utilized by terrestrial wildlife along the Grande Ronde River change longitudinally from mixed conifer forests to ponderosa pine forests in the headwaters and middle reaches to grassland and shrub-steppe in the lower reaches. Species diversity of mammals, birds and reptiles within these habitats will also decrease towards the lower reaches to some degree as habitat changes along the Grande Ronde River. A potential decrease in species diversity as habitat changes may indicate that habitat specialist species are more likely to be found in the headwaters of and middle reaches while habitat generalists are likely to be found in the middle and lower reaches of the Grande Ronde River. This concept of decreasing species diversity in a downstream gradient indicates that the River Continuum Concept, traditionally an aquatic hypothesis, may have some applicability to distributions of terrestrial wildlife in the context of riverine ecosystems.

Species diversity of terrestrial wildlife is also heavily influenced by the presence of riparian vegetation along the river. Riparian vegetation is likely to be found within the headwaters and middle reaches of the Grande Ronde River and in patches pertaining to locations of physical complexity along the river such as confluences with tributaries. Riparian vegetation provides complex habitat for mammals and birds that live along the river and those that utilize riparian habitat for foraging, water requirements, migration or other activities necessary for survival. Amphibians also depend on these patches of physical complexity to provide slower waters needed to complete their lifecycles. Wildlife species diversity will be higher in the headwaters and middle reaches of the Grande Ronde River and in areas of high physical complexity where greater diversity and structural complexity of habitat will support large numbers of wildlife species along the Grande Ronde River.

HABITATS, HYPOTHESES, AND WILDLIFE

Riverine ecosystems are composed of biotic communities of living organisms that interact with each other and with their physical environment. Physical components of rivers such as geology and flow regimes impact the shape and structure of aquatic communities of invertebrates, fish and other organisms. Vannote et al. (1980) proposed the River Continuum Concept (RCC) to relate these physical processes to aquatic ecology. This hypothesis predicts that features of aquatic ecosystems will change predictably in a longitudinal gradient as physical features of the river such as the width and stream order change from the headwaters to the lower reaches of a stream system. Although it has been considered an aquatic concept, the RCC does have some application to the terrestrial world as well.

Habitat shapes the diversity of wildlife communities potentially found in an area. Habitat types encountered along the Grande River system (Figure 1) may change in a downstream gradient as elevation changes, transitioning from mixed conifer forests at the headwaters of our journey to ponderosa pine forest and then bunchgrass and shrub steppe in canyon areas in the lower reaches (Scott et al. 1989, Nowak 2001, and Stewart 2007, this volume). This decrease in vegetative habitat downstream may to some extent predict that habitat specialists- species small in size, exhibiting high fecundity (the number of offspring produced yearly by one female) and having all of their habitat requirements met in vegetative communities (Patton 1992)- are more likely to be found in the headwaters and middle reaches. Furthermore habitat generalists- species that are large in size, highly mobile, exhibit low fecundity and require large landscapes to meet their vegetative requirements (Patton 1992)- are more likely to be found in the middle and lower reaches of the Grande Ronde River. This change in habitat, when considered alone, may result in a gradient of change in wildlife abundance and diversity as we move downstream from the headwaters, concurring with the River Continuum Concept.

Any existing gradients and subsequent changes in wildlife along the Grande Ronde River, however, are further influenced by the presence of a major physical feature: the river itself. The ecology of certain wildlife species, including the American beaver, restricts them to riparian zones, potentially resulting in greater wildlife diversity along waterways. The presence of flowing water also promotes the growth of riparian vegetation which provides key habitat for wildlife including reptiles, amphibians, mammals and birds in the form of cover, water and/or food (Thomas 1979). Riparian habitat is affected by many factors such as the presence and

magnitude of floodplain depositions that create deep soils, providing quality sites for plant establishment and growth (Thomas 1979). Patches of high physical complexity along the waterway, such as confluences and other sites of natural disturbance, may increase the amount of suitable sites for diversity of vegetative species to become established under the Intermediate Disturbance Hypothesis and Riverine Ecosystem Synthesis (Hester 2007, this volume). If these and other factors are favorable along the river and do not change in a continuous gradient then it is likely that the riparian habitat associated with the waterway will not change in a continuous gradient. Furthermore, high vegetative abundance and diversity in these areas of intermediate disturbance may generate patches of high wildlife diversity due to the high habitat complexity available in these areas (Thomas 1979). Impacts of human land use activities such as logging on the quantity and quality of habitat within the area are also likely to affect species distributions along the Grande Ronde (Lawson 2007, this volume).

The presence of terrestrial wildlife species in an area depends on the quality and quantity of suitable of habitat in the area. Habitat- "the environment of and the specific place where an organism lives (Patton 1992, p. 359)" – must provide suitable water, food and cover specific to species needs (Thomas et al. 1979, United States Forest Service 2003). The needs for each of these three components vary with season and life stage for individuals of a species. Water requirements for metabolism and reproduction of many species are met through drinking of free water (Patton 1992). The presence of an abundant year-round water source will likely lead to high diversity of wildlife species utilizing the river and available riverine habitats of the Grande Ronde River. Use of habitats along the Grande Ronde River will be further influenced by the quality and quantity of food sources along the river. Food resources must be available (both seasonally present and physically obtainable) for use by wildlife in suitable habitats (Patton 1992). Food must also be palatable, easily digestible, and nutritionally appropriate for the life stage of the animal (Patton 1992). Seasonal changes in food requirements and food availability for terrestrial wildlife species will also impact species distributions through various habitats along the Grande Ronde River.

Cover exists as different structural forms within habitats, including living forms (grasses, seedlings, trees) and physical attributes (aspect, rocks, hills, water etc.), of the environment (Patton 1992). Cover provides protection from predators and hazards of the environment as well as shelter for reproductive activities which also vary with season and can affect species

distribution (Patton 1992). Habitats themselves often vary seasonally as well, such as deciduous riparian vegetation that provides one form of structure in spring and summer and another type of structure in fall and winter (Thomas 1979). High structural complexity of habitat may contribute to high species diversity within an ecosystem (Thomas 1979, USFS 2003, Patton 1992). Most species utilize multiple habitat types depending on time of year and lifecycle stage. The quantity and quality of food, water and cover provided within these habitats will characterize the abundance and diversity of wildlife species along the Grande Ronde River. Greater abundance and diversity of wildlife is expected in areas containing high abundance of riparian vegetation.

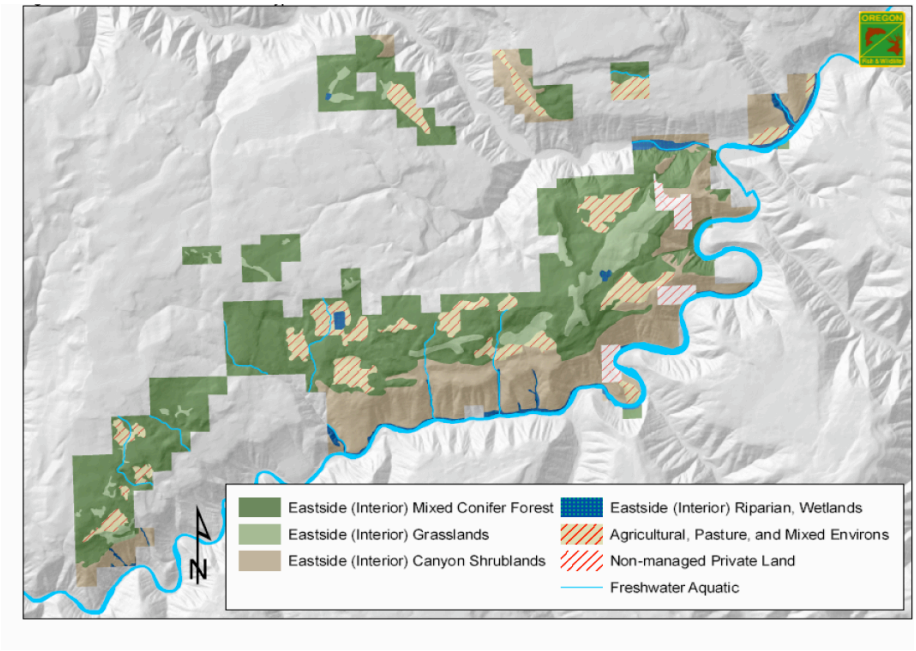

Figure 1. An example of habitats utilized by wildlife along the Grande Ronde River including upland habitat types and riparian vegetation located along the Grande Ronde River and tributaries. (Oregon Department of Fish and Wildlife 2007)

HERPETOFAUNA

Although few reptile and amphibian species occur along the Grande Ronde River (Table 1) amphibians and reptiles play an important ecological role and are considered briefly here. Amphibians require water to complete part of their lifecycle and thus predictable waterways are crucial habitats for these animals (Welsh et al. 2005). The Columbia spotted frog (*Rana luteiventris*) is usually found near slow-moving clear waters within a variety of habitat types

including mixed conifer forests (Nowak and Kuckenbecker 2004, Csuti 2001). This species often requires deep silt substrate for hibernating through winter months or they may over winter at undercut banks or springheads (Nowak and Kuckenbecker 2004, Stebbins 2003). The diet of Columbia spotted frogs varies with life stage with larvae feeding on algae, bacteria and decaying organic matter while adults consume aquatic invertebrates, spiders, and earthworms (Csuti et al. 2001, Nowak 2004). Confluences with tributaries where physical processes may create backwater areas (Thorpe et al. 2006) may characterize amphibian habitat along the Grande Ronde River. These areas of slow moving water where larvae can develop and adequate food sources exist for adults are key habitat for amphibians.

Reptiles are not constrained to water and thus may be more abundant along the Grande Ronde River. The western rattlesnake (*Crotalus viridis*) is associated with rocks, downed logs or other forms of habitat cover rather than water (Csuti et al. 2001). Western rattlesnakes are most active at night when weather is warm and during the day in cooler months, seeking shelter in dens on south-facing slopes in the winter (Csuti et al. 2001). This species like other reptiles in the area feeds mainly on mammals (mice, rabbits, squirrels etc.) and birds (Csuti et al. 2001, Stebbins 2003). With these habitat requirements the western rattlesnake and similar reptile species are likely to be found throughout the habitats of the Grande Ronde River in areas from the headwaters to the lower reaches where adequate prey populations exist.

Figure 2. Columbia spotted frog (left) and western rattlesnake (right). (http://www.pacificbio.org/ESIN/ReptilesAmphibians/ColumbiaSpottedFrog/0187.jpeg; http://www.fs.fed.us/r6/centraloregon/wildlife/species/reptiles-amphibians/images/sn-westernrattlesnake.jpg).

BIRDS

Birds are grouped both by habitat utilization as well as family associations and examples are provided relating species diversity of these groupings to their associated habitats along the Grande Ronde River. High biodiversity is expected in habitats containing greater structural complexity due to the increased number of habitat components available within a given area (Podulka et al. 2004). Along the Grande Ronde River species diversity will likely be higher in forested areas of the headwaters and middle reaches and within riparian communities where several layers of vegetative cover may serve as different habitat for different types of species within the same area. Food resources in these habitats are also likely to be more diverse and abundant, especially in the context of a highly productive river system containing a diversity of invertebrate and fish species (see Orear 2007, Nogroski 2007, and Sommerauer 2007, this volume).

Edge effects may also be present in areas of abrupt transition between habitats. Bird species may make use of both their preferred habitat and adjacent habitats. In addition, other species may be present that utilize the transition zone as a unique habitat (Podulka et al. 2004). Edge effects may be present where forested habitats transition into riparian habitats along the river corridor. Forests along the river also transition into grasslands as elevation decreases. This may lead to increased species diversity in transitions between habitat types along the Grande Ronde River. Pockets of riparian vegetation in areas of complexity within the physical environment may also add to edge effects exhibited along the Grande Ronde River by providing cover for species utilizing the aquatic resources present there. Bird species diversity is expected to be highest in complex habitats along the Grande Ronde River including forested areas of the headwaters and middle reaches, as well as in riparian vegetation that may be found along portions of the River within the grasslands of the lower reaches.

Cavity Nesters

Cavity nesting species that require trees with adequate cavities for nesting during the breeding season include owls and waterfowl. The Pileated Woodpecker (*Dryocopus pileatus*) prefers large diameter trees with closed canopies for breeding (USFS 2003, Nowak 2004). This secretive and solitary species eats carpenter ants that it excavates from dead woody material such as snags which aids in the management of insect populations (Csuti et al. 2001, USFS 2003).

The Pileated Woodpecker also excavates a large cavity for nesting in April, laying a single clutch of four to five eggs, within grand fir stands of high canopy closure (Csuti et al. 2001). Adults disperse after breeding and may be found in a variety of forested habitats where adequate prey items exist (USFS 2003, Csuti et al. 2001).

Waterfowl species like the Common Merganser (*Mergus merganser*) will then nest in cavities, laying one clutch of nine to twelve eggs, excavated by Pileated Woodpeckers within forested areas along rivers (Csuti et al. 2001). Common Mergansers require clear water and shallow areas in order to see and hunt for fish species including salmonids such as trout (Csuti et al. 2001). Common Mergansers and other waterfowl will most likely be found within forested and riparian areas adjacent to river corridors, especially those containing palatable fish populations likely to occur in the colder headwaters and middle reaches of the Grande Ronde River (see Nogroski, A. this volume).

Cavities excavated by the Pileated Woodpecker are also utilized by owls where one clutch of five to seven eggs is layed (USFS 2003). The Northern Saw-whet Owl (*Aegolius acadicus*) inhabits conifer forests with high canopy closure and, like many owls, hunts for small mammals such as mice, chipmunks and squirrels as well as some small birds in open areas or forest edges (Csuti et al. 2001). This species may also migrate from coniferous forests used for summer breeding to riparian thickets in valleys during the winter months (Csuti et al. 2001). During the breeding season, owls are likely to be found in forested areas containing adequate nesting cavities and abundant prey items such as are found along the headwaters and upper middle reaches of the Grande Ronde River.

Figure 2. Pileated Woodpecker (http://www.valdosta.edu/~bergstrm/piwo1sm.JPG)

Gallinaceous Birds

Gallinaceous birds refer to species such as grouse, quails, turkeys and other species in the order Galliformes (Podulka et al. 2004) which are usually ground-dwelling species. Some gallinaceous species present of the Grande Ronde such as the Blue Grouse (*Dendragapus obscurus*) require some form of deciduous vegetation component in their habitat (Csuti et al. 2001). The Blue Grouse prefers coniferous forests, selecting deciduous cover near forest edges and water sources under which to build its nest on the ground laying one clutch of six to eight eggs in April (Csuti et al. 2001). Diet of Blue Grouse and other gallinaceous species varies seasonally with adults and young eating insects, berries and seeds during spring and summer months and needles and buds of conifers in winter months (Csuti et al. 2001). Other ground-dwelling species such as the California Quail (*Callipepla californica*) will also utilize more open habitats such as sagebrush areas within 1200 feet of a water source (Csuti et al. 2001). Ground-dwelling bird species are likely to be found throughout the Grande Ronde River. It is expected that some grouse and other gallinaceous species requiring brushy and deciduous cover will be present in forested habitats that include a riparian component within the headwaters and upper reaches. Still other species inhabiting grassland and low cover areas will utilize the river as it flows through grassland and sagebrush habitats of the lower reaches provided that banks are not too steep and the river is accessible.

Marsh Birds

The Great Blue Heron (*Ardea herodias*) utilizes a wide variety of habitats associated with water where adequate forage and cover components exist. Great Blue Herons nest in colonial groups of up to a few hundred individuals in spring with young hatching by summer and fledging by September (Csuti et al. 2001). Suitable nesting habitat generally requires a tree grove at least 1 acre (0.4 hectare) in size, with open canopy trees so that the nest can be easily accessed (Nowak and Kuckenbecker 2004, Csuti et al. 2001). Nesting habitat for this species must also be within 680 feet (250 meters) of wetlands or a waterway containing a food source and a single clutch of three to four eggs is produced (Csuti et al. 2001, Nowak and Kuckenbecker 2004). As a primarily piscivorous species Great Blue Herons may forage in a variety of habitats along the Grande Ronde River, provided that habitats contain palatable fish populations with spaces of clear shallow water over a firm substrate for wading (Nowak and Kuckenbecker 2004). During

the breeding season, Great Blue Herons will likely use forested areas along the headwaters and middle reaches of the Grande Ronde River where suitable nesting locations are available in close proximity to the abundant fish populations of this waterway.

Figure 3. Great Blue Herons building a nest.
(http://www.islandnet.com/beaconhillpark/articles/112_herons.htm)

Raptors

A variety of raptors are found within the Grande Ronde River subbasin including species that prefer each of the habitats that we will encounter on our journey.
The Bald Eagle (*Haliaeetus leucocephalus*) for example prefers forested or cliff areas with adequate nesting habitat for the two eggs produced in winter months that are adjacent to waterways (Csuti et al. 2001, USFS 2003). Listed as a threatened species and currently proposed for delisting from the Federal List of Endangered and Threatened Wildlife and Plants (United States Fish and Wildlife Service 2007), the Bald Eagle is common along the Grande Ronde River in areas such as the Wenaha Wildlife Area (ODFW 2007). Bald Eagles require large outcrops above waterways for perching where they feed primarily on fish that they catch or steel from Ospreys and occasionally on small mammals or birds within riparian areas (USFS 2003, Csuti et al. 2001).

Other raptors such as the Feruginous Hawk (*Buteo regalis*) may also utilize ledges of cliffs or trees for cover, building nests of large sticks and twigs for a clutch of three to four eggs laid in spring months (Csuti et al. 2001). The food sources of this bird, however, differ from the Bald Eagle in that they forage in open areas adjacent to these habitats where their prey base of

small mammals is likely abundant (Csuti et al. 2001). Ferruginous Hawks and many other raptors, including Golden Eagles (*Aquila chrysaetos*), prefer open grasslands that support abundant mammalian prey such as rabbits and squirrels as well as small birds adjacent to forest edges or other sources of cover (Csuti et al. 2001). With several wildlife refuges in the area such as the Zumwalt Prairie Preserve, which supports numerous raptor species near the lower reaches (Nature Conservancy 2007), raptors are likely to be abundant along the Grande Ronde River. Species distributions of raptors will be shaped by habitat preferences pertaining to food and cover components. Tree-nesting species will be found where adequate vegetative cover exists (likely the headwaters and middle reaches) and raptors preferring open areas found where abundant mammalian prey items exist in grassland and sagebrush habitats along the Grande Ronde River.

Figure 4. Ferruginous Hawk (http://www.birdsofprey.blm.gov/photos/photo-ferrug.htm).

Passerines

Songbirds, members of the order Passeriformes, contribute to nearly half of the species of birds in the world (Podulka et al. 2004) and numerous species are found within the Grande Ronde area. This group utilizes diverse habitats ranging from species with general cover requirements such as jays that live in forested areas, to those with specific habitat needs such as migrant breeders that seek out riparian vegetation. Food sources are also diverse, ranging from foliage and seeds to insects. These habitat components will influence songbird species diversity along the Grande Ronde River.

Evening Grosbeaks (*Coccothraustes vespertinus*) are common songbirds in areas along the Grande Ronde River such as the Wenaha State Wildlife Area (ODFW 2007). The Evening Grosbeak inhabits spruce and mixed conifer forests where it feeds on the seeds of conifers and deciduous trees including willows (Csuti et al. 2001). Nests are built in June in conifer trees with one clutch of three to four eggs laid and the diet is often supplemented with insects during breeding season (Csuti et al. 2001). Many other species common along the Grande Ronde River also utilize forested habitats including seed-eating species of corvids and insectivorous species such as nuthatches (ODFW 2007).

Migratory species such as the Willow Flycatcher (*Empidonax traillii*), often prefer riparian vegetation along waterways. The Willow Flycatcher is common to the Umatilla National Forest in summer months (USFS 2007). This species migrates from Mexico and Central America to various locations in North America where it breeds in June, building cup nests and generally laying a single clutch of three to four eggs in riparian vegetation along streams (Csuti et al. 2001). This species forages near waterways to catch flying insects including wasps, flies and mosquitos (Csuti et al. 2001). Other insectivorous species found along the Grande Ronde River include nuthatches and warblers. Many of these species utilize riparian vegetation and forested habitats likely to be found along the headwaters, middle reaches, and in areas of physical complexity (i.e. confluences) along the Grande Ronde River.

Among the passerines some species require riparian habitat not only for the vegetative cover that is often associated with these habitats but also for the water component of riverine environments. American Dippers (*Cinclus mexicanus*) are associated with swiftly flowing waterways. While they prefer coniferous forests, Dippers may be found in any variety of habitats where water conditions are favorable (Csuti et al. 2001). Breeding in April and laying four to five eggs, Dippers defend habitats sometimes over a mile long on a waterway. They forage in clear waters for aquatic invertebrates, a process that may be impacted by sedimentation due to human activities (Csuti et al. 2001).

Figure 5. An American Dipper at the edge of rushing water. (http://digitalrepository.fws.gov/cdm4/item_viewer.php?CISOROOT=/Birds&CISOPTR=71&REC=2).

Great variety exists in the habitat and food preferences of bird species found along the Grande Ronde River. Many bird species including cavity nesters, some raptors and songbirds of the area require the cover provided by forests as a key habitat component. Several of these species exhibit high fecundity and utilize vegetation to meet their habitat needs which characterizes them as habitat specialists. These habitat preferences indicate that high species diversity will occur within the headwaters and middle reaches of the river system, especially during spring and summer breeding months. Other species are more adapted to use grassland and canyon habitat and will be found in abundance along the lower reaches of the river. These species may exhibit lower fecundity than similar species and species of other forms and these birds are more likely to be found in the middle and lower reaches. Still other species (some potentially specialist species), including several songbirds, prefer riparian vegetation or the river itself as their primary habitat components and may be found throughout the river system where adequate habitat exists. These habitat preferences indicate that high species diversity will exist in the headwaters and middle reaches as well as in areas of riparian vegetation along the Grande Ronde River.

MAMMALS

Habitat structure and vegetation type influence mammalian species diversity by providing for both the cover and food components of animal needs. Mammals found within the Grande Ronde River subbasin, with the exception of bats, are ground dwelling species and have unique habitat needs that vary with body form, diet, life stage and season. Vegetative cover is crucial for many animals and water itself can act as a form of cover for riverine species (Patton 1992). In addition to these structural habitat requirements mammals also require appropriate food sources, whether prey or herbaceous vegetation, within a reasonable distance from cover. These needs change seasonally and with reproductive status (Patton 1992). Changes in habitats of the Grande Ronde River from headwaters to the lower reaches may result in changes in the composition of mammalian species with animals adapted for different types of habitats. Greater diversity of mammalian species is expected in the headwaters and middle reaches of the Grande Ronde River due to the presence of more complex and diverse plant communities.

Small Mammals and Rodents

This grouping encompasses a broad range of animals from shrews and moles to voles, mice and squirrels. Diets of these animals range from strictly herbivorous species eating grasses, herbaceous (non-woody) vegetation, berries, seeds, bulbs and bark to insectivorous and omnivorous species eating fungi, bird eggs, insects and herpetofauna in addition to vegetative components (Csuti et al. 2001). Habitat needs of small mammals are diverse and representatives of many different groups are likely to be located throughout the four main habitat types we will encounter along the Grande Ronde River.

Bat species are a key component to natural ecosystems, helping to control insect populations with their ravenous insectivorous habits (USFS 2003). As highly mobile species of mammals for their relative size bats have relatively low fecundity (one young per year) and are long lived when compared with other small mammals that breed large, multiple litters and die at young ages (USFS 2003). Several bat species prefer forested areas such as the silver-haired bat (*Lasionycteris noctivagans*) which is often associated with conifer forests and forages for insects over ponds and forest streams (Csuti et al. 2001). Other species such as the Yuma myotis (*Myotis yumanensis*) must drink free water in addition to the water obtained from the insects that they eat and thus are found in a wide range of habitats where water is present (Csuti et al. 2001). Due to

the diversity of cover and presence of abundant insect prey (Orear 2007, this volume) bats will utilize a variety of habitat types along the Grande Ronde River.

Squirrel species found along the Grande Ronde River have similar inter-specific diets and make use of a variety of cover types. Diet varies seasonally for many species as buds, seeds and grasses are available in spring while ripening seeds, berries and grains are available in fall as is the case for the Columbian ground squirrel (*Spermophilus columbianus*) (Csuti et al. 2001). Other squirrels will also consume fungi, conifer seeds, insects and even occasionally bird eggs or lizards as is the case for the golden-mantled ground squirrel (*Spermophilus lateralis*). Ground squirrels often prefer to inhabit open forested areas with moist conditions for burrowing since they may spend nearly three quarters of a year underground as does the Columbian ground squirrel (Csuti et al. 2001). Some species prefer to have rocky cover within open forested or even grassland areas while other species like the red squirrel (*Tamiasciurus hudsonicus*) and the northern flying squirrel (*Glaucomys sabrinus*) prefer mixed conifer forests because they use trees for nesting (Csuti et al. 2001). Many of these squirrel species produce only one litter of three to five young per year (Csuti et al. 2001).

Habitat preferences of mice and other rodents are less variable with a greater emphasis on using herbaceous and other forms of vegetation for food and cover. The muskrat (*Ondatra zibethicus*), a rodent sharing the same family and subfamily as the voles, relies heavily on the presence of riparian vegetation for its survival. As an aquatic rodent, muskrats of eastern Oregon build mounds using mud and vegetation approximately one meter high by two meters wide for protection and nesting with two to three litters of six to eight young per year (Csuti et al. 2001). Muskrats feed on riparian vegetation such as tules, rushes, cattails and grasses, as well as riverine organisms including crawfish, fish, reptiles and amphibians (Csuti et al. 2001). The main predators of this rodent are coyotes, owls, mink (where the two coexist) and humans as this animal is trapped for its fur (Ingles 1965, Csuti et al. 2001).

The American Beaver (*Castor canadensis*) depends on permanent water sources for cover and breeding habits, often selecting riparian habitats within coniferous forests (Nowak 2001). Beavers are strictly herbivorous, feeding on leaves, leaf buds, branches and the bark of trees and woody plants with preferences for willow and aspen species as well as aquatic and herbaceous plants (Csuti et al. 2001). Although not common in areas such as the Wenaha Wildlife Area beavers have been seen along the Grande Ronde River (ODFW 2001; Baxter

2006). Beavers build dams by felling riparian vegetation into a waterway and piling mud over the collecting branches and sticks, thereby creating pools of water that provide cover from predators and the storage of sticks to feed on in winter (Ingles 1965). The beaver itself is a natural source of disturbance for aquatic systems that adds spatially complex habitat to aquatic environments in the form of ponds, side channels and floodplain wetlands (Baxter 2006). Beaver abundance will be high in aquatic areas containing adequate riparian vegetation within forested areas for feeding and damming purposes as is expected in the headwaters and middle reaches of the Grande Ronde River.

Figure 6. The American beaver. (http://www.turtletrack.org/Issues01/Co06302001/CO_06302001_Beaver_flea.htm).

The life histories of small mammal and rodent species likely to be found along the Grande Ronde River indicate that abundance is shaped by dependence upon available food and cover types. This indicates that greater species diversity will exist where quality habitats are present within close proximity to the waterway. The lower fecundity, higher mobility and high variety of habitats used by some groups such as squirrels and bats indicates that these species are habitat generalists and they may be more likely to occur in the middle and lower reaches of the Grande Ronde River. Still other species such as rodents like the muskrat rely on specific vegetation and have higher fecundity, indicating that these species may occur more often within forested areas of the headwaters and middle reaches, in association with forested and riparian vegetative habitats.

Omnivores

Omnivores are opportunistic species whose feeding preferences vary with food availability. Generally feeding on vegetation, fruit and berries as well as aquatic invertebrates and fish species, mammalian omnivores will likely be present within riparian areas of the forested headwaters and upper middle reaches of the Grande Ronde River where available forage and cover are abundant. The American Black Bear (*Ursus americanus*) prefers a habitat of mixed conifer and deciduous tree forest with a dense understory (Csuti et al. 2001) and occurs commonly along the Grande Ronde River in such places as the Wenaha Wildlife Area (ODFW 2007). Bears are omnivorous and opportunistic mammals that feed on seasonally available forage of berries, insects, fungi, roots, birds and tree bark and a litter of two to three young is produced every few years (Csuti et al. 2001). Another highly nutritional food item for bears exists in anadromous salmon species migrating upstream from the ocean to spawn. These fish, where present in the headwaters, may aid bears with accumulating fat storage for hibernation in the winter (Willson and Halupka 1995). While bears may have large home ranges of several square miles, their habitat is more likely to include a productive aquatic environment within forested areas that contains abundant forage items such as salmonids, berries and herbaceous vegetation (Csuti et al. 2001, Hayden, K.L., personal communication, 2007). These large omnivores are likely to be found within the headwaters and early middle reaches of the Grande Ronde River.

Skunks and raccoons are common omnivores along the Grande Ronde River in areas where appropriate habitat occurs (ODFW 2007; Nowak and Eddy 2001). These nocturnal animals are associated with habitats containing rocky or vegetative cover for hiding during the day, and in close proximity to permanent water sources (Csuti et al. 2001). Although a member of the order Carnivora, the diet of the northern raccoon (*Procyon lotor*) is mostly vegetative and varies seasonally, consisting of berries, fruit and seeds as well as fish, invertebrates, amphibians and reptiles (Csuti et al. 2001, Ingles 1965). The striped skunk (*Mephitis mephitis*) and the Western Spotted Skunk (*Spilogale gracilis*) are more carnivorous, feeding on small mammals (spotted skunk), insects (striped skunk), reptiles and bird eggs, in addition to berries and fruits when these various forage items are available during different seasons (Csuti et al. 2001). These omnivorous nocturnal species will be present along much of the Grande Ronde River where

adequate vegetative and rocky cover is present in combination with abundant aquatic and vegetative riparian food sources.

Figure 7. The American Black Bear. (http://www.blueplanetbiomes.org/american_black-bear_taiga.htm).

Ungulates

Rocky mountain bighorn sheep were extirpated in Oregon by the mid 1940s due to over hunting, disease and competition with grazing livestock (Nowak and Eddy 2001). Reintroduced herds have been established within the Grande Ronde subbasin including releases of sheep in the Lostine, Minam and Wenaha drainages. These populations remain sensitive to disease (Nowak and Eddy 2001). Rocky mountain bighorn sheep (*Ovis canadensis*) inhabit rocky canyons, steep mountains and talus slopes including canyon scrublands and one young is born per year (Csuti et al. 2001, Nowak 2004, Ingles 1965). Seasonal forage availability influences migration of this species with bighorn sheep feeding on grasses such as bluebunch wheatgrass (*Festuca sp.* and *Agropyron sp.*) and sedges (*Carex sp.*) on high elevation slopes when available in spring and summer months. They migrate down slope to feed on woody plants in fall and winter (Csuti et al. 2001, Ingles 1965).

Rocky mountain elk (*Cervus elaphus nelsoni*) reside in a variety of habitats where preferred forage is abundant. Elk and deer utilize many habitats found along the Grande Ronde River including mixed conifer forests, mountain valleys and agricultural lands. They migrate seasonally along the Grande Ronde River between these habitats (Csuti 2001, Nowak and Kuckenbecker 2004). Diet varies seasonally with food availability. Elk prefer grasses, sedges

and rushes when available in higher elevation forests during warmer months, migrating to lower elevation areas in winter in search of water and available forage where they browse woody plants including aspen, alder and willow (Csuti 2001, Nowak and Eddy 2001). Elk will also utilize ridge-top plateaus in grassland and shrub habitat when calves are born (one young per female per year) and mothers segregate with their young from the rest of the herd (USFS 2003). Ungulate distributions are most influenced by food availability and ungulates will likely be more abundant within the grassland habitats of the lower reaches of the Grande Ronde River as well as in riparian areas within those habitats during migrations.

Figure 8. Rocky mountain bighorn sheep. (http://www.fs.fed.us/outdoors/naturewatch/Nevada/wildlife/lamoille-canyon/bighorns.jpg).

Carnivores

Several large carnivores reside within the Grande Ronde Subbasin. A few of these species, such as the Canada lynx have likely been extirpated from the area due to habitat degradation and other human activities (Nowak and Eddy 2001). Some carnivores require closed canopies and large diameter trees typical of natural or undisturbed habitats within their home range for breeding and daily cover purposes (Nowak and Eddy 2001, USFS 2003). Other species such as cougars utilize a variety of habitats and are more dependent on the presence of sufficient prey populations for survival (Nowak and Eddy 2001).

The American marten (*Martes Americana*) requires late successional old growth mixed conifer forests with closed canopies and high numbers of snags and downed woody material as

available cover (Nowak and Eddy 2001, USFS 2003). Martens are nocturnal carnivores feeding primarily on shrews, voles, wood rats, squirrels and sometimes fruits with a litter size of two to four young born yearly (Csuti et al. 2001, USFS 2003). Martens avoid their predators by hiding during the day. Preferred cover varies seasonally, including use of the burrows of their prey items, tree cavities, under the snow and other insulated places in winter. Trees, snag tops and other breezy and cooler rest sights are used during the summer (USFS 2003). Martens are highly susceptible to predation and the high tree cover of closed canopy forests provides protection and escape routes from mammalian and avian predators (USFS 2003). Due to the risks of predation, martens rarely enter open areas but will utilize riparian areas as travel corridors to move throughout more open forests and areas with low cover in search of squirrels and other prey (USFS 2003). The American marten and other forest carnivores (fishers, wolverines etc.) require dense conifer forests adjacent to habitats with abundant prey items and are likely to be associated with the forested areas of the headwaters along the Grande Ronde River.

Other carnivores have more general cover requirements and are more dependent on the prey component of habitat to determine their distribution. The cougar (*Puma concolor*) is found in a variety of habitats from dense forests to open woodlands and canyon areas where adequate cover exists (Csuti et al. 2001). Cougars feed on large game species including elk and deer as well as smaller mammalian species and a litter of two young is produced every two years (Csuti et al. 2001). Cougars select habitats, such as open forested areas, where prey populations are abundant and adequate hiding cover exists for them to use as they hunt (Nowak and Eddy 2001, Csuti et al. 2001). These predator-prey interactions may also influence seasonal habitat use if carnivores such as the cougar follow migrating prey populations. Carnivores may be found in a wide variety of habitats along the Grande Ronde River from the headwaters to the lower reaches provided that suitable prey and cover exist.

Figure 9. Cougar (*Puma concolor*). (http://www.co.jackson.or.us/Page.asp?NavID=1771).

Mammals of the Grande Ronde River utilize a variety of habitats. Small mammals and omnivores, both habitat generalists and specialists, utilize riparian vegetation extensively and often prefer more open forests with brushy cover adjacent to the river where food and water are abundant. Ungulates of the Grande Ronde River are habitat generalists with high mobility and low fecundity and may be found in all habitats we are likely to encounter. Elk and deer in may be present in mixed conifer forests and open pine forests, to rocky mountain bighorn sheep, rocky mountain elk and deer herds along the bunchgrass and sagebrush steppe habitat types along the lower reaches of the Grande Ronde River. Forest carnivores often require more dense forests and may utilize riparian areas to move between habitats or as a source for their prey items. Other more generalist carnivore species may utilize a wide variety of habitats where abundant prey are available throughout the habitats of the Grande Ronde River. Mammalian abundance and diversity will be higher within the headwaters and along portions of the Grande Ronde River where riparian plant communities and diverse vegetation in the adjacent uplands provide additional cover and food sources for both habitat generalists and specialists. Many species specific to habitats of the lower reaches or those able to utilize multiple habitats will also be present, providing diversity in the lower reaches as well.

CONCLUSION

Physical processes of rivers shape the resulting biological aquatic ecosystems of riverine environments. The RCC attempts to qualify interactions and connections between geology and physical morphology of the stream system and the aquatic communities of invertebrates and fish. This concept can be applied to some extent to gain a better understanding of the diversity and abundance of terrestrial vertebrate species in the Grande Ronde River system. Life histories, life stages, and seasonal needs of different animals will influence species distributions as animals seek appropriate food, water and cover components for suitable habitat, and as these habitat components also change seasonally. Habitat types will change in a gradient from the headwaters to the lower reaches of the river. The distribution and diversity of reptiles, mammals and birds may change to some extent as a function of these habitat changes with a greater number of habitat specialists and generalists in the headwaters and middle reaches.

Riparian vegetation provides habitat for numerous wildlife species along the Grande Ronde River. The presence of patches of riparian vegetation at areas of physical complexity within the river system may lead to patches of high diversity of amphibian, mammalian and bird species. Abundance of riparian vegetation within these areas creates high habitat complexity, and provides additional food and cover for wildlife inhabiting areas within and adjacent to the riverine ecosystem. The presence of this riparian vegetation may result in higher diversity of both opportunistic and habitat specific mammals, birds and amphibians. Greater abundance and species diversity of wildlife will occur within the headwaters and middle reaches and in areas of high physical complexity where greater diversity and structural complexity of the food, water and cover components of habitat will support the greatest number of wildlife species along the Grande Ronde River.

Species (Common Name)	Habitat Associations					Species (Common Name)	Habitat Associations			
BIRDS										
Common Loon	CF					Common Nighthawk	CF	PF		GC
Canada Goose			R			Common Poorwill		PF		
Blue-winged Teal			R			Vaux's Swift	CF			
Cinnamon Teal			R			White-throated Swift		PF		
Great Blue Heron	CF					Calliope Hummingbird		PF	R	
Black-crowned Night Heron	CF					Rufous Hummingbird	CF		R	GC
Gadwall	CF					Black-chinned Hummingbird		PF	R	
Mallard	CF					Belted Kingfisher	CF	PF	R	
Harlequin Duck	CF					Williamson's Sapsucker	CF	PF	R	
Bufflehead	CF					Lewis's Woodpecker		PF		
Turkey Vulture	CF					Red-naped Sapsucker	CF			
Osprey	CF					Downy Woodpecker	CF		R	
Bald Eagle	CF					Hairy Woodpecker		PF	R	
Sharp-shinned Hawk	CF		R			Pileated Woodpecker	CF			
Cooper's Hawk	CF		R			White-headed Woodpecker		PF		
Northern Goshawk	CF					Black-backed Woodpecker		PF		
Swainson's Hawk	CF			GC		Northern Flicker		PF		GC
Red-tailed Hawk	CF					Olive-sided Flycatcher	CF			
Ferruginous Hawk				GC		Western Wood-Pewee	CF	PF	R	
Golden Eagle	CF	PF		GC		Willow Flycatcher			R	
Northern Harrier				GC		Dusky Flycatcher		PF	R	
American Kestrel				GC		Western Flycatcher			R	
Merlin		PF		GC		Hammond's Flycatcher	CF			
Peregrine Falcon		PF		GC		Say's Phoebe				GC
Prairie Falcon		PF		GC		Cassin's Vireo	CF	PF	R	
Wild Turkey	CF		R			Warbling Vireo			R	
Ruffed Grouse			R			Red-eyed Vireo			R	
Blue Grouse	CF					Gray Jay	CF	PF		
Chukar				GC		Steller's Jay	CF			
American Coot			R			Clark's Nutcracker	CF			
Mountain Quail		PF	R			Common Raven	CF	PF		
California Quail				GC		Tree Swallow	CF	PF		
Sandpipers and Phalarope	CF					Bank Swallow	CF			
Spotted Sandpiper			R			Violet-green Swallow		PF	R	GC
Killdeer			R			Cliff Swallow		PF		GC
Mourning Dove		PF		GC		Barn Swallow		PF		GC
Rock Dove	CF					Black-capped Chickadee	CF		R	
Western Screech-Owl			R			Mountain Chickadee	CF	PF		
Northern Pygmy-Owl	CF	PF	R			Chestnut-backed Chickadee	CF			
Flammulated Owl		PF				Red-breasted Nuthatch	CF			
Great-horned Owl	CF	PF				White-breasted Nuthatch	CF	PF		
Great Grey Owl	CF	PF	R			Pygmy Nuthatch		PF		

Long-eared Owl	CF	PF	R			Brown Creeper	CF		R	
Northern Saw-whet Owl	CF					House Wren	CF		R	
Species Name	**Habitat Associations**					**Species Name**	**Habitat Associations**			
Rock Wren				GC		Orange-crowned Warbler		PF	R	
Canyon Wren				GC		Yellow-breasted Chat	CF		R	
Winter Wren			R			Western Tanager	CF		R	
American Dipper			R			Black-headed Grosbeak	CF		R	
Golden-crowned Kinglet	CF					Lazuli Bunting			R	
Ruby-crowned Kinglet	CF					Spotted Towhee	CF	PF	R	GC
Mountain Bluebird	CF					Brown-headed Cowbird		PF	R	
Townsend's Solitaire	CF	PF	R			Chipping Sparrow	CF		R	
Swainson's Thrush	CF	PF	R			Fox Sparrow			R	
Hermit Thrush	CF	PF	R			Song Sparrow			R	
American Robin	CF	PF	R			Lincoln's Sparrow			R	
Varied Thrush	CF					White-crowned Sparrow			R	GC
Gray Catbird	CF		R			Vestper Sparrow				
Cedar Waxwing	CF		R			Dark-eyed Junco	CF		R	
Nashville Warbler	CF		R			Cassin's Finch		PF		
Yellow-rumped Warbler	CF					House Finch		PF		
Yellow Warbler			R			Red Crossbill	CF	PF		
MacGillivary's Warbler			R			Pine Siskin	CF			
Townsend's Warbler	CF					Evening Grosbeak	CF			
American Redstart	CF		R			Bullock's Oriole			R	
Wilson's Warbler	CF					American Goldfinch			R	
MAMMALS										
Southern Red-backed Vole	CF		R			Fisher	CF			
Yellow-pine Chipmunk	CF					Wolverine	CF			
Columbian Ground Squirrel	CF	PF		GC		Black Bear	CF			
Red Squirrel	CF		R			Raccoon	CF			
Northern Flying Squirrel	CF	PF	R			Western Spotted Skunk	CF	PF		GC
Northern Pocket Gopher			R			Western Striped Skunk			R	GC
Muskrat			R			Northern River Otter			R	
House Mouse			R			Long-tailed Weasel	CF	PF	R	GC
Deer Mouse Peromyscus	CF	PF				Coyote		PF	R	GC
Canyon Mouse				GC		Red Fox		PF	R	
Bushy-tailed Woodrat				GC		Cougar	CF	PF		GC
Snowshoe Hare Lepus	CF					Canada Lynx	CF			
North American Porcupine	CF	PF	R			Bobcat	CF	PF		GC
American Beaver			R			Mule Deer		PF	R	
Northern Raccoon			R			White-tailed Deer		PF	R	
Mink			R			Rocky Mountain Elk		PF		GC
American Marten	CF					Rocky Mountain Bighorn Sheep				GC

Species Name	Habitat Associations					Species Name	Habitat Associations			
REPTILES										
Western Fence Lizard	CF	PF	R	GC		Gopher Snake	CF	PF	R	GC
W. Terrestrial Garter Snake	CF	PF	R	GC		Common Garter Snake	CF	PF	R	
Ringneck Snake		PF	R			Western Rattlesnake	CF		R	
Western Racer		PF		GC		Western Skink	CF	PF	R	
Rubber Boa	CF	PF	R	GC						
AMPHIBIANS										
Long-toed Salamander	CF	PF	R	GC		Columbia Spotted Frog	CF	PF	R	
Western Toad	CF	PF	R	GC		Great Basin Spadefoot Toad			R	
Pacific Chorus (Tree) Frog	CF	PF	R	GC		Bullfrog			R	

Table 1. Habitat associations for wildlife species found along the Grande Ronde River including mammals, birds, reptiles and amphibians. CF=mixed conifer forest (headwaters and middle reaches), PF=ponderosa pine forest (middle reaches), R= riparian vegetation or riverine associated species GC=grassland and canyon habitats (lower reaches). Species list compiled from Ladd Marsh (http://www.oregoniba.org/laddmarsh.htm), Umatilla National Forest bird species list (http://www.fs.fed.us/r6/uma/maps/Birds_of_the_Umatilla.pdf) and the Wenaha Wildlife Area species list (USFS 2003). Habitat associations were referenced from Csuti et al. (2001) and Thomas (1979).

Common Name	Scientific Name	W	Sp	S	F
Amphibians					
Long-toed Salamander	*Ambystoma macrodactylum*	C	C	C	C
Great Basin Spadefoot	*Scaphiopus intermontanus*	R	R	R	R
Western Toad	*Bufo boreas*	R	R	R	R
Pacific Chorus (Tree) Frog	*Pseudacris regilla*	C	C	C	C
Columbia Spotted Frog	*Rana luteiventris*	R	R	R	R
Bullfrog	*Rana catesbeiana*	R	U	U	U
Total Amphibians: 6					
Reptiles					
Western Fence Lizard	*Sceloporus occidentalis*	C	C	C	C
Rubber Boa	*Charina bottae*	U	U	U	U
Racer	*Coluber constrictor*	C	C	C	C
Ringneck Snake	*Diadophis punctatus*	R	R	R	R
Gopher Snake	*Pituophis catenifer*	C	C	C	C
Common Garter Snake	*Thamnophis sirtalis*	C	C	C	C
Western Rattlesnake	*Crotalus viridis*	R	U	U	U
Total Reptiles: 7					
Birds					
Turkey Vulture	*Cathartes aura*		U	U	
Great Blue Heron	*Ardea herodias*	C	C	C	C
Canada Goose	*Branta canadensis*	C	C	C	C
Wood Duck	*Aix sponsa*	R	U	U	U
Mallard	*Anas platyrhynchos*	C	C	C	C
Common Merganser	*Mergus merganser*	C	C	C	C
Osprey	*Pandion haliaetus*		U	U	
Bald Eagle	*Haliaeetus leucocephalus*	C	C	C	C
Northern Harrier	*Circus cyaneus*	C	C	C	C
Sharp-shinned Hawk	*Accipiter striatus*	U	U	U	U
Cooper's Hawk	*Accipiter cooperii*	C	C	C	C
Northern Goshawk	*Accipiter gentilis*	R	R	R	R
Red-tailed Hawk	*Buteo jamaicensis*	A	A	A	A
Rough-legged Hawk	*Buteo lagopus*				C
Golden Eagle	*Aquila chrysaetos*	C	C	C	C
American Kestrel	*Falco sparverius*	C	C	C	C
Chukar	*Alectoris chukar*	C	C	C	C
Gray Partridge	*Perdix perdix*	C	C	C	C
Ruffed Grouse	*Bonasa umbellus*	C	C	C	C
Blue Grouse	*Dendragapus obscurus*	C	C	C	C
Wild Turkey	*Meleagris gallopavo*	C	C	C	C
Mountain Quail	*Oreortyx pictus*	R	R	R	R
California Quail	*Callipepla californica*	C	C	C	C
Killdeer	*Charadrius vociferus*	R	C	A	C
Common Snipe	*Gallinago gallinago*	U	U	U	U
Rock Dove	*Columba livia*	U	U	U	U
Mourning Dove	*Zenaida macroura*	R	C	C	C
Western Screech-owl	*Otus kennicottii*	C	C	C	C
Great Horned Owl	*Bubo virginianus*	C	C	C	C
Northern Pygmy-owl	*Glaucidium gnoma*	R	C	C	R
Great Gray Owl	*Strix nebulosa*	R	R	R	R
Long-eared Owl	*Asio otus*	U	U	U	U
Northern Saw-whet Owl	*Aegolius acadicus*	R	R	R	R
Common Nighthawk	*Chordeiles minor*		C	C	C
Rufus Hummingbird	*Selasphorus rufus*		C	C	
Belted Kingfisher	*Ceryle alcyon*	C	C	C	C
Red-naped Sapsucker	*Sphyrapicus nuchalis*	U	U	U	U
Downy Woodpecker	*Picoides pubescens*	C	C	C	C
Hairy Woodpecker	*Picoides villosus*	C	C	C	C
Northern Flicker	*Colaptes auratus*		C	C	C
Pileated Woodpecker	*Dryocopus pileatus*	C	C	C	C
Olive-sided Flycatcher	*Contopus cooperi*		U	U	
Western Kingbird	*Tyrannus verticalis*		C	C	
Northern Shrike	*Lanius excubitor*	U	R	R	R
Warbling Vireo	*Vireo gilvus*		U	U	

Gray Jay	*Perisoreus canadensis*	U	C	C	C
Steller's Jay	*Cyanocitta stelleri*	A	A	A	A
Clark's Nutcracker	*Nucifraga columbiana*	C	U	U	R
Black-billed Magpie	*Pica pica*	A	A	A	A
American Crow	*Corvus brachyrhynchos*	A	A	A	A
Common Raven	*Corvus corax*	A	A	A	A
Horned Lark	*Eremophila alpestris*		U	U	U
Tree Swallow	*Tachycineta bicolor*		C	A	
Violet-green Swallow	*Tachycineta thalassina*		C	A	
Cliff Swallow	*Petrochelidon pyrrhonota*		C	A	
Barn Swallow	*Hirundo rustica*		C	A	
Black-capped Chickadee	*Poecile atricapillus*	C	C	C	C
Mountain Chickadee	*Poecile gambeli*	C	C	C	C
Red-breasted Nuthatch	*Sitta canadensis*	C	C	C	C
White-breasted Nuthatch	*Sitta carolinensis*	C	C	C	C
Pygmy Nuthatch	*Sitta pygmaea*	U	U	U	U
Canyon Wren	*Catherpes mexicanus*	C	C	C	C
House Wren	*Troglodytes aedon*	R	C	C	C
Winter Wren	*Troglodytes troglodytes*	C	U	U	U
American Dipper	*Cinclus mexicanus*	C	C	C	C
Golden-crowned Kinglet	*Regulus satrapa*	C	C	C	C
Ruby-crowned Kinglet	*Regulus calendula*	C	C	C	C
Western Bluebird	*Sialia mexicana*	R	C	C	C
Mountain Bluebird	*Sialia currucoides*	R	C	C	C
Townsend's Solitaire	*Myadestes townsendi*	C	C	C	C
Swainson's Thrush	*Catharus ustulatus*	R	R	R	R
American Robin	*Turdus migratorius*	C	A	A	C
European Starling	*Sturnus vulgaris*	U	A	A	A
Cedar Waxwing	*Bombycilla cedrorum*	C	C	C	C
Yellow Warbler	*Dendroica petechia*		C	C	U
Yellow-rumped Warbler	*Dendroica coronata*		U	U	R
Townsend's Warbler	*Dendroica townsendi*		C	C	U
MacGillivray's Warbler	*Oporornis tolmiei*		U	U	U
Western Tanager	*Piranga ludoviciana*		U	U	
Chipping Sparrow	*Spizella passerina*	R	U	U	U
Vesper Sparrow	*Pooecetes gramineus*	R	C	C	C
Song Sparrow	*Melospiza melodia*	C	C	C	C
White-crowned Sparrow	*Zonotrichia leucophrys*		U	U	R
Dark-eyed Junco	*Junco hyemalis*	A	A	A	A
Red-winged Blackbird	*Agelaius phoeniceus*		U	U	
Western Meadowlark	*Sturnella neglecta*	U	U	U	U
Brewer's Blackbird	*Euphagus cyanocephalus*	R	C	C	C
Brown-headed Cowbird	*Molothrus ater*	U	C	C	U
Bullock's Oriole	*Icterus bullockii*		R	R	R
Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*	R	R	R	R
Pine Grosbeak	*Pinicola enucleator*	R	R	R	R
Cassin's Finch	*Carpodacus cassinii*	U	C	C	U
Pine Siskin	*Carduelis pinus*	C	C	C	C
American Goldfinch	*Carduelis tristis*	C	C	C	C
Evening Grosbeak	*Coccothraustes vespertinus*	C	C	C	R
House Sparrow	*Passer domesticus*	A	A	A	A
Total Birds: 97					
Mammals					
Bats (Species unknown)					
Eastern Cottontail	*Sylvilagus floridanus*	C	C	C	C
Snowshoe Hare	*Lepus americanus*	C	C	C	C
Yellow-pine	*Chipmunk Tamias amoenus*	U	C	C	C
Yellow-bellied	*Marmot Marmota flaviventris*	R	C	C	R
Belding's Ground Squirrel	*Spermophilus beldingi*	R	A	A	U
Columbian Ground Squirrel	*Spermophilus columbianus*	R	C	C	R
Golden-mantled Ground Squirrel	*Spermophilus lateralis*	A	A	A	A
Red Squirrel	*Tamiasciurus hudsonicus*	C	C	C	C
Douglas' Squirrel	*Tamiasciurus douglasii*	C	C	C	C
Northern Flying Squirrel	*Glaucomys sabrinus*	C	C	C	C
Northern Pocket Gopher	*Thomomys talpoides*				
American Beaver	*Castor canadensis*	U	U	U	U

Deer Mouse	*Peromyscus maniculatus*	A	A	A	A
Canyon Mouse	*Peromyscus crinitus*	C	C	C	C
Meadow Vole	*Microtus pennsylvanicus*	C	C	C	C
Muskrat	*Ondatra zibethicus*	U	U	U	U
House Mouse	*Mus musculus*	A	A	A	A
Common Porcupine	*Erethizon dorsatum*	U	U	U	U
Coyote	*Canis latrans*	A	A	A	A
Gray Wolf	*Canis lupus*	R	R	R	R
Red Fox	*Vulpes vulpes*	R	R	R	R
Black Bear	*Ursus americanus*	U	C	C	C
Raccoon	*Procyon lotor*	C	C	C	C
Long-tailed Weasel	*Mustela frenata*	C	C	C	C
Mink	*Mustela vison*	U	U	U	U
American Badger	*Taxidea taxus*	C	C	C	C
Western Spotted Skunk	*Spilogale gracilis*	U	U	U	U
Striped Skunk	*Mephitis mephitis*	U	C	C	C
Northern River Otter	*Lutra canadensis*	R	R	R	R
Cougar (Mountain lion)	*Puma concolor*	C	C	C	C
Bobcat	*Lynx rufus*	C	C	C	C
Rocky Mountain Elk	*Cervus elaphus nelsoni*	A	A	A	A
White-tailed Deer (eastside)	*Odocoileus virginianus ochrourus*	A	A	A	A
Shiras moose	*Alces alces shirasi*	U	U	U	U
Mule deer	*Odocoileus hemionus*	A	A	A	A
Bighorn Sheep	*Ovis canadensis*	C	C	C	C
Total Mammals: 37					

Table 2. Species list for the Wenaha State Wildlife Area, where right hand columns indicate abundance by season with W-winter, Sp-spring, S-summer, F-fall and A-abundant, C-common, U-uncommon, R-rare, (USFS 2003).

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