Part 5: 'There are a few focal species for which viability was not evaluated. These species, except for the bats, all had extremely limited distribution on lands managed by the USFS. These species are addressed in Table 4 and Part 5. Although each of the bat species fits within a group or family that at least one focal species was analyzed except the Townsend's big-eared bat, there is an additional discussion on bats in part 5.'

For some focal species, a focal species model was not developed in this section we include a qualitative assessment of habitat associations and known risk factors. Included in this section are: Upland Sandpiper, Gray-crowned Rosy finch, Black-crowned night heron, Eared grebe, and a general section on bats.

Focal species – Upland sandpiper (f)

Group: Upland grassland (*Bartramia longicauda)*

Introduction

The upland sandpiper is the only species in this group. This species has a very limited distribution in Oregon and Washington. Although they were probably never abundant in the Northwest, they formerly bred widely in eastern Washington. With the loss of native grassland habitat, the Northwest population has now dwindled to a few small, isolated populations. The last remaining Washington population, near Spokane, is most likely extirpated. Most recent (1990's) breeding locations in northeastern Oregon were in Bear Valley (private lands adjacent to Malheur NF) and Logan Valley (Malheur NF). Other sightings have occurred in the planning areas, but breeding has not been documented. However, monitoring for presence and/or breeding has not occurred, so the abundance of this species on national forest systems lands is not known though likely very limited in distribution and abundance.

Due to the limited distribution of this species within the planning area, and its unique habitat, we did not develop a Focal Species assessment model to evaluate viability but rather provide a qualitative assessment of its habitat relationships and general management considerations.

Source Habitat

In general, uses dry grasslands "with low to moderate forb cover, low woody cover, moderate grass cover, moderate to high litter cover, and little bare ground" (Dechant et al. 1999). The small and declining populations in mountain valleys and open uplands of ne. Oregon (Union, Umatilla, Grant Cos.) unusual because of altitude (1,035–1,585 m), use of sedge stands and of slightly elevated mounds in wet meadows, and location within 100 m of forest edge (Akenson 1991, Herman and Scoville 1988, Houston and Bowen 2001). Wooden fence posts also appear to be associated with sandpiper use. Nests are usually hidden within a clump of vegetation, usually grasses and some forbs. The nest is a grass-lined depression with a normal clutch of 4 eggs.

Upland Sandpipers in Oregon, are found in montane meadows ranging 1,000-30,000 ac (400-12,000 ha) at 3,400-5,060 ft (1,036-1,542 m) elevation, generally surrounded by lodgepole sometimes ponderosa pine forests (Stern 2004). Meadows include native and non-native grasses and forbs, often with a small intermittent creek nearby; they may have a component of sagebrush within or along the margin. Presence of forbs such as cinquefoil may be a critical component of nesting habitat (Herman and Scoville 1988).

Risk Factors

Loss of habitat to agriculture and urban development and heavy grazing is thought to be the biggest factor in upland sandpiper decline (Houston and Bowen 2001). Former grasslands in the Spokane Valley of e. Washington have been "steadily altered" by housing developments, gravel pits, and the increase and spread of spotted knapweed (*Centaurea maculosa*), which is too tall and dense for Upland Sandpipers to nest in (McAllister 1995).

Other reasons for decline are uncertain, but may include habitat loss caused by encroachment of pine into meadows and use of herbicides to control and eliminate the forb component of the nesting meadows (Stern 2004). Overgrazing of meadows, especially in spring and early summer during incubation and brood rearing, can have a direct impact, and any resultant downcutting of streams in riparian areas that might lead to a lowering of the water table can lead to drying of adjacent meadows. Research on the effects of grazing on upland sandpipers is variable (Deschant et al. 2002).

Viability Outcome

At the scale of this analysis for the project areas, it is unlikely that management activities described in the proposed action or any of the alternatives would lead to an increased risk to the viability of the upland sandpiper. However, because so little is known about the distribution of this species on U.S. Forest Service lands, during project level analysis, it will be important to analyze potential effects on this species in potential habitat.

Management Recommendations:

Maintain large (>100 ha), contiguous tracts of prairie to reduce edge, provide habitat heterogeneity, and to decrease nest depredation (Herkert et al. 1993, Herkert 1994, Klute 1994, Helzer 1996). Blocks should be within 1.6 km of each other and be contiguous with grassy habitats (e.g., pasture, hayfields) (Herkert et al. 1993). Shape, as well as area, of management units must be taken into consideration; perimeter-area ratio strongly influenced occurrence of Upland Sandpipers in Nebraska (Helzer and Jelinski 1999).

Maintain native prairie by implementing burning, grazing, or haying treatments, or leaving idle, every 2-3 yr (Kaiser 1979, Kantrud 1981). In South Dakota, Upland Sandpipers successfully nested in pastures stocked in May at 1.0 to 2.5 AUM/ha (Kaiser 1979). In North Dakota, spring-burning at 3-yr intervals provided habitat conditions needed by Upland Sandpipers for nesting; grazing did to a lesser extent, but was more compatible than cropland or seeding tame grasses (Kirsch and Higgins 1976). Allow some blocks of grassland to be undisturbed to serve as nesting cover (Lindmeier 1960, Bowen and Kruse 1993). Avoid burning, mowing, or plowing during the nesting season (Buss and Hawkins 1939, Lokemoen and Beiser 1997).

Provide display perches, such as fence posts, rock piles, or tree stumps (White 1983). Prevent encroachment of woody vegetation (Herkert et al. 1993).

A complex of fields of different management practices may be necessary to meet Upland Sandpiper needs during the breeding season. Grazed, burned, and hayed fields provide suitable habitat for feeding, loafing, and brood rearing, but undisturbed fields are needed for nesting (Bowen and Kruse 1993). Provide a mosaic of habitat types, such as grassland of various heights and densities as well as cropland, to provide for the needs of Upland Sandpiper throughout the breeding season (Bolster 1990).

Annually burn 20-30% of grassland fragments <80 ha (Herkert 1994). Small fragments should have <50% of their area burned at a time, and, if next to other fragments, should be burned in a rotating manner that allows unburned fragments to be next to burned fragments. Burns should occur from March to early April or October to November (Herkert et al. 1993).

Graze at moderate levels to provide diverse grass heights and densities (Skinner 1974). Graze using a rotational system of two or more grazing units to increase grass eights and densities within and among units. Avoid season-long grazing; where grazing is necessary, delay grazing until mid- to late June to maintain nest densities (Bowen and Kruse 1993, Sedivec 1994). Choose rotational grazing over season-long grazing to provide more undisturbed cover during the nesting season by deferring two or more pastures until mid- to late June (Sedivec 1994). With rotational grazing systems, delay grazing until late May to early June to benefit nesting sandpipers as well as to optimize calf performance. Follow stocking rates as outlined by the U.S. Soil Conservation Service (1984); rates may be slightly higher for rotational grazing (Sedivec 1994).

Strategies to Address Issues and Improve Outcomes

1. Further habitat evaluations will occur for any project proposal that may affect this habitat. Efforts will be made in watersheds with known habitat for upland sandpipers to minimize potential negative effects to the quality of these habitats.

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Focal Species: Gray-crowned rosy finch (Leucosticte tephrocotis)

Group: Alpine

Introduction

The gray-crowned rosy finch does not have a special federal or state status. It is listed on the Nature Serve database as a G5 (globally widespread, abundant and secure) and in Oregon and Washington as aS3 (vulnerable to extirpation or extinction at the state level). The gray-crowned rosy finch is a migratory species. It tends to spend the summer in high elevation alpine areas (mainly on National Forest lands) and winters in adjacent valley areas located off the National Forests.

The gray-crowned rosy finch, particularly the variety within the Wallowa Mountains, is a uniquely important component of species diversity within the Blue Mountains. It is one of two subspecies of birds considered to be endemic to Oregon.

Due to the limited distribution of this species within the planning area, and its unique habitat, we did not develop a Focal Species assessment model to evaluate viability but rather provide a qualitative assessment of its habitat relationships and general management considerations.

Habitat Description

Gray-crowned rosy finches breed in open, rocky areas above timberline. They nest in rocky crevices located on cliffs (French, 1959). In the winter they tend to concentrate in flocks and migrate to lower elevation areas (Csuti et. al., 2001). They will use a variety of winter roost sites (i.e. buildings, mine shafts and caves) (Marshall et.al.,Eds, 2003). Breeding and nesting habitat occurs in alpine habitat associations throughout the plan revision area (Wisdom et.al. 2000, Johnson 1975 and Miller 1939). The Wallowa Mountains supports a sub-specific variety (*Leucosticte tephrocotis wallowa*) of the gray-crowned rosy finch. Marshall et. al. (2003), consider this variety of finch to be one of only two birds endemic to Oregon.

Risk and Threats

For the gray-crowned rosy-finch the amount of source habitat has not changed from the historic situation but as Hann et al. (1997) pointed out; while the overall trend may not be changing, site specific instances of loss of habitat quality from past excessive domestic sheep grazing may have already occurred. Current risks would be overgrazing by domestic sheep and human recreational activities in alpine tundra (Lehmkuhl et al. 1997). The amount of habitat subjected to domestic sheep grazing varies by Forest (Table GCRF-1), from zero on the Wallowa-Whitman to 15 percent on the Malheur. This estimate of source habitat is all Cold UH PVG found within the range of the species as given by Marcot et al. (2003) and not just the known occupied habitat, although both the gray-crowned on the Wallowa-Whitman NF and the Malheur NF.

Table TW24. GCRF-1: Estimated acres of gray-crowned rosy-finch source habitat by Forest and the percent in active grazing allotments, subject to domestic sheep grazing and within designated wilderness.

National Forest	Acres of Source Habitat	Active Allotment	Domestic sheep grazing	Designated Wilderness
Malheur	1,500	38	15	66
Umatilla	3,900	13	8	45
Wallowa-Whitman	44,000	38	0	53

Only Alternative C reduces the amount of source habitat that is subject to domestic sheep grazing; zero on the Malheur and just slightly over one percent on both the Wallowa-Whitman and the Umatilla NF. Although alternatives A, B, E, and F have the same amount of source habitat within active allotments, alternatives E and F should have the least impact due to a lower utilization level, followed by alternative A and then alternative B.

Though Gray-crowned Rosy-Finch, a generalist songbird typically thought of as a seed eater, is indirectly affected by the introduction of fish to naturally fishless habitats. Based on benthic invertebrate sampling at 12 fishless lakes and 12 fish-containing lakes, Nikcolas (2009) found mayflies to be 50 times more common at fishless lakes than at fish-containing lakes. As a result, Rosy-Finches foraged preferentially at fishless lakes than at fish-containing lakes. During mayfly emergence nearly six times more Rosy-Finches were observed at fishless lakes than at fish-containing lakes. We have no data to know whether fish-stocking has had an impact on populations of rosy finches in the Blue Mountains planning area though we do know some of the high elevation lakes have been stocked with non-native fish by ODFW.

Stanek (2009) fount that the closely related, brown-capped rosy-finch breeding area use and foraging habitat selection were positively correlated to the availability of snow-free alpine tundra and after reviewing potential climate change impacts facing rosy-finches and their alpine habitat, he indicated that increasing temperatures may result in a slow contraction of alpine habitat, an upward shift and range contraction for rosy-finches.

Viability Outcome

Likely in the planning area, the amount of source habitat has not changed from the historic situation to the existing condition (Wisdom et al, 2000). The effect of potential risk factors is unknown though no current management practices by the U.S.F.S. are known to be causing a negative risk to this species.

We do not expect that the viability of the gray-crowned rosy finch has changed due to any management activities (or other reasons) on lands managed by the U.S.F.S. It is not likely that management activities described in the proposed action or any of the alternatives will lead to an increased risk to the viability of this finch.

The findings in ICBEMP support this conclusion (Lehmkuhl et al 1997, Wisdom et al. 2000). However, Hann et al, 1997 point out that while the overall trend is not changing site specific instances of habitat degradation have occurred. Long-term climate change is likely to reduce the extent of source habitat for the gray-crowned rosy finch within the plan areas (Stanek 2009).

Management Implications

Presently, there is no information that suggests grazing by either native or nonnative ungulates is affecting the quality of source habitat for the gray-crowned rosy finch.

Strategies to Address the Issues

1. Limit potential risks to alpine environments including recreation, livestock grazing and fish stocking until research is available to help determine potential consequences of these activities.

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BLACK-CROWNED NIGHT HERON (*Nycticorax nycticorax*)

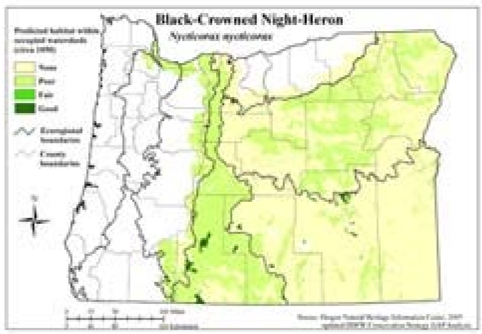
Group: Marsh with Adjacent Large Tree

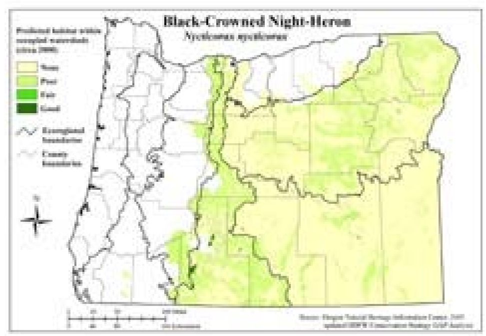
Introduction

Two species are in the Marsh with Adjacent Large Tree Group: the Black-crowned night heron (*Nycticorax nycticorax*) and the great blue heron (*Ardea Herodias*). The Black-crowned night heron was chosen as focal because it has the most widespread distribution across the planning area, and represents the risk factors associated with human disturbance important to all the species in this group.

Due to the limited distribution of this species (and the one other species in the Group) within the planning area, and its unique habitat, we did not develop a Focal Species assessment model to evaluate viability but rather provide a qualitative assessment of its habitat relationships and general management considerations.

Black-crowned night heron:





Great blue heron:

Habitat Description

Breeding habitat for black-crowned night herons (*Nycticorax nycticorax*) has been characterized, in general, as trees or shrubs in the vicinity of foraging areas or emergent vegetation in wetlands that is suitable for nest building (Giles and Marshall 1954, Davis 1993, Fasola 1994, Quinn et al. 1996, Rottenborn 1999, Hothem and Hatch 2004). However, it has been noted numerous times that black-crowned night herons nesting in shrubs or emergent vegetation are more susceptible to all forms of nest predation (e.g., Wolford and Boag 1971, Burger 1979, Greenwood 1981). Beaver et al. (1980) found them only nesting in trees and Kelly et al. (1993) reported that breeding distribution was affected more by predator avoidance than by proximity to feeding areas. Kelly et al. (1993) reported that 82% of heron colonies were within 0.5 km of wetland habitats. Tourenq et al. (2004) found that herons responded to wetlands within 1.0 km of nesting colonies. Natural and artificial wetlands are used for foraging (Erwin et al. 1996). An equal mix of open water and emergent vegetation is preferred (Hoefler 1979).

Risk Factors

Direct and indirect mortality of herons and other colony-nesting birds often results from disturbance by humans (Erwin 1989). Increasing densities of roads are expected to result in reductions of habitat quality for black-crowned night herons as a result of increased human disturbance and habitat fragmentation (Tremblay and Ellison 1979, Parsons and Burger 1982, Davis 1993, Rottenborn 1999). Human disturbance may increase predation (Skagen et al. 2001) and predation has been described as the primary limiting factor for black-crown night herons (Hothem and Hatch 2004).

Viability Outcome

Within the planning areas, it is likely that habitats for black-crowned night herons and great blue herons identified in the Marsh with Adjacent Large Tree Group in the Wetland family are not widely distributed nor are they abundant. These habitats have likely not declined in abundance compared to historical on lands managed by the U.S.F.S.

Though the risk of human disturbance due to the increase in road densities since historical has likely increased in the planning areas there is little known habitat.

We do not expect that the viability of black-crowned night herons has changed due to any management activities (or other reasons) on lands managed by the U.S.F.S. It is not likely that management activities described in the proposed action or any of the alternatives will lead to an increased risk to the viability of the black-corwned night heron or any of the other species in this Group.

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EARED GREBE (*Podiceps nigricollis*)

Group: Marsh/Open Water Group

Introduction

Eared grebes were chosen as a focal species to represent species associated with the Marsh/Open Water Group in the Wetland Family. The main risk factors for all species associated with marsh habitat were draining, filling, and degradation of marshes; environmental contaminants; and disturbance. Eared grebes were chosen as the focal species for this group because they had widespread yet very limited distribution, in eastern Oregon and eastern Washington State, their risk factors included those of the other species in this group, and they were not a hunted species. However, habitats for eared grebes and other species in this group are not abundant on National Forest System lands in the Blue Mountains (see Figures at end of this discussion).

Due to the limited distribution of this species within the planning area, and its unique habitat, we did not develop a Focal Species assessment model to evaluate viability but rather provide a qualitative assessment of its habitat relationships and general management considerations.

Source Habitat

Large, very open (i.e., 70% open water) wetlands, ponds, and lakes <3 m deep were preferred colony sites for eared grebes (Faaborg 1976, Boe 1992, Savard et al. 1994). Kantrud and Stewart (1984) reported that 54% of eared grebe colonies were in seasonal wetlands, 36% in semipermanent wetlands, and 11% in permanent wetlands (n = 35). Naugle et al. (1999) and Savard et al. (1994) also noted that eared grebes avoided wetlands, ponds, and lakes with woody vegetation at the edges. Although wetlands may have been created with development of reservoirs within the planning area, wetlands were also inundated as reservoirs were filled (Yokom et al. 1958).

Eared grebes require a long, running take off to take flight so they prefer large, very open ponds and lakes (Faaborg 1976, Johnsgard 1987). Increasing area of wetland was strongly related to suitability of a site for eared grebes (Yokom et al. 1958, Naugle et al. 2001). Ponds and lakes >30 ha were preferred (Boe 1992) although smaller water bodies (e.g., 20 ha) will be used (Faaborg 1976). Colony size was positively correlated with wetland size and larger wetlands tended to be used more often in subsequent years than smaller wetlands (Boe 1992).

Access to open water was important for eared grebes because they move to open water when disturbed from their nests, and also because they need a running start before taking flight (Boe 1992).

Risk Factors

Grass carp (*Ctenopharyngodon idella*) and common carp (*Cyprinus carpio*) have been documented to have detrimental effects on aquatic vegetation in lakes and wetlands through uprooting of plants, increased herbivory, and decreased water quality resulting in a decrease in habitat quality for waterfowl (Crivelli 1983, Fletcher et al. 1985, Roberts et al. 1995, Bonar 2002). The presence of carp in lakes and wetlands identified as source habitat for eared grebes was assumed to result in lower habitat quality.

Presence of boat-launch ramps and campgrounds on lakes and ponds was expected to result in reductions of habitat quality for eared grebes as a result of increased potential for human disturbance and habitat fragmentation (Boe 1992, Hanus et al. 2002). Potential adverse effects include egg and nestling mortality, premature fledging or nest evacuation, and reduced body mass or slower growth of nestlings (Rogers and Smith 1995, Skagen et al. 2001). Adult behavior also may be altered by disturbance, resulting in altered foraging patterns. Use of motorized water craft in the vicinity of nests of eared grebes may result in increased disturbance but the published literature was equivocal on this aspect (e.g., Titus and VanDruff 1981, Rogers and Smith 1995).

Viability Outcome

Within the planning areas, habitats for eared grebes as well as other species indentified in the Marsh/Open Water Group in the Wetland family are not widely distributed nor are they abundant. These habitats have likely not changed in abundance or distribution compared to historical.

Some risk factors may have increased including the introduction of carp and potential negative effects due to human disturbance; however, there is no information available on the effects of these risk factors on any potential habitat in the planning areas.

Viability of eared grebes is not expected to change due to any management activities on lands managed by the USFS. The Forest Service will follow legal direction (Executive Order 11990) that mandates that wetlands will not be destroyed or negatively affected. None of the alternatives would change the distribution or abundance of habitat within the planning areas. The Desired Conditions for Aquatic

Habitat and Watershed Direction (1.1 Watershed Function) describe areas of continued improvement in abundance and quality of riparian areas as compared to current conditions. Other Standard and Guidelines likely to benefit eared grebes are listed under the management area 4B.

It is unlikely that management activities described in the proposed action or any of the alternatives would lead to an increased risk to the viability of the eared grebe or any of the other species in this Group.

Management Considerations

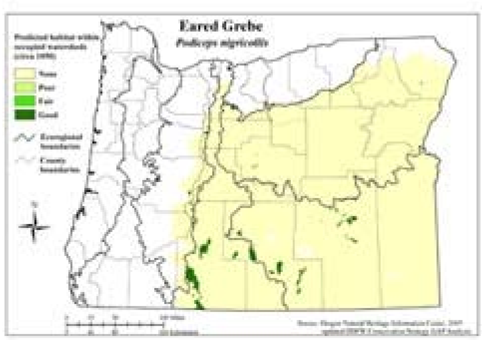
The following issues were identified during this assessment and from the published literature for species associated with the Marsh/Open Water Group in the Wetland Family:

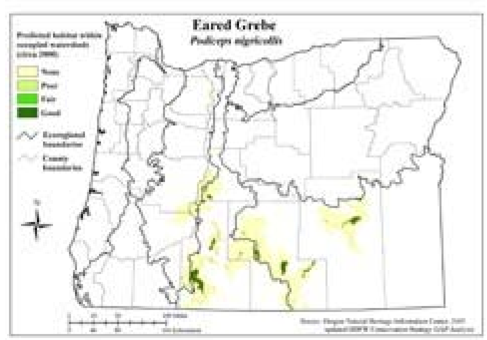
2. Negative effects of carp invasion in source habitats.
3. Negative effects of disturbance from water-based recreation.
4. Further habitat evaluations will occur for any project proposal that may affect this habitat. Efforts will be made in watersheds with known habitat for eared grebes, or any of the other species in this Group, to minimize potential negative effects to the quality and abundance of these habitats.

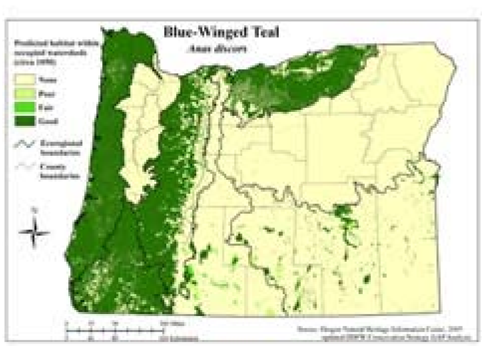
Other species in the Open Water group:

Marsh/Open Water Group Distribution – Eared Grebe was selected as focal species for this group though using data developed by *Jimmy Kagan, INR Information Program Manager and Eleanor Gains, INR Zoology Projects Manager (2008)* http://oe.oregonexplorer.info/Wildlife/wildlifeviewer/, we conclude little potential habitat for any of these species occurs in the Blue Mountains planning areas.

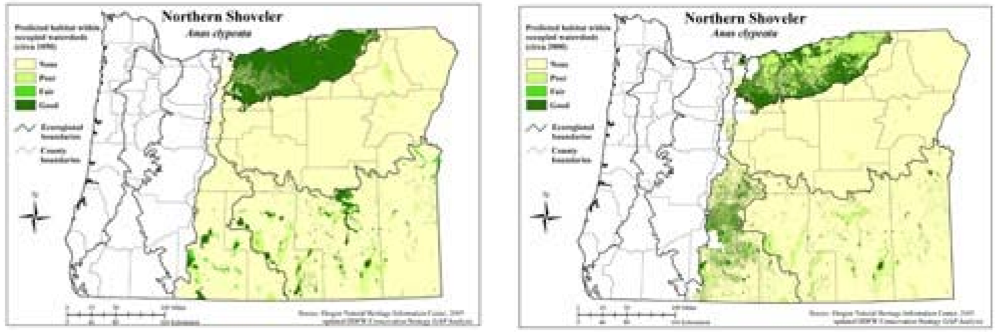
Eared Grebe



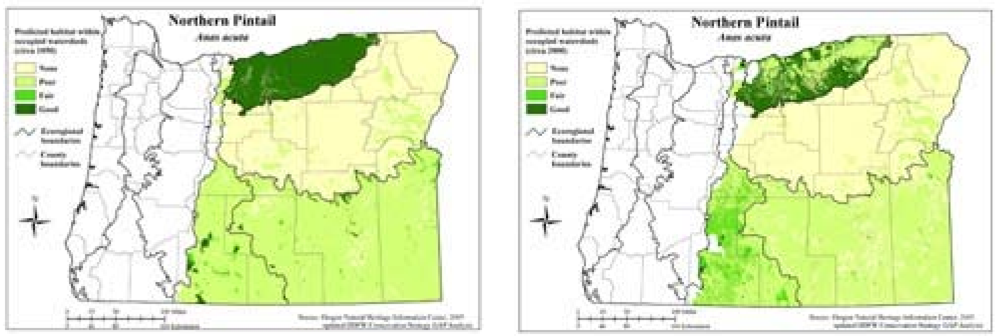




Blue-Winged Teal



Northern Shoveler



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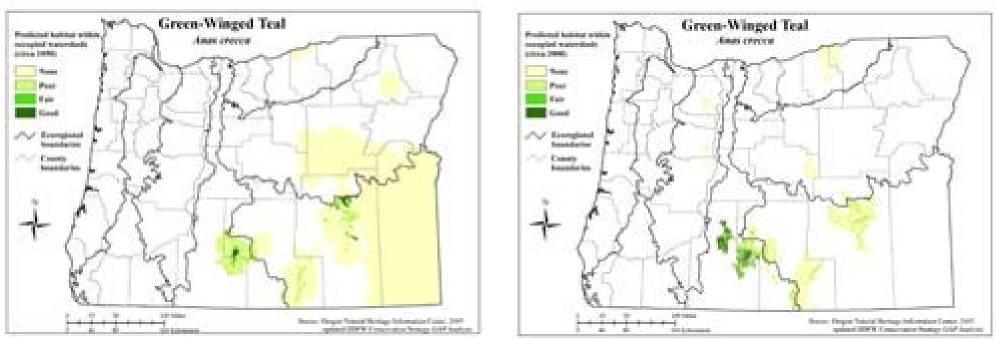
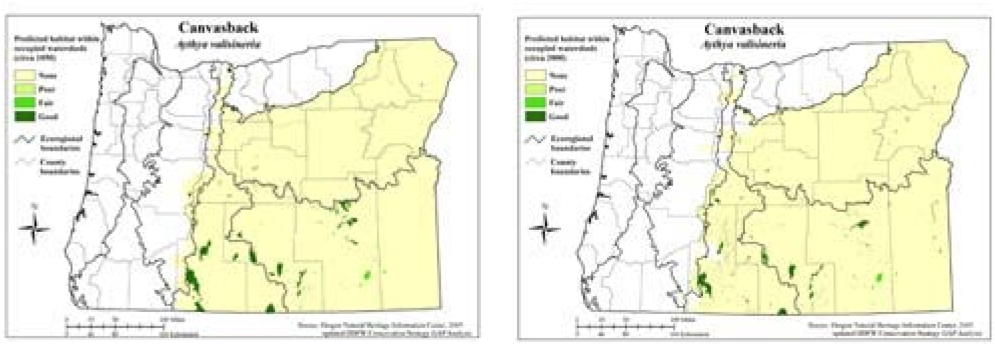


Green-Winged Teal



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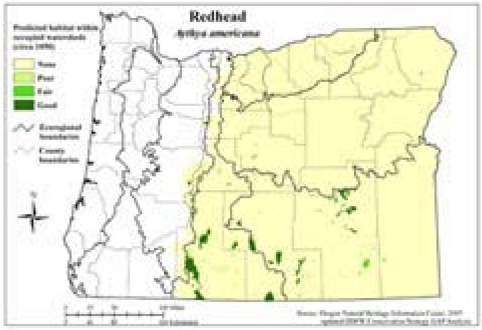
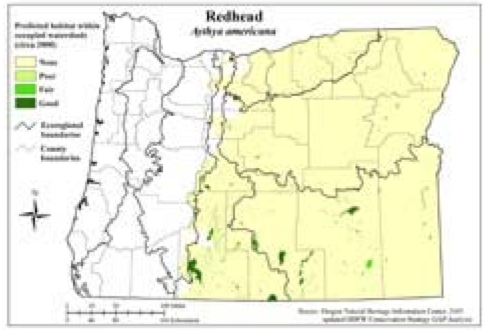
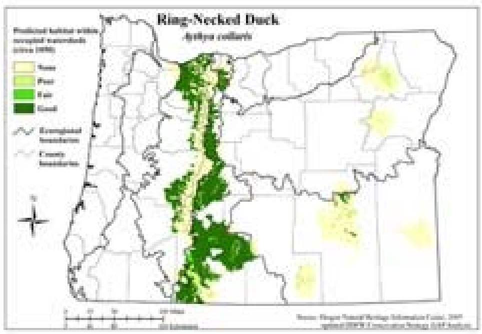
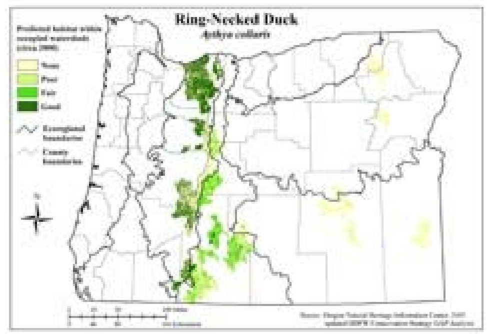


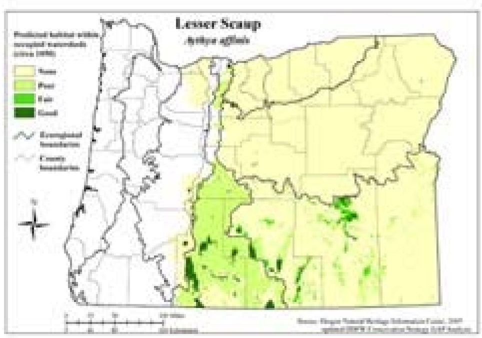


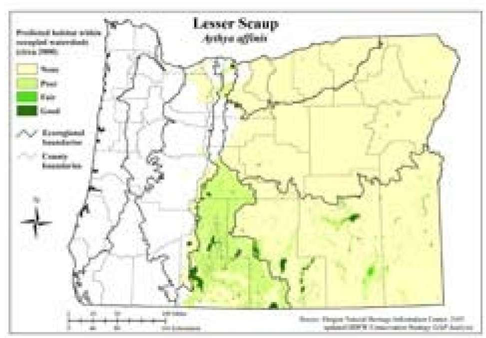
Redhead



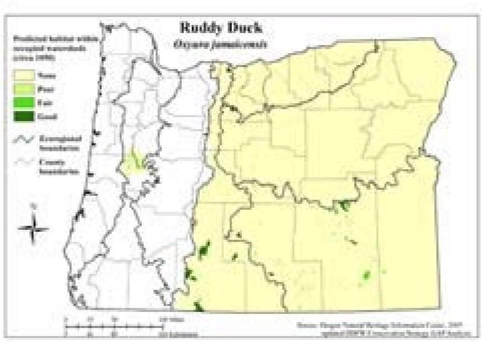


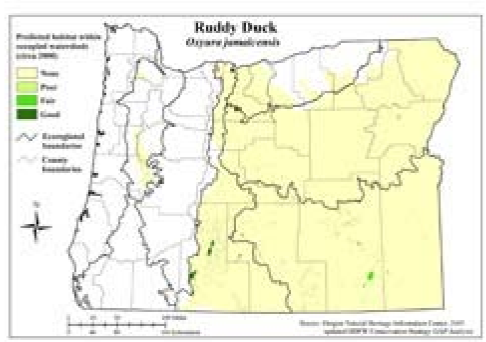
Ring-Necked Duck





Lesser Scaup





Ruddy Duck

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Various Bat Species

Introduction

We identified 11 species of bats as species of conservation concern. We placed these species among 4 of the Family groups described in chapter 1. The groups they were placed in are the medium to large tree forests, open forests, woodland/grass/shrub, and chambers/caves (see Table 1). Table 6 describes the general habitats these species are found in as described by the Western Bat working group, their known roosting sites, as well as a list of desired conservation actions by species as described by the Oregon Conservation Strategy (ODFW 2005). The fringed myotis, pallid bat and Townsend's big-eared bat were chosen as focal species for their particular groups, largely due to their high dependence on unique and not necessarily widespread roosting sites.

However, we did not develop focal species assessment models for any of these species. We felt we did not have the knowledge to adequately map habitat and develop a model at this scale for these species. However, each of the bat species fits within a group or family that at least one focal species was analyzed except the Townsend's big-eared bat. What follows below is a description of habitat variables researchers have found important for all bats in general.

Source Habitat

Bats utilize resources at the landscape scale. Land management must take into account the juxtaposition of all habitat components: roosting, and foraging areas and water resources. It is suspected that the closer the essential components are to each other (e.g. less than several km): Keinath 2004 fringed assessment) the higher the likelihood of persistence. Hayes and Loeb (2007, chapter 8) added amount of clutter to this list of habitat attributes that play a critical role in defining niches for bats. Clutter is defined as vegetation that has the potential to impede bat echolocation and flight.

Roost sites

Suitable characteristics of roost sites differ among species and sex (Broders and Forbes 2004), and optimal thermal conditions at roost likely vary with species, sex reproductive status, weather, age of bats, and time of year (Hayes and Loeb, 2007). A recent meta-analysis of tree roost selection of North American forest bats showed that roost trees of bats were tall with large DBH and in stands with open canopy and high snag density (Kalcounis-Ruppell et al. 2005). However, Hayes (2003) suggest that an over-reliance on one habitat type or topographic setting for retaining roost is unlikely to provide the conditions necessary to meet the habitat needs for bats across seasons. For example thermal characteristics of riparian areas often differ from those of upslope forests the exclusive retention of snags and wildlife trees in riparian areas is not likely to be in the best interest of bat conservation.

In addition, the ephemeral nature of snag roosts and the movement by colonies of bats among several snags within seasons indicate that tree-roosting bats require areas of high snag density, perhaps more so than cavity-nesting birds (Rabe et al. 1998, Baker and Lacki 2006). Baker and Lacki (2006) suggest forest management practices target and set aside large-diameter (e.g., >60 cm) snags surrounded by snag densities of >=40 snags per hectare in snag management efforts directed toward conservation of bat-roosting habitat. A study in northern California on *Myotis thysanoides*, found that regular pockets containing over 80 large snags per hectare may be necessity to support populations of this species (Weller and Zabel 2001). Also, because of the short longevity of bark on snags, used by many crevice roosting bats, bats require higher early-decay snag densities than birds (Rabe et al. 1998, Ellison et al. 2004 (col bat work grp).

Maintaining roost trees and replacements across the landscape in a variety of topographic settings is a logical and conservative approach that should provide the broad spectrum of conditions necessary to meet the varying needs of bats needs.

Efforts to restore ponderosa pine forest with reintroduction of fire could result in the destruction of large diameter trees, dead tops, and snags (Rancourt et al 2008). Management strategies to should be implemented to preserve these large defective trees and snags during forest restoration. Selective thinning of areas with dense ponderosa pine surrounding potential roost trees and removal of excess duff and debris around the base of the tree (s), dead-top or snag prior to burning may help protect these potential roost sites.

Recreational rock climbing is increasing in popularity. The cracks and crevices in rock faces that provide attractive sites for climbers also provide sites for bat roosting. High climbing activity may displace roosting bats, and increase threats to species of concern.

Limited research suggest that vegetative structure and habitat surrounding caves may have on influence on use of caves as roosts by some species or in some situations (Raesly and Gates 1987); but not on others (Raesly and Gates 1987,; Wethington et al. 1997).

Foraging

When foraging, bats often move along forest edges more than within the forest interior (Black 1974, Crampton and Barclay 1996, de Jong 1994, Kunz and Martin 1982). This may facilitate orientation, but may also maximize contact with insect prey. When comparing bat foraging activity among forests, clearcuts, and water bodies, activity was found to be higher around water bodies (Lunde and Harestad 1986). Other researchers have also found that foraging areas usually encompassed a body of open water or riparian corridor (Waldien an dHayes 2001; Wilshite et al. 1998b). Forested corridors connecting forested patches have been shown to provide valuable foraging habitat as well as travel corridors for bats between roosting and foraging sites (van Zyll de Jong 1995).

Bat activity has been found to be higher in thinned stands than in unthinned stands (Humes et al 1999; Loeb and Waldrop 2008), however this affect may vary by forest type (Tibbles and Kurta 2003, Patriquin and Barclay 2003). Bat activity is highly variable in space and time (Hayes 1997; Broders 2003; Ellison et al. 2005) due to variation in prey availability, weather conditions, and proximity to roosts (Loeb and Waldrop 2008).

Prescribed fire, wildfire, fire suppression, and fire management all influence insect populations and, thus may affect bat population. However, the influences of fire on insects depend on the timing of the fire with respect to the life history of insects, the intensity of the fire, its rate of spread, and the area affected by the fire. As a result, the impact of fire and fire management on prey availability for bats, and on ecology of bats is generally poorly understood (Carter, et al. 2002, Hayes and Loeb 2007).

Use of insecticides and herbicides likely influence prey availability, the influence of the chemicals applied, the ecological context, and bat-prey relationships have not been well studied. Insecticides can have a direct impact on prey availability; herbicides can have an indirect influence on insect populations by changing the abundance and composition of the plant communities (Guynn et al. 2004), however no data are available on the effects of chemical treatments and bat-prey relationships (Hayes and Loeb 2007).

Water resources

Daily water loss in bats is extreme compared to other mammals, largely due to the respiratory demands imposed by flight (Studier and O'Farrell 1980). Land management activities that alter bodies of water, water regimes, or water quality may impact bats and should be carefully evaluated. Management activities such as livestock grazing of mountain meadows, springs, and riparian zones should be managed to retain native vegetation, natural hydrological regimes, and water quality sources in order to retain habitat of prey species and quality sources of open water for drinking.

Management Recommendations:

- Protect an adequate density of large diameter and/or tall snags and wildlife trees within forest stands. In addition, trees with the following characteristics should be favored for retention: loose bark, dead or broken tops, lightning strikes, natural cavities, or woodpecker cavities.
- Provide snags in clumped or clustered patterns across the landscape, to address frequent roost switching that occurs with many forest-dwelling bats.
- Protect snags, live cavity trees and trees with evidence of heart rot within intact habitat patches. Avoid leaving these trees isolated within clearcut blocks
- Develop future bat roosting habitat by identifying large-diameter live wildlife trees for retention during harvest activities. These trees should be protected during subsequent harvest entries as well.
- Develop firewood guidelines to ensure the protection of adequate snag and wildlife tree densities.
- Restore fire to forest stands to meet management objectives. Periodic low intensity burning in some forest systems could help maintain a more open understory and reduce clutter that impedes bat flight. Incorporate snag and wildlife tree protection measures within burn plans.
- Minimize impacts of recreational climbing on crevice-roosting bats through education and cooperation
- Identify sites with significant bat roosts in cliffs or crevices where significant climbing activities occur
- Protection of water resources
- Land management activities that alter bodies of water, water regimes, or water quality may impact bats and should be carefully evaluated.
- Livestock grazing of mountain meadows, springs, and riparian zones should be managed to retain native vegetation, natural hydrological regimes, and water quality sources in order to retain habitat of prey species and quality sources of open water for drinking.
- For cave, mine and building maternity roosts and hibernacula, no prescribed burning or major forest alteration should be conducted within 0.21 mile radius of the roost (Keinath 2004).

Viability Outcome

Within the planning areas, habitats for different species of bats are varied. Roost site habitats include snags, trees, caves, cliffs. Some of these habitats have likely been reduced in abundance or the quality of these habitats has been changed due to management and natural actions since historical.

Several plan components address these special habitat features that provide important habitats for bats (see below). Components that encourage the protection and conservation of snags, large trees, riparian areas will benefit these species.

It is not likely that management activities described in the proposed action or any of the alternatives will lead to an increased risk to the viability of any of the bat species of conservation concern.

WLD-HAB-6	**Standard**
S-1	Activities that have potential to cause abandonment or destruction of known denning, nesting, or roosting sites of threatened, endangered, or sensitive species shall not be authorized or allowed within 1,200 feet of those sites.

WLD-HAB-2 G-2	**Guideline** Areal extent of existing late old structure stands within the moist and cold old forest types that are 300 acres or larger should not be reduced or fragmented.
WLD-HAB-3 G-3	**Guideline** Riparian corridors **connecting moist and cold old forest types should not be reduced.**
WLD-HAB-11 G-11	**Guideline** To the extent practical, known cavity or nest trees should be preserved when conducting prescribed burning activities, mechanical fuel treatments, and silvicultural treatments.
WLD-HAB-13 S-7	**Standard** Where management activities occur within dry or cool moist forest habitat, all snags 21 inches DBH and greater and 50 percent of the snags from 12 to 21 inches DBH shall be retained, except for the removal of danger/hazard trees. Snags shall be retained in patches.
WLD-HAB-22 G-6	**Guideline** Where salvage logging occurs, all snags 21 inches DBH and greater and 50 percent of the snags from 12 to 21 inches DBH should be retained except for the removal of danger/hazard trees. Snags should be retained in patches.
WLD-HAB-23 G-7	**Guideline** Bat maternity and roost sites should not be disturbed.
OF-1 G-59	**Guideline** Management activities in old forest stands should retain live old forest trees (≥ 21 inches DBH). Exceptions include: • old forest tree(s) need to be removed to favor hardwood species, such as aspen or cottonwood, or other special habitats • old forest late seral species, such as grand fir, are competing with large diameter early seral species, such as ponderosa pine • old forest tree(s) need to be removed to reduce danger/hazard trees along roads and in developed sites • a limited amount of old forest trees need to be removed where strategically critical to reinforce and improve effectiveness of fuel reduction in WUIs
OF-2	**Guideline**

G-60	Management activities in non-old forest stands should retain live legacy old forest trees (≥ 21 inches DBH). Exceptions to retaining live legacy old forest trees are the same as those noted in the previous guideline (OF-1).
OF-3 *New*	**Guideline** New motor vehicle routes should not be constructed within old forest stands.

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