Montana Partners in Flight

workshops, ecologically sensitive area of remnant grassland and shrubsteppe in the northern Great Plains (The Nature Conservancy 1999). We will build upon this effort to implement conservation measures in these polygons.

Land Trusts. Land trusts are non-profit organizations that help landowners find ways to protect their land in the face of ever-growing development pressure. They work with landowners to write conservation easements (permanent deed restrictions that prevent harmful land uses), acquire land through donation and purchase, or devise other plans to maintain all kinds of open space--wetlands, wildlife habitat, ranches, shorelines, forests, scenic views, farms, watersheds, historic estates, and recreational areas. There are at least 10 land trusts operating on a statewide, regional or local leve. in Montana (Appendix C), including the Montana Land Reliance, Trust for Public Lands, Five Valleys Land Trust, the Nature Conservancy, and the Rocky Mountain Elk Foundation. Well over 600,000 acres have been protected through conservation easements in Montana, the highest state total in the United States (Montana Fish, Wildlife and Parks 1999).

THE PRIORITIZATION PROCESS

Species Prioritization

Partners in Flight uses a system that identifies species of conservation priority in each of its planning units, rather than writing planning information about all species. It is assumed that if conservation measures are focused on these species and their habitats, the other species in the area will benefit as well.

We identified a pool of species from among the breeding avifauna, which represents priorities for conservation action within Montana (Table 2). Note that a species may be considered a priority for several different reasons, including global threats to the species, high concern for regional or local populations, or high state responsibility for conserving large or important populations of the species. The different potential reasons for priority status are represented by shaded cells in Table 2. Our primary means of prioritizing species was through the PIF prioritization scores generated by the Colorado Bird Observatory (Hunter et al. 1993, Carter et al. 1998). This system ranks species according to seven measures of conservation vulnerability. These include four global measures (i.e., they do not change from area to area), as well as measures which are specific to each physiographic area or state. A total rank score is then derived, which is a measure of overall conservation priority; scores for all breeding species in Montana are found in Appendix B.

The Partners in Flight Species Prioritization scheme was first developed in 1991, and has been continually reviewed and refined in the years following inception (Carter et al. 1998). The system ranks each species of North American breeding bird based upon seven measures of conservation "vulnerability". These factors include relative abundance (interspecific; RAT), size of breeding (BD) and non-breeding (ND) ranges, threats to the species in breeding (TB) and non-breeding (TN) areas, population trend (PT), and relative density (intraspecific; AI) in a given planning unit compared to the maximum reached within its range. Each species is given a score of 1-5 in each category, with 1 indicating the least amount of vulnerability with regard to that parameter and 5 the most. Scores in each category are then summed to produce a composite score potentially ranging from 7-35. Species with relatively high overall scores (e.g. >22) are considered most vulnerable to extinction (although they often are not endangered at present) and usually need conservation measures or at least need to be carefully monitored through their ranges.

We used the following criteria to help us select priority bird species in Montana:

Rockies. Its nomadic nature makes it hard to monitor and to manage for. Habitat manipulations that influence cone production have implications for the species' productivity. Montana has potential as an excellent area to investigate the relationships between crossbill races, tree species forest management.

Distribution. The Red Crossbill is distributed throughout the west from eastern New Mexico north to Alaska then east across southern Canada (north of the Great Plains region) and northern United States. Breeding has been documented throughout most of Montana with the exception of the northeast corner (Montana Bird Distribution Committee 1996).

Habitat Requirements. The Red Crossbill is found within a wide variety of mature coniferous forests and mixed deciduous/coniferous forest. Usually they are associated with mature open canopy tree stands. They have been found in types ranging from dry savannah ponderosa pine, Douglas-fir, up to grand fir and subalpine fir types. Gap analysis (Redmond et al. 1998) identified 6.5 million ha of Crossbill habitat in the State.

Ecology. The Red Crossbill is a very nomadic species with its distribution and reproduction tied to the coniferous seed crop production. Breeding can occur at almost any time of the year. Research has indicated that there are up to 6 distinct forms of Red Crossbills, which differ in song type and in morphology. Though little is known of the individual distribution of these types in the state, each is apparently adapted to feed on the cones of a different tree species. Several of these (potential species) do occur in Montana.

Management Recommendations. Any silvicultural treatments which emphasize seed production in conifers are likely to improve habitat suitability for this species In Dry Forest, maintaining some element of Douglas-fir is important for those crossbills adapted to feed on its smaller seeds, in addition to those adapted to feeding on ponderosa pine. Douglas-fir is also most likely the preferred tree for nesting.

DF

Habitat and Population Objectives: Dry Forest

Mature Ponderosa Pine Restoration. Restoration activities in dry forest habitat types are important due to the dramatic changes in tree species composition and stand structure that have affected most dry forest habitat in western North America. An awareness and understanding of these changes, and the desirability of restorative activities in ponderosa pine habitat, is ubiquitous in Forest Service regions in the American West. The political will (or feasibility) and financial resources to accomplish restoration, however, vary throughout the West (Amundson 1998; Denton 1998; Dick 1998; Shafer 1998)

Habitat Objectives for Dry Forest

- Retain all current old-growth stands that meet minimum regional old-growth characteristics (Table 8). Restore historic structural characteristics with no elimination of large trees or snags.
- Manage for the long-term maintenance of 25% of dry forest habitat (per 4th order watershed) as old growth based on mean values of regional old-growth characteristics (Table 9). Values for old-growth characteristics should be no lower than 25% below mean values; and 50% of old-growth stands should meet or exceed regional mean values for old-growth elements.

25%

Table 8. Minimum values of old-growth characteristics, Dry forest habitats (ponderosa pine and Douglas-fir), USFS Region 1 (Green et al. 1992)

Forest Types	Ave. Age of Large Trees	# Large Trees
Warm, dry ponderosa pine (west side)	170 yr	8 trees/ac ≥ 21 in dbh
Cool, dry Douglas-fir (west side)	170 yr	8 trees/ac ≥ 21 in dbh
Warm, dry ponderosa pine (east side)	180 yr	4 trees/ac ≥ 17 in dbh
Cool, dry Douglas-fir (east side)	200 yr	5 trees/ac ≥ 19 in dbh

- Restore the role of fire, and use thinning as necessary, to restore historic conditions.
- Retain all snags and broken-top trees ≥ 9 in dbh and all large trees ≥ 17 in dbh in harvest units.
- Manage for single- and double-storied stands with open conditions (< 50% cover) in dry forest habitat of all age classes.

Table 9. Mean values of old-growth characteristics, Dry forest habitats (ponderosa pine and Douglas-fir), USFS Region 1 (Green et al. 1992)

Forest Type	Ave. Age of Large Trees	# of Large Trees	# Standing Dead Trees
Warm, dry ponderosa pine (west side)	246 yr	17 trees/ac ≥ 21 in dbh	6 trees/ac ≥ 9 in dbh
Cool, dry Douglas-fir (west side)	232 yr	18 trees/ac ≥ 21 in dbh	7 trees/ac ≥ 9 in dbh
Warm, dry ponderosa pine (east side)	215 yr	24 trees/ac ≥ 17 in dbh	7 trees/ac ≥ 9 in dbh
Cool, dry Douglas-fir (east side)	229 yr	31 trees/ac ≥ 17 in dbh	10 trees/ac ≥ 9 in dbh

- Manage for a variety of habitat conditions at the landscape level, particularly varied understory conditions, to meet the needs of the Flammulated Owl and Lewis's Woodpecker.

Priority Species Objectives.

The absence of suitable nest sites is usually considered the limiting factor for cavity-nesting species (Thomas et al.1975). Retention of all existing large snags and broken-top trees, and management for adequate numbers over the landscape is a critical objective in order to maintain viable populations of Lewis's Woodpeckers and Flammulated Owls. The retention of all snags and broken-top trees ≥ 9 in. dbh and all

habitat.

Distribution. The Townsend's Warbler breeds from southeastern Alaska, south through western Canada to central and northeastern Oregon, northern Idaho, northwestern and southcentral Montana, and northwestern Wyoming. In Montana, it only breeds in the western quarter of the state (Montana Bird Distribution Committee (1996). It winters in central and southern California, western Mexico, and the highlands of Central America.

Habitat Requirements. Townsend's Warblers nest in coniferous forests or mixed coniferous/deciduous forests where coniferous trees comprise a predominant feature of the habitat (Bent 1953, Erskine 1977). Surveys in northern Idaho and Montana detected them most frequently in cedar-hemlock forests, followed in order by mixed conifer, spruce-fir, Douglas fir, riparian shrub (probably adjacent or within forest), lodgepole pine, and ponderosa pine (Hutto 1995). In those surveys, they were less abundant in drier and more open forest cover types and in forest patches that have been harvested. They were more likely to occur on points with a few or lots of snags within 10 m (30 ft) of the survey points and were nearly 5 times more common on points with a lot of dead and down material (Hutto 1995). In a review of several studies, Hejl et al. (1995) listed the Townsend's Warbler as an old-growth associate in studies in Montana, Idaho, and Oregon, although another Idaho study found them present but not clearly associated with old-growth, mature, or immature forests. Hejl et al. (1995) found Townsend's Warblers to be less abundant in clearcut or partially cut forest than in uncut forest.

Ecology. Townsend's Warblers build cup-shaped nests in and near the tops of coniferous trees on a branch well away from the trunk. They feed mostly on insects (e.g., weevils, bugs, leafhoppers, caterpillars) and spiders, gleaning them from the foliage or hawking them from the air (Ehrlich et al. 1988, Groves et al. 1997). Herman and Bulger (1979) found breeding densities of 10-47 pairs/40 ha (100 ac) in Oregon mixed-coniferous forests.

Management Issues. Hutto (1995) stated that the Townsend's Warbler is probably one of the more sensitive species to timber harvesting activity as evidenced by a continuous decline in probability of occurrence with increasing amounts of timber removed. It appears from Hutto's data that they are found more frequently on points where no edge is within 100 m (305 ft). Management at the landscape level should allow for retention and recruitment of mature mixed conifer stands.

Habitat and Population Objectives: Moist Douglas-fir and Grand fir

Habitat Objectives - Old Growth:

- Existing old-growth stands (> 170 years, meeting minimum criteria for region and forest type: Green) should be retained whenever possible, especially in areas that are in likely refugia from stand-replacement fires. 20%

- Maintain mature or overmature stands for recruitment into old growth, toward goal of 20% of the

habitat type managed for old-growth conditions; these should be located in likely refugia from fire or in areas providing connectivity to isolated old-growth stands.

- Abnormally dense young to mature stands surrounding old growth could be targets for forest health treatment (thin-from-below or partial cut) to reduce the risk of fire spread into old-growth stands.

- Old-growth should be well-scattered throughout forest lands rather than grouped into adjacent areas (McClelland et al. 1979); stands may be of variable size but most should be at least 50-100 acres (McClelland et al. 1979), imbedded within an area of 364-1000 acres of mature or partial cut forest managed snag and log retention (McClelland et al. 1979, Bull and Holthausen 1993). Some larger blocks, especially in mesic areas where historically more likely (see Pileated Woodpecker).

- Encourage retention of snags and logs in all silvicultural treatments [Bulland Holthausen recommended > 8 snags/ha, at least 20% of which are > 50 cm, and . 100 logs/ha, with a preference for logs > 38 cm]

- Refrain from sanitation cutting of insect-killed trees within the 20% of lands managed for old-growth; limit firewood cutting to snags less than 40 cm and discourage use of larch, ponderosa pine, and broadleaf species (McClelland et al. 1979).

Prescribed Fire: (see also section on Burned Forests)

- Expand the opportunity for allowing lightning fires to burn.
- Re-ignite suppressed lightning fires when conditions come back into prescription.
- Use broadcast burning to restore normal fuel conditions so that lightning fires can be allowed to burn.
- Capitalize on opportunities to develop stand conditions that approximate those created by stand-replacement fire regimes.

Timber Harvest:

- Vary timber harvest methods, using more even-age prescriptions ("messy" clearcuts and seed-tree cuts) in more mesic sites that would have historically had stand-replacement fire regimes. Retain seed trees permanently, preferably large larch (> 40 cm), and retain snags and occasional clumps of green trees.

- Produce a diversity of stand structures in mixed and variable fire regime types. Some regular thinning methods may be appropriate, but vary with more heterogeneous stand prescriptions. Leave clumps of intact forest, snags, and large logs.