Northern Regional Overview
Wildlife Species: Status, Risk, Opportunities, and References

Fred Samson
Wildlife Ecologist
Northern Region

Ecosystems

Ecosystem Status

National Review

In 1999, a group of scientists representing major conservation organization conducted a detailed review of the conservation status of each North American ecosystem in order to develop priorities to conserve biodiversity including wildlife species (Ricketts et al. 1999). Each major ecosystem was placed within the Ecological hierarchy developed by Bailey (1996), and is essential the same as the ecological hierarchy the Forest Service is encouraged to use in the Draft Directives that implement the 2005 Planning Rule.

The review conducted Ricketts et al. (1999) placed each North American Ecoregion into one of five categories.

Category	Description
I.	Globally outstanding Ecoregion requiring immediate protection of remaining habitat and extensive restoration.
II.	Regionally outstanding Ecoregion requiring immediate protection of Remaining habitat and extensive restoration.
III.	Globally or regionally outstanding Ecoregion that present rare Opportunities to conserve large blocks of habitat.
IV.	Bioregionally and nationally important ecoregions requiring protection of Remaining habitat and extensive restoration.
V.	Bioregionally and national important ecoregions requiring protection or representative habitat blocks and proper management elsewhere for biodiversity conservation.

In addition, each ecoregions was identified in terms of condition as

Critical,
Endangered,
Vulnerable,

Relatively Stable, and
Relatively Intact.

Within the Northern Region, ecoregions were identified by Ricketts et al. (1999) to fall into the following categories.

I.	Globally Outstanding/Critical	Tallgrass prairie (North Dakota)
II	Regionally Outstanding/Endangered	Shortgrass prairie (South Dakota)
IV	Bioregionally outstanding/Endangered	Snake/Columbia Shrub steppe (Idaho)
IV	Bioregionally outstanding/Vulnerable	North Central and South Central Rocky Mountain Forests (Montana and Idaho)
V.	Nationally Important/Endangered	Montana Valley and Foothill Grasslands (Montana)
V.	Nationally Important/Vulnerable	Wyoming Basin Shrub Steppe (Montana and Idaho)

State Strategic Wildlife Plans

A second major review of the status of ecosystems in the Northern Region is within the State Strategic Wildlife Plans. These plans were requested by Congress and will be reviewed and approved by the US fish and Wildlife Service. The following is a brief summary of important ecosystems as identified in the State Strategic Plans.

Montana

The Montana State Strategic Plan (http://fwp.state.mt.us/wildthings/cfwcs/swg/planning.html; accessed November 2) provided a list of Tier 1 habitats for conservation that are listed below (map available).

Bitterroot/Frenchtown Valleys
Central Montana Broad Valleys
Deerlodge Valley
Flathead River Valley
Little Belt Foothills

North Tobacco Root Mountains and Foothills
Rocky Mountain Front Foothills
South Elkhorn Mountains
Southwest Montana Intermontane Basins and Valleys
Upper Yellowstone Valley

Idaho

The Idaho State Strategic Plan (http://fishandgame.idaho.gov/cms/tech/CDC/cwcs_table_of_contents.cfm; accessed November 2) provides both status and risk to each of the Ecological units listed below (similar to Bailey's 1996 but based on United States Geological Survey GAP). No overall priority list for ecosystems is provided.

Palouse Prairie
Yellowstone Highlands
Overthrust Mountains
Idaho Batholith
Beaverhead Mountains
Flathead Valley
Bitterroot Mountains
Northwestern Basin and Range

North Dakota

Wildlife habitat in North Dakota is largely (>90%) on private lands. The goal for lands in public ownership is no net loss of habitat (http://www.nd.gov/gnf/conservation/cwcs.html, accessed November 2, 2005).

South Dakota

The South Dakota State strategic Plan uses the Haufler et al. (1996) approach (http://www.teaming.com/state_cwcs/south_dakota_cwcs.htm, accessed November 2, 2005) and, for each Ecoregion (Bailey 1996), describes historic conditions, major ecological processes, risks, and recommendations for future landscapes.

Ecosystem Risks

Primary grasslands

Grasslands have declined in area (over 90% for the tallgrass prairie, 29.1% for the mixed prairie and 51.6% for the shortgrass prairie) (Samson et al. 2004).

Ecological drivers of the grasslands at the broad scale is climate, grazing and fire at landscape and local scales. Grasslands are 1) inherently heterogeneous where composition, productivity and diversity are highly variable across multiple scales

(Fuhlendorf and Engle 2001), 2) traditional range management practices have promoted homogeneity through uniform distribution of cattle, an approach leading to the listing of species under the Endangered Species Act (1973) (Samson et al. 2004), and 3) management through use of fire and grazing at the landscape and local scale in which patches of habitat shift over time can enhance biodiversity and wildlife habitat (Knapp et al. 1999).

Today, grazing is uniform in distribution and pressure while historically, bison moved nomadically in response to vegetation changes associated with rainfall and fire (Samson et al. 2003). Today, fire is rare on native grasslands, i.e., on Forest Service lands, 7.9 of 371 km^2 on the tallgrass, 33.4 km^2 of 17,663.4 km^2 of mixed prairie, and 14.2 km^2 of 2,675.8 km2 in the shortgrass prairie. Historically, fire returned every one to four years (Umbanhowar 1996).

The extensive invasion of tree has caused ecosystem-level problems ranging from loss of the ability of prairie soils to store carbon (Jackson et al. 2002) to stabilizing riparian areas (Grant and Murphy 2005), slowing the sediment flow into rivers and stream so important to the native prairie fish. Summaries of how green ash and aspen expansion as large herbivores were eliminated and natural and anthropogenic fires were suppressed are provided by Grant and Murphy (2005) and others.

Other non-native species such smooth brome and Kentucky bluegrass have substantially altered natural ecological processes and dominance by native plants (Grant and Murphy 2005). Water developments have also impacted the distribution of native and non-native (increased their number).

Primary forests

As with grasslands, arrival of Europeans accelerated the human-induced changes in forested ecosystems (Hessburg and Agee 2003). Specifically:

> 1) introduction of exotic plant species,
> 2) introduction of non-native insects and pathogens,
> 3) timber harvest that focused the largest, oldest and most sound trees,
> 4) loss of fire and changes in fire regimes,
> 5) fire suppression, and
> 6) "the most widely distributed change in forest structure across the Interior Columbia River Basin was sharply increased area and connectivity of intermediate (not new and not old) forest structure" (Hessburg and Agee 2003: 65).

This increase in connectivity is a primary reason why oldgrowth forests in this Region are at risk and plans to save such oldgrowth forest (viewed by some to be important to the conservation of biological diversity) are probably ill fated (Hessburg and Agee 2003: 65).

Low Elevation/mountain Grasslands and Shrublands

Evidence suggests that major shifts occurred in the distribution and abundances of low elevation grasslands in the 1860' (Lesica and Cooper 1997). An example is Antelope Basin in Southwest Montana where photographs from the 1800's show a grassland in contrast to today's shrubland. Osborn Russell, an early but educated fur trapper saw no sagebrush in the 1840's in southwest Montana, only bunch grass, but did record sagebrush as he neared the Snake River in Idaho. The ability of domestic herbivores to irreversible change grasslands to shrublands is well known (van de Koppel et al. 2002).

Little information exists on the condition of low elevation grasslands other than substantial conversion to agriculture and other uses (Ricketts et al. 1998). A widely recognized risk to mountain grasslands and shrublands is conifer invasion (Gallant et al. 2003). Historically, grassland and shrublands were mostly likely far more extensive. An example is in the Greater Yellowstone ecosystems where open areas may have accounted for upwards to 60% of the landscape, areas of mature timber were rare, and deciduous trees (particularly aspen) rather than conifers may have dominated the landscape.

The condition of the shrublands—particularly those dominated by sagebrush—have been the subject of intense investigation largely due to concern over the sage grouse. Risks to sagebrush include conversion to human related uses, loss of native forbs and grasses, loss of specific structure important to species such as sage grouse, increases in extent of invasive species such as cheat grass (that alters patterns in fire leading to cheat grass and not shrub dominated landscapes), and use of fire and herbicides in a pattern that would encourage development and persistent of native forbs and grasses (Connelly et al. 2000).

Ecosystem Opportunities

Primary grasslands

1. Major opportunities include the following.

2. Land consolidation to increase the size (e.g., reduce fragmentation) of remaining prairie.

3. Reintroduce fire to control woody vegetation.

4. Control invasive plants.

5. Manage grazing to provide for a full range of seral stages—short, medium and tall.

Primary forests

"Many large, continuous areas that display elevated fuels and increasing severe wildlife behavior" (Hessburg and Agee 2003:46) exist today, particularly in low elevation forests.

"A reasonable target for restoration would be to restore more natural patterns of forest structure and composition, fuels, and fire behavior attributes to the dry forests" (page 46). Such actions would benefit the long-term redundancy and resiliency of habitat for wildlife species, particularly those of focus (Samson 2005).

A second issue at the ecosystem level is roads. In some areas , e.g., Helena NF, many areas with important older forest are in roaded areas (more easy access for fire suppression) and a debate exists as to whether "roads are the source of all fire problems" to "roads are the source of all fire solutions" (Hessburg and Agree 2003 citing Agee 2002). Future restoration may well rest of use of roads to 1) treat areas that are most of need for fuel treatment, 2) provide for flexibility to leave other portions of the landscape available to wildfire, 3) and could help where needed to reduce fire-associated erosion and sedimentation.

Low Elevation/mountain Grasslands and Shrublands

Major opportunities include the following.

> Land consolidation to increase the size (e.g., reduce fragmentation) of remaining low elevation/mountain grasslands and shrublands.
>
> Reintroduce fire and implement timber harvest to control woody vegetation.
>
> Control invasive plants.
>
> Manage grazing and encourage timber harvest to provide for a full range of native forbs and grasses and seral components.

Species

Four groups of species are considered: 1) regulatory species [Species-of-concern (SOC) and Species-of-interest (SOI)], 2) species listed under the Endangered Species Act (1973) (ESA), 3) species of focus, and 4) State priority species.

Species Status

Regulatory Species

Table 1 provides a summary by planning zone as to the number of SOC as identified by the criteria in draft Directives that implement the 2005 Planning Rule. The criteria includes those species considered to be G1-G3 (globally endangered), rated T (a sub-taxa unique to an area), or either proposed or candidate under the Endangered Species Act (1973) or under 90 day status review. A map of the G1-G3 locations for the WMPZ, KIPZ, and CNZ is soon to be available.

Table 1. Summary of the number of Species-of-concern in the Northern Region by planning zone

	Northern Great Plains	East Side (ESPZ)	Western Montana Zone (WMPZ)	Kootenai/Idaho Panhandle Zone (KIPZ)	Clearwater/Nez Perce Zone (CNZ)
Number of G1-G3 species		Yet to be determined	10	11	18

Species-of-interest

A second category in the draft Directives that support the 2005 planning rule are the Species-of-interest (SOI). Table 2 provides a summary as to the number of Species-of-interest by planning zone. A map of SOI habitat for the WMPZ is available.

Table 2. . Summary of the number of Species-of-interest in the Northern Region by planning zone

	East Side (ESPZ)	Western Montana Zone (WMPZ)	Kootenai/Idaho Panhandle Zone (KIPZ)	Clearwater/Nez Perce Zone (CNZ)
Wildlife Species-of-interest	Yet to be decided by a responsible official	Elk, whitetail deer, mule deer, and bighorn sheep.	Yet to be decided by a responsible official	Yet to be decided by a responsible official

Species listed under the Endangered Species Act

Three globally secure species—gray wolf (G4), grizzly bear (G4), and lynx (G5) are listed under the Endangered Species Ac (1973). A map of the grizzly bear recovery areas is available.

Species of focus

Modeling habitat requirements for four species (northern goshawk, black-backed woodpecker, flammulated owl, and pileated woodpecker) has been undertaken to determine the extent and distribution of habitat across the Region and by Forest (Samson 2005). The intent of this assessment is to provide context to Projects relative to key regulatory requirements such as population viability. Summaries (and maps) showing habitat by Ecological Section (subsection in some cases) and by Forest are available.

State Species-at-risk

Montana

During the initial planning stages, the FWP technical and steering committees determined that the Strategy would not include Montana's invertebrate species. With nearly 1,000 species of aquatic invertebrates in the state, and at least twice that number of terrestrial invertebrates, it is impossible at this time to develop a Strategy to comprehensively address invertebrate conservation in Montana. However, it was decided to include aquatic mussels and crayfish. The possibility of securing long-term funding will allow for greater inventory and surveying of invertebrates. These species are especially important because many are considered bioindicators of overall habitat health.

Tier I

Coeur d'Alene Salamander
Northern Leopard Frog
Western Toad
Milksnake
Smooth Greensnake
Western Hog-nosed Snake
Bald Eagle
Black-backed Woodpecker
Burrowing Owl
Flammulated Owl
Greater Sage Grouse
Harlequin Duck
Long Billed Curlew
Nelson's Sharp-tailed Sparrow
Olive-Sided Flycatcher
Sedge Wren
Trumpeter Swan
Gray Wolf
Great Basin Pocket Mouse
Grizzly Bear
Hoary Marmot
Lynx
Meadow Jumping Mouse
Northern Bog Lemming
Pallid Bat
Pygmy Rabbit
Spotted Bat
Townsend's Big-eared Bat
White-tailed Prairie Dog

Idaho

Northern Alligator Lizard
Ring-necked Snake
Northern Pintail
Lesser Scaup
Harlequin Duck
Hooded Merganser
Mountain Quail
Common Loon
Western Grebe
Bald Eagle
Swainson’s Hawk
Ferruginous Hawk
Peregrine Falcon
Long-billed Curlew
Flammulated Owl
Boreal Owl
Black Swift
Lewis’s Woodpecker
White-headed Woodpecker
American Three-toed Woodpecker
Boreal Chickadee
Pygmy Nuthatch
Black Rosy-Finch
White-winged Crossbill
Lesser Goldfinch
Pygmy Shrew
Merriam's Shrew
Dwarf Shrew
California Myotis
Fringed Myotis
Townsend's Big-eared Bat
Red-tailed Chipmunk
Northern Bog Lemming
Gray Wolf
Fisher
Wolverine
Canada Lynx
Caribou
Mountain Goat
Western Flat-whorl
Fir Pinwheel
Salmon Coil
Nimapuna Tigersnail
Marbled Disc

Pygmy Slug
Pale Jumping-slug
Magnum Mantleslug
Smoky Taildropper
Sheathed Slug
Lyre Mantleslug
Thinlip Tightcoil
Selway Forestsnail
River of No Return Oregonian
An Oregonian (Lower Salmon River)
An Oregonian (Lower Clearwater River)
Kingston Oregonian
Humped Coin
Lyrate Mountainsnail
Striate Mountainsnail
Seven Devils (Mt. Sampson) Mountainsnail

South Dakota

American White Pelican
Osprey
Bald Eagle
Northern Goshawk
Ferruginous Hawk
Peregrine Falcon
Greater Sage-Grouse
Willet
Long-billed Curlew
Marbled Godwit
Wilson's Phalarope
Interior Least Tern
Black Tern
Burrowing Owl
Lewis's Woodpecker
American Three-toed Woodpecker
Black-backed Woodpecker
American Dipper
Sprague's Pipit
Lark Bunting
Baird's Sparrow
Le Conte's Sparrow
White-winged Junco
Chestnut-collared Longspur
Fringe-tailed myotis
Northern myotis
Townsend's big-eared bat

Franklin's ground squirrel
Richardson's ground squirrel
Northern flying squirrel
Bear Lodge meadow jumping mouse
Black-footed ferret
Northern river otter
Dakota vertigo
Mystery vertigo
Frigid ambersnail
Cooper's rocky mountainsnail
Ghost tiger beetle
Great Plains tiger beetle
American burying beetle
Powesheik skipperling
Ottoe skipper
Dakota skipper
Iowa skipper
Regal fritillary
Black Hills fritillary
Lined Snake
Western Hognose Snake
Black Hills Redbelly Snake
Many-lined Skink
Short-horned Lizard

North Dakota

Level 1

Horned Grebe
White pelican
American bittern
Swainson's hawk
Ferruginous hawk
Yellow rail
Horned grebe
Willet
Long-billed curlew
Marbled godwit
Wilson's phalarope
Franklin's gull
Upland sandpiper
Black tern
Black-billed cuckoo
Baird's sparrow
Nelson's sharp-tailed sparrow

Grasshopper sparrow
Sprague's pipit
Chestnut-collared longspur
Canadian toad
Plains spadefoot toad
Smooth green snake
Western hognose snake
Lark bunting
Black-tailed prairie dog

Level 2

Northern pintail
Canvasback
Redhead
Northern harrier
Golden eagle
Bald eagle
Prairie falcon
Sharp-tailed grouse
Greater prairie chicken
Greater sage grouse
Piping plover
American avocet
Short-eared owl
Burrowing owl
Red-headed woodpecker
Loggerhead shrike
Sedge wren
Least tern
Dickcisssel
Le Conte's sparrow
Bobolink
Common snapping turtle
Short-horned lizard
Redbelly snake
Richardson's ground squirrel
Swift fox
River otter
Black-footed ferret
Paddlefish
Pygmy shrew

Level 3

Whooping crane

Peregrine falcon
Brewer's sparrow
McCown's Longspur
False map turtle
Smooth softshell turtle
Northern sagebrush lizard
Arctic shrew
Western small-footed myotis
Long-eared myotis
Long-legged myotis
Northern prairie skink
Plains pocket mouse
Hispid pocket mouse
Sagebrush vole
Eastern spotted skunk
Gray wolf
Chestnut lamprey

Invasive Species

The breakdown of barriers to dispersal and the subsequent increases in exotic species (species introduced from another continent) or alien species (species translocated beyond their historic distribution) has been recognized for over a decade as the major threat in the conservation of biological diversity worldwide including the United States (Cullota 1992).

For wildlife, for example, in the southeastern United States, the distinctiveness and identity of native faunal being eroded and replaced by a homogenized collection of wildlife by the arrival of non-native species was detailed as early as 1992 (Harris and Silva-Lopez 1992). The arrival of alien species due to loss of natural ecological barriers continues to threaten the continued existence of over 100 native, often endemic vertebrate species in the southeast of the United States.

The two most commonly discussed examples of the impact of an invasive species is 1) the impact of the barred owl on the spotted owl, and 2) the brown-headed cowbird as a major nest parasite on a large number of passerine birds.

The barred owl, benefiting from the loss of natural barriers and increased connectivity of the landscape, has emigrated from east to west. The barred owl is able due to nesting at on an earlier date and aggressive nature to outcompete the spotted owl for nest habitat, and hybridization between the two taxa is beginning to occur (Peterson and Robbins 2003).

The barred owl also is known to predate of the young of the northern goshawk and is a major threat to the flammulated owl (see references in Samson 2005).

Peterson and Robbins niche models shows habitat very suitable to the barred owl in much of the Northern Region but particularly in west-central Idaho.

A map (ftp://ku.wru.umt.pub/outgoing/melissa) of occupied (and some unoccupied) barred owl habitat is available.

Nest parasitism by the brown-headed cowbird is a widely recognized impact of passerine birds (Lowther 1993) and reflects the loss of natural barriers to emigration and increased connectivity of the landscape. The brown-headed cowbird is a major impact to the conservation of other similar-sized or smaller birds in the western United States (Morrison et al. 1999).

A map (ftp://ku.wru.umt.pub/outgoing/melissa) of occupied and some unoccupied brown-headed cowbird habitat is available and should be used in the evaluation of habitat to conserve passerine birds of similar or smaller size.

Species Opportunities

Regulatory Species

The SOC terrestrial species tend to be associated with wet riparian areas, talus andor limestone areas, or open shrub areas (i.e., Gillete checkerspot butterfly). One aspect of the increases in the extent and composition of the forest is to alter waterflows (Hessburg and Agee 2003: 53), particulary in the severity and chronic nature of some disturnbances. Moreover, these authors that ripratrrian buffers have an impact on catchment and that managers should consider the long-tern impacts of custodial management of riprarian areas.

At this point, guidlines to conserve SOC are being developed and water availability, fire severity, and the composition of forests will most likely be key factors. As with most species, providing a landscape more similar to historic may provide the best chance of long-term survival for SOC.

Management for SOI includes many issues, from access, to cover, to winter range, to proximity to domestic species, and so on.

Species of focus

Modeling habitat requirements for four species (northern goshawk, black-backed woodpecker, flammulated owl, and pileated woodpecker) has shown amounts of habitat that exceed that thought to occur on the historic landscape.

Suppression of natural processes in the Northern Region has benefited the northern goshawk by: 1) increasing the distribution and abundance of forested habitats 2) increased amounts and distributions of Douglas-fir to include mid sized to large trees , 3)

extensive and widespread encroachment by trees into open areas across the Northern Region, and 4) the likelyhood of larger insect outbreaks and areas of wildfire (Gallant et al. 2003, Hessburg and Agee 2003, Hessburg et al. 2004, Arno and Gruell 1986 and others). Such changes in the extent and frequency of natural processes do not provide for long-term resilient, redundant nor representative habitat habitat for the four focus species (Samson 2005).

Invasive Species

Invasive species are one of three factors (along with habitat loss and hunan related activities such as recreation) that have lead to the listing of species under the Endangered Species Act (1973) (Wilcove et al. 1998). Practical measures to reduce known threat caused by two (the barred owl and brown-heaed cowbird) would be to 1) manage for habitat unfavorable to the two species, 2) focus conservation of species negatively impacted by the barred owl and brown-heaed cowbird on areas where the two species are not predicyted to occur, and 3) recognize that habitat management must be viewed in a broad scale, that is avoid significant future issues as have occured with the spotted owl by focusing both on species and habitat patterns and structure historic to the Northern Region (see Olsen et al. 2004).

Summary

Ecosystem risks vary by type—habitat loss for the grasslands and shrublands in important, while increases in mid-aged forest and connectivity of those types is contributing to a vastly different pattern in disturbance processes (fire and insects) as occurred historically. Several opportunities, however, are shared across the major ecosystems, i.e., reintroduction of fire, managing by timber harvest or grazing to restore landscape patterns more similar to historic, and management to reduce the impacts invasive species, plant or animal.

The Forest Service by Regulation is required to consider SOC and SOI. Conservation measures for SOC have yet to be developed but locations are (or will be) for three planning zones.

Actions relative to SOI will most likely focus on improving habitatbt are not yet available.

The 36 CFR 219.9(a)(2) Engaging State and local governments and Federal agencies states "The Responsible Official must provide opportunities for the coordination of Forest Service planning efforts undertaken in accordance with this subpart with those of other resource management agencies. The Responsible Official also must meet with and provide early opportunities for other government agencies to be involved, collaborate, and participate in planning for National Forest System lands. The Responsible Official should seek assistance, where appropriate, from other State and local governments, Federal agencies, and scientific and academic institutions to help address management issues or

opportunities." This rule make enhance the possibility that State species-at-risk will be reviewed by the Forest service.

Maps

Montana priority ecosystems (available)
Species-of-concern locations (in preparation)
Species-of-interest winter habitat (in preparation)
Species of focus habitat (in preparation)
Invasive species (available/in preparation)
Grizzly bear recovery areas (available)

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