

Wilderness Needs Assessment--2003

USDA Forest Service

Northern Region

Between 2001 and 2008, all forests and grasslands within the USDA Forest Service Northern Region will be engaged in revisions of their Land and Resource Management Plans. As part of the revision, forests are required to complete an evaluation of all inventoried roadless areas (IRAs) for their suitability as congressionally designated wilderness areas to be included in the National Wilderness Preservation System (NWPS). The process for completing the Wilderness Evaluation is detailed in Chapter 7 of the Land and Resource Planning Handbook (1909.12). The process includes three steps; determining capability, availability and need. Capability and availability are to be completed on a forest level by the interdisciplinary planning team. Need is described in Chapter 7 as an analysis of the degree to which an area contributes to the local and national distribution of wilderness. Need is analyzed using such factors as the geographic distribution of areas, representative-ness of landforms and ecosystem types, and the presence of wildlife expected to be visible in a wilderness environment. To best analyze the need for additional wilderness in the Northern Region, the Regional Forester decided that the Needs Assessment would be completed at the Regional level.

The following assumptions are provided in 7.23a of 1909.12, Chapter 7:

1. Demand for wilderness increases with both an increasing population and a growing awareness of wilderness.
2. Some undeveloped lands provide many opportunities for a primitive type of recreation outside of wilderness. These lands are going to decrease in acreage as the demands on public lands increase.
3. Some visitor use that occurs in designated wildernesses is not dependent upon the wilderness environment.
4. Within social and biological limits, management may increase the capacity of established wildernesses to support human use without unacceptable depreciation of the wilderness resource.
5. To survive, some biotic species and/or associations may require the environment found only in a wilderness.

Chapter 7 provides a list of suggested factors for considering need. The factors considered in the Northern Region assessment are social and ecological. The social factors include current levels of use in designated wilderness in the Northern Region, national and local trends in outdoor activities, and population statistics. Ecological factors include representative-ness of vegetative cover types and ecological sections, fisheries and wildlife.

Organization of Needs Assessment

The following needs assessment includes a description of the current situation and the analysis of social and ecological factors, including maps and conclusions.

Current Situation

The USFS, Northern Region is comprised of twelve national forests and four grasslands in Montana, Northern Idaho and North and South Dakota covering 25 million acres. There are thirteen designated wilderness areas completely within the Northern Region and two that are shared with other regions; the Salmo-Priest Wilderness shared with the Pacific Northwest Region to the West and the Frank Church River of No Return Wilderness, shared with the Intermountain Region to the South. These fifteen areas total approximately 5 million acres. There are no designated wilderness areas in the Dakota Prairie Grasslands, though the National Park Service does have designated wilderness in the Theodore Roosevelt National Grasslands. The Dakota Prairie Grasslands completed their National Land and Resource Management Plan in 2001. The assessment determined that there were four areas, totaling 41,500 acres suitable for wilderness.

In Montana, there are twelve wilderness areas, covering approximately 3.4 million acres and Idaho has four covering approximately 1.5 million acres in the Northern Region. One wilderness, the Selway Bitterroot straddles the Montana and Idaho border.

The USFS Northern Region currently has approximately 8.5 million acres of inventoried roadless areas (IRAs), approximately 6 million in Montana and 2.5 million in Idaho.

The Value of Wilderness Nationally

American's have long treasured their wildlands. Nothing has proved this more than the establishment and growth of the National Wilderness Preservation System. Shortly after World War II, the population of the United States was growing rapidly and lands were being developed to provide homes and jobs. Conservationists were concerned that if growth continued at that rate, it wouldn't be long before all wildlands were lost to development. In the mid-1950's, they began educating the American people and Congress of the value of wildlands and the risk of losing them forever. After ten years of debate, Congress overwhelmingly supported and passed a wilderness bill. President Lyndon Johnson signed the Wilderness Act into law on September 3, 1964. The Wilderness Act accomplished two things. First, it established the National Wilderness Preservation System (NWPS), comprised of 9 million acres in 66 areas and it established the framework for additional areas to be added to the System at a later date.

Section 2 (a) of the 1964 Wilderness Act, the Statement of Policy, clearly describes Congress' intent with establishment of the NWPS, "In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States...leaving no lands designated for

preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.” Wilderness is defined in Section 2 (c) as an area of undeveloped Federal land without permanent improvements which is managed to preserve its natural condition, generally appears to have been affected primarily by the forces of nature, with outstanding opportunities for solitude or a primitive and unconfined type of recreation. Wilderness may also contain ecological, geological, scientific, educational, scenic or historical values.

Since the Wilderness Act passed in 1964, more than 100 wilderness bills have been signed, increasing the size of the NWPS from 9 million acres to approximately 106 million acres. This amounts to approximately 4 % of the public land base.

In 1995, Dr. Ken Cordell, Senior Scientist for the Forest Service Research Station in Athens, Georgia completed a telephone survey of a random sample of approximately 1900 people over the age of 16 in the United States who were asked questions about their awareness of the NWPS, the adequacy of the amount of wilderness that is protected and the importance of various benefits or values from wilderness protection. Findings indicate broad support for the concept of wilderness, based mostly on the ecological, environmental quality, and off-site values respondents believe, wilderness protection provides.

The study concluded that nationally over 1/2 of American's 16 and older knew about the NWPS. Only 4.4% felt that there are too many acres in the NWPS and 52.6 % felt there is not enough acres designated wilderness. When asked what they value about wilderness, 52.7 % said they valued protecting wildlife habitat, 49.8 % protecting endangered species, 44.3 % valued preserving unique ecosystems and genetics and 27.8 % valued wilderness because of the recreation opportunities wilderness provides. (“How the Public Views Wilderness”, Cordell, Tarrant, McDonald, Bergstrom. International Journal of Wilderness, Vol.4, Number 3).

On March 26, 2003, the Forest Roads Working Group (FRWG) released a paper titled, "Recommendations for Protection of Roadless Areas". The FRWG is an ad hoc coalition comprised of organizations that collectively represent conservationists, sportspersons, members of the forest products industry and outdoor recreation businesses that support the protection of roadless areas of the National Forest System. The paper concluded that,

"Inventoried roadless areas provide clean drinking water and large, relatively undisturbed landscapes that are important to fish and wildlife species and their habitat needs. Inventoried roadless areas provide opportunities for dispersed outdoors recreation, and biological strongholds for population of threatened and endangered species. They also provide reference areas for study and research and serve as bulwarks against the spread of non-native invasive species that can displace native fish and wildlife."

Though the paper does not include opinions on designated wilderness, currently wilderness is a common way to legislatively protect roadless areas from development.

It's clear from these opinion polls and from the growth of the National Wilderness Preservation System over the last 40 years, that American's recognize the value of legislatively protecting wildlands for all of the values they provide, including representation of unique ecosystems, wildlife habitat and endangered species. Montana and Idaho, because of the number of acres of roadless, still provide opportunities to protect these values, unlike many States, particularly in the Midwest and East where undeveloped lands are rare.

The rest of this assessment will focus on the need for protection of specific resources and the opportunities to provide that protection in the Northern Region.

Native Fish Populations

As the Region completes Forest Plan revisions, we need to consider the importance of wilderness and roadless areas for the preservation of native fisheries. We have an opportunity to consider additional areas for wilderness designation that would benefit native fish populations.

However, wilderness and fish managers need to have meaningful dialogue on whether wilderness designation is the appropriate management tool for restoration of native fishes. If recovery of native stock requires extensive manipulations to recover and expand the populations, wilderness designation may not be the appropriate tool. The Forests have the ability to utilize other designations, including Research Natural Areas (RNA), that may be more beneficial to the management of the species.

Numerous assessments have stressed the importance of roadless and wilderness areas for native fish stocks. Most of these assessments did not differentiate between wilderness and roadless, rather combined the two into the “unroaded” category.

These assessments have found that current strongholds (most secure and robust populations) are dependant on wilderness and roadless areas. Given the protection of roadless and wilderness, some of our strongest populations for native fishes are in “unroaded” areas of our National Forest System lands.

The protection of roadless areas within historic native fish species ranges provides for important functions for recovery and restoration of native fish stocks. These include:

- more contiguous relatively undisturbed habitat thereby a reduction in fragmentation and isolation of populations,
- maintain migratory corridors and all life histories with less non-native species interaction/competition and interbreeding,
- provide refuge sites relatively free of human disturbances, for population stabilization,
 - less fishing pressure and human induced impacts,
 - very few roads and the associated impacts of roads to the fisheries resources.
 - “Roads modify natural drainage networks and accelerate erosion processes. These changes can alter physical processes in streams, leading to changes in streamflow regimes, sediment transport and storage, channel bank and bed configurations, substrate composition, and stability of slopes adjacent to streams. These changes can have biological consequences, and they can affect all stream ecosystem components. Salmonids require stream habitats that provide food, shelter, spawning substrate, suitable water quality, and access for migration upstream and downstream during their life cycles. Roads can cause direct or indirect changes in streams that affect each of these habitat components” (Furness et al 1991).

Note: these assessments were conducted in very different ways, so the numbers are not comparable between assessments, but are presented to represent the importance of current roadless and wilderness areas for fisheries resources.

- The assessment of aquatic species and habitats conducted by ICBEMP identified subwatersheds with strong populations of at least one of seven key salmonids and found that 68% of known and predicted fish population strongholds in the Upper Columbia Basin EIS area are in unroaded condition, of which 37% are outside wilderness (Quigley et al. 1997).
- The most recent status assessment for Westslope cutthroat trout (WCT) found that of the 33,000 miles of habitats currently occupied (only 59% of the historic range) by WCT across its range (Idaho, Montana, small portions of Washington and Oregon),
 - 19% (6270 miles) occurred within designated wilderness areas and
 - 40% (13,200 miles) were within Forest Service roadless areas (including wilderness areas, Shepard et al 2003).
- The most recent status assessment for Yellowstone cutthroat trout (YCT) found that of the 7,528 miles of habitats currently occupied by YCT (only 43% of the historic range) across its range (Idaho, Montana, Wyoming, Nevada and Utah),
 - 14% (1,086 miles) occurred within designated wilderness areas and
 - 33% (2,510 miles) were within Forest Service roadless areas (including wilderness areas, May et al 2003).
- An assessment by the Western Native Trout Campaign looked at eight native trout populations in the western US. *Of the eight native trout investigated (of which these subspecies occupy 1-5% of their historic range), five trout species have over*
 - 60% of the conservation populations in roadless and other undeveloped areas (Western Native Trout Campaign, 2001).
 - Bull trout – 62% of remaining strong populations are in roadless, wilderness study, wilderness or National Park lands.
 - Westslope cutthroat – 71%.

The Northern Region currently has six fish species that are listed as threatened under the federal Endangered Species Act, and several other species that have Forest Service sensitive status.

Native Fish Species	Historic habitat currently occupied throughout it's range(%)	Special Status
Westslope Cutthroat Trout	59%	FS Sensitive
Yellowstone Cutthroat Trout	43%	FS Sensitive
Bull Trout	45%	Threatened, ESA

To get a rough idea of areas of importance of roadless and wilderness areas in the region we ran a simple GIS analysis to identify resources present. We compared the distribution of bull trout, Westslope cutthroat and Yellowstone cutthroat trout to our designated wilderness and inventoried roadless areas in the Northern Region. We used these particular species because the information is readily available. There is a need to do the same analysis with some of the listed Snake River salmon species. When that data is available, we will update this paper to include that information. *The map of this assessment is available from the region and accessible via and FTP site.*

Table 2. Miles of occupied habitat in wilderness, roadless within the Northern Region for Westslope cutthroat, Yellowstone cutthroat and bull trout.

Native Fish Species	Wilderness Miles Occupied within the Northern Region (% of total stream miles within the Region)	Roadless Miles Occupied within the Northern Region (% of total stream miles within the Region)	Historic habitat currently occupied throughout the range of the species (%)
Westslope Cutthroat Trout	1,424 miles (17%)	1,006 miles (12%)	59%
Yellowstone Cutthroat Trout	61 miles (14%)	32 miles (7%)	43%
Bull Trout	271 miles (20%)	218 miles (16%)	45%

- These rough estimates show that 29% of the Westslope cutthroat trout, 21% of Yellowstone cutthroat, and 36% of bull trout occupied habitat in the Northern Region is within wilderness or roadless areas.
- These estimates represent a large portion of the current range of the species (current range is significantly less than historic for all 3 species).
- These species have seen significant declines in the historic range of the species.

The Forests should examine current native fish populations within wilderness study and roadless within their planning area. Wilderness and fish managers need to have meaningful dialogue on whether wilderness designation is the appropriate management tool for restoration of native fishes.

- Consider the possibilities of those “unroaded” areas as long term strongholds for the species,
 - If these roadless areas can maintain these strongholds with minimal manipulations, consider the wilderness designation as a tool for protection.
 - If the populations will require extensive management and manipulation, look to other designations as the appropriate tool for protection.

<ftp://fsweb.r1.fs.us/pub/open/wilderness/fish.pdf>

Rare Plant Species

Designated wilderness areas, as well as inventoried roadless areas (IRAs), provide habitats for numerous elements of biological diversity in the Northern Region. These elements include rare plant and animal species, federally listed threatened and endangered species, Forest Service sensitive species, and examples of unique or uncommon plant communities. This report summarizes an analysis that examined the degree to which wilderness areas and IRAs contain occurrences of rare plant species.

Methods

Data on the occurrences of all rare plants and animals, as well as plant communities of conservation concern, were obtained in a GIS format from the Montana Natural Heritage Program (Helena) and the Idaho Conservation Data Center (ICDC; Boise). The spatial data consist in part of polygons for each occurrence of the rare species and communities in the respective states. For example, in Montana there are 330 rare vascular plant species that are tracked as species of concern in the state. MTNHP enters occurrence records for each known population of these species in a centralized database.

The GIS layer of element occurrences was overlapped with a layer containing the boundaries of all wilderness areas and IRAs in Idaho and Montana. The element occurrence data were sorted by status, to distinguish those species that are designated as sensitive by the Forest Service. Also, for both FS sensitive and non-sensitive species, the globally rare species (those with Natural Heritage Program ranks of G1, G2 or G3) were examined separately from those species that are rare at the state level but more common on a rangewide basis (Natural Heritage Program ranks of S1, S2, or S3).

Results

The following table summarizes the number of rare plant species in the Idaho and Montana portions of Region 1 that are found in wilderness areas (of any ownership), Forest Service IRAs, or both.

Rare Plant Species Category	Total # of rare plant species in Natural Heritage Program databases (ID + MT)	# of rare plant species occurring in Wilderness (any ownership)	# of rare plant species occurring in both Wilderness and FS IRAS	# of rare plant species occurring in FS IRAS (but not in Wilderness Areas)
A -- FS Sensitive Species (globally rare)	45	3	17	19
B -- FS Sensitive Species (state rare)	118	3	36	52
C -- Non-FS Sensitive Species (globally rare)	64	4	13	13
D -- Non-FS Sensitive Species (state rare)	299	24	65	78

Discussion

To initially evaluate the conservation benefits that could be obtained by the addition of wilderness acreage in Region 1, the first focus should be on the species that occur in Inventoried Roadless Areas (IRAs) and are not represented in currently designated wilderness areas. A total of 19 globally rare plant species designated as sensitive by the Forest Service have one or more occurrences in IRAs in the Montana and Idaho portions of Region 1, but no occurrences in presently designated wilderness areas. A total of 52 plant species that are rare at the state level, and are also designated as FS sensitive species, have one or more occurrences in IRAs but none in wilderness areas. Thus, the protection of additional IRAs in Region 1 could enhance the conservation of occupied habitats for 71 sensitive plant species that are not protected in the existing wilderness network.

For rare plant species that are not designated as sensitive by the Forest Service, 13 globally rare species and 78 state rare species have occurrences in IRAs but not in designated wilderness areas. Thus, designation of additional wilderness acreage in the Region could also provide a greater level of habitat security for 91 additional plant species that are rare at the global or state level according to the state Natural Heritage Programs.

Several habitats that are important for these rare plant species deserve special mention. **Grasslands, peatlands** (specialized wetlands in areas where organic matter has built up over time) and **shrublands** are all critical habitats for certain rare plants in IRAs. Grasslands, which are generally very threatened in the northern Rockies due to development, heavy grazing or weed invasion, provide habitat for such globally rare sensitive plants as *Cirsium longistylum* (long-styled thistle); this species is found only in Montana, and 16 of the 54 known populations occur in IRAs. Peatlands provide habitats for numerous state rare sensitive species; six of the 46 occurrences for this rare wetland type occur in IRAs in Montana. Shrublands, including sagebrush habitats, also harbor many rare plants. For example, *Penstemon lemhiensis* (Lemhi beardtongue) is a globally rare sensitive species found in southwest Montana and adjacent Idaho; 15 of the 81 occurrences in Montana are found in IRAs. Thus, protection of additional acreages of these important habitats in wilderness areas would greatly enhance conservation of some regionally significant plant communities and their associated rare species.

Details regarding these rare plant species and their distributions on specific National Forests can be obtained from the Regional Office, using the GIS layers from the state Natural Heritage Programs. These data could be made available to the Forest planning teams, for use in evaluating alternatives for additional wilderness acreage in Region 1.

Additional analysis:

Three additional specific GIS analyses were conducted, to further clarify the role that wilderness designation of additional IRAs could provide in the conservation of sensitive plant species in Region 1. These analyses examined:

1. the number of IRAs that contain occurrences of Forest Service sensitive plant species that are not presently known to occur in existing wilderness areas.
2. the number of IRAs whose designation as wilderness would provide ecological benefits for the long-term maintenance of such unprotected sensitive plant species that occur in those IRAs.
3. the number of IRAs that contain occurrences of globally rare sensitive plant species (and as such represent “unique features” in IRAs).

Analysis 1

As explained above, there are 71 rare plant species that are designated as sensitive in Region 1 that currently are known to occur in IRAs, but are **not** known to occur in designated wilderness areas. These occurrences were overlaid on a GIS map of the IRAs, and 93 IRAs were found to contain such occurrences. This represents 33.2% of the 280 IRAs in Idaho and Montana. Designation of any of these IRAs as wilderness would thus offer additional protection for these currently unrepresented species.

Analysis 2

The list of 71 sensitive plant species that are currently known to occur only in IRAs, and not in the existing wilderness network, was qualitatively sorted in order to identify those species for which wilderness protection of one or more of their occurrences could provide additional assurance of long-term viability. Specifically, those species that might depend on landscape-scale disturbance processes and other biophysical and ecological attributes of wilderness areas (such as watershed integrity) were selected, to highlight IRAs where such benefits might be obtained through wilderness designation. Species that are related to dynamic fire-adapted ecosystems, or occur in specialized habitats that can be protected through large-scale conservation areas (such as peatlands, wetlands, and old-growth forests), are the focus of this additional GIS assessment. The landscape-level scales and functional ecological processes that exist in wilderness areas are estimated to be beneficial to continued viability of these species. A total of 42 of the 71 species occurring in IRAs, but not wilderness, were included in this assessment. Examples of species that could benefit ecologically from the designation of additional wilderness include *Calochortus nitidus* (broad-fruit mariposa lily) and *Lesquerella pulchella* (bladderpod), which occur in grassland and shrubland habitats where natural fire regimes are likely to have beneficial effects on population viability. Peatland and wetland species, such as *Drosera intermedia* (sundew) and *Carex rostrata* (beaked sedge), could benefit from landscape-scale protection provided by wilderness designation, as such

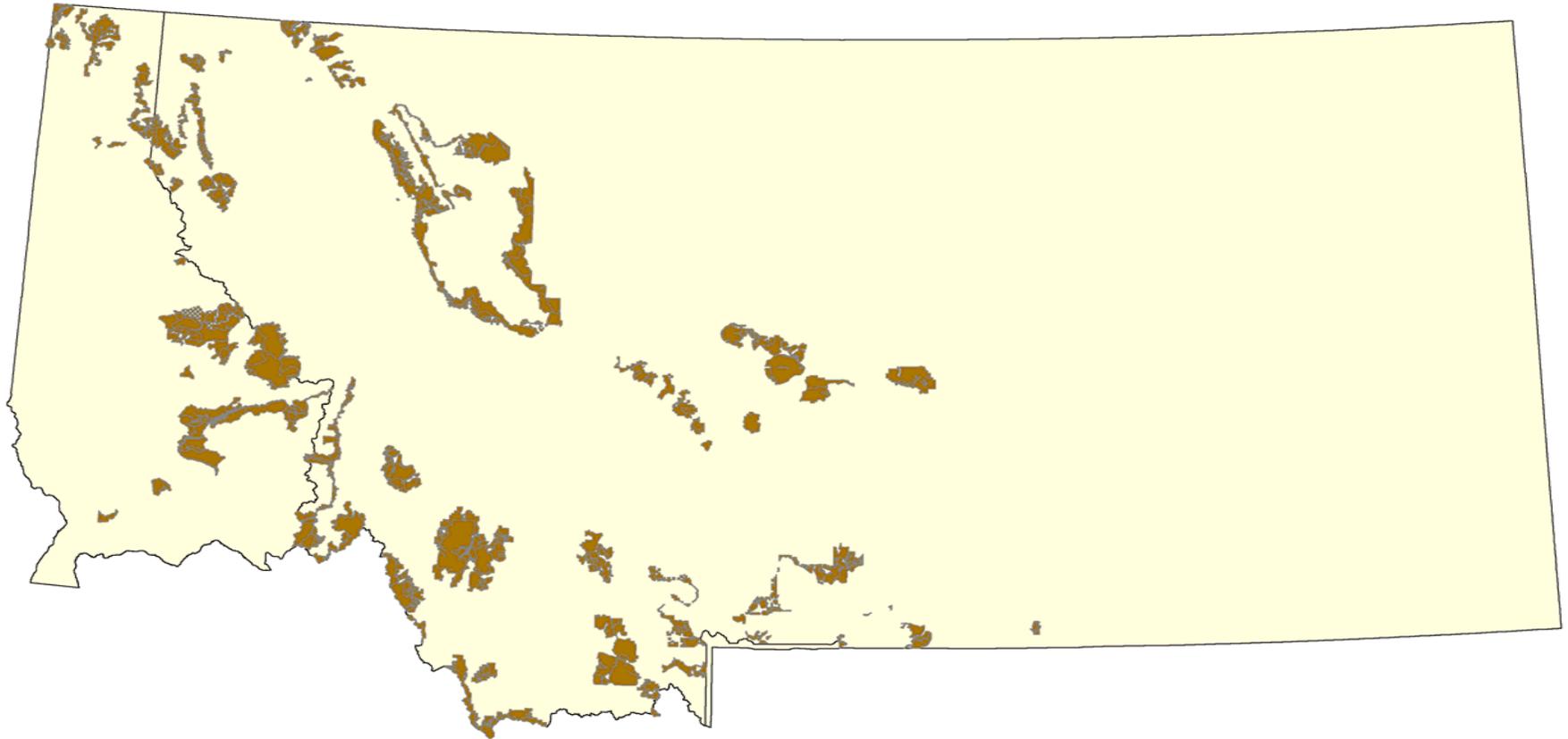
protection enhances the long-term functional integrity of the associated watersheds where the habitats occur. This habitat-based screening approach formed the basis for the qualitative determination of which sensitive plant species might benefit, in terms of landscape scale and ecological processes, from wilderness designation.

Sixty-seven IRAs were found to have one or more occurrences of these 42 species. This represents 23.9% of the 280 IRAs in Idaho and Montana.

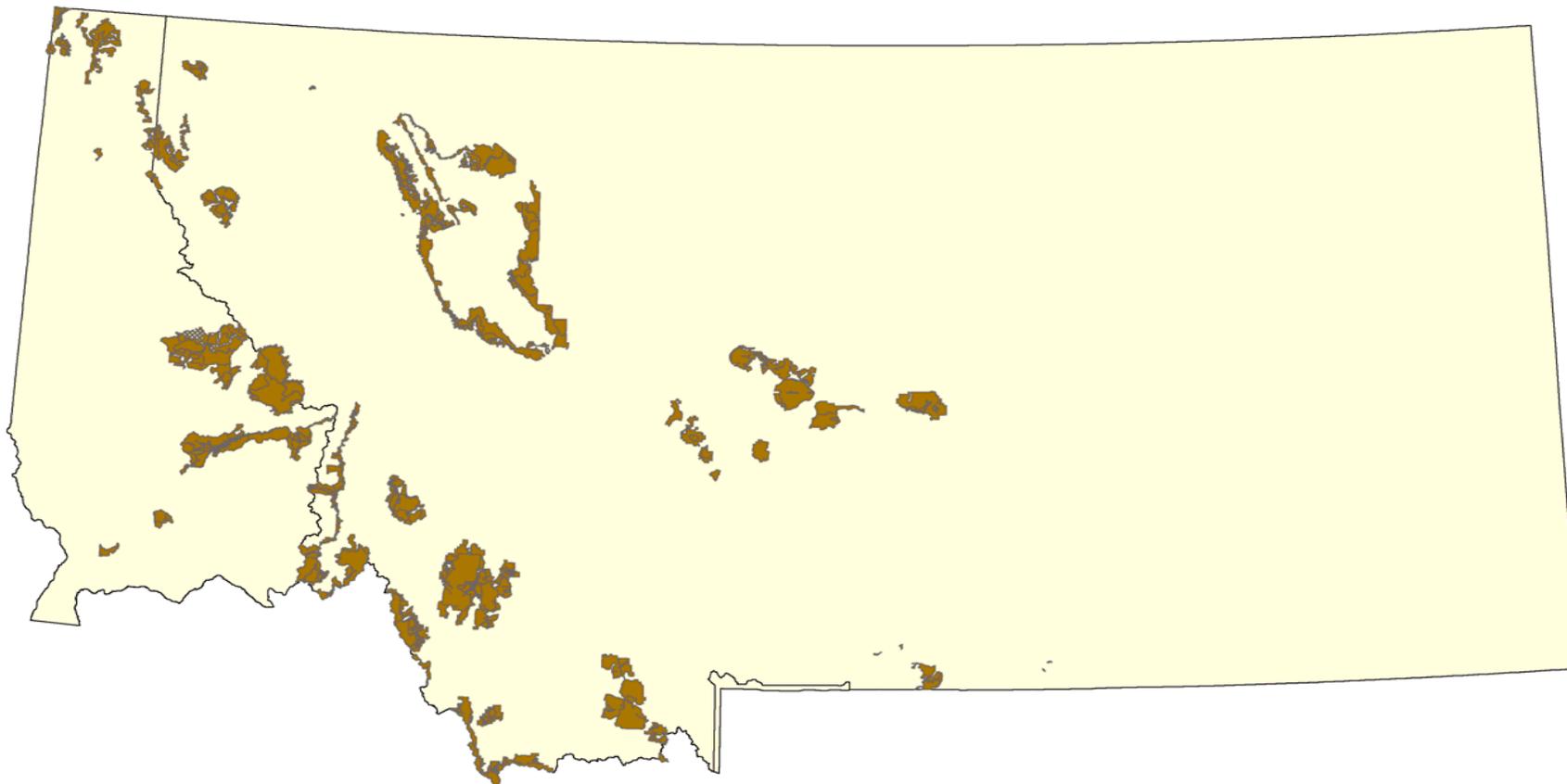
Analysis 3

A total of 45 globally rare sensitive plant species occur in Idaho and Montana (defined in the Methods section above). Occurrences of these species were screened against the GIS layer of IRAs in the two states. Ninety-nine IRAs were found to contain at least one occurrence of these species. This represents 35.4% of the 280 IRAs in Idaho and Montana. These 99 IRAs could thus be considered to include “unique features” in that they provide currently occupied habitat for globally rare sensitive plant species.

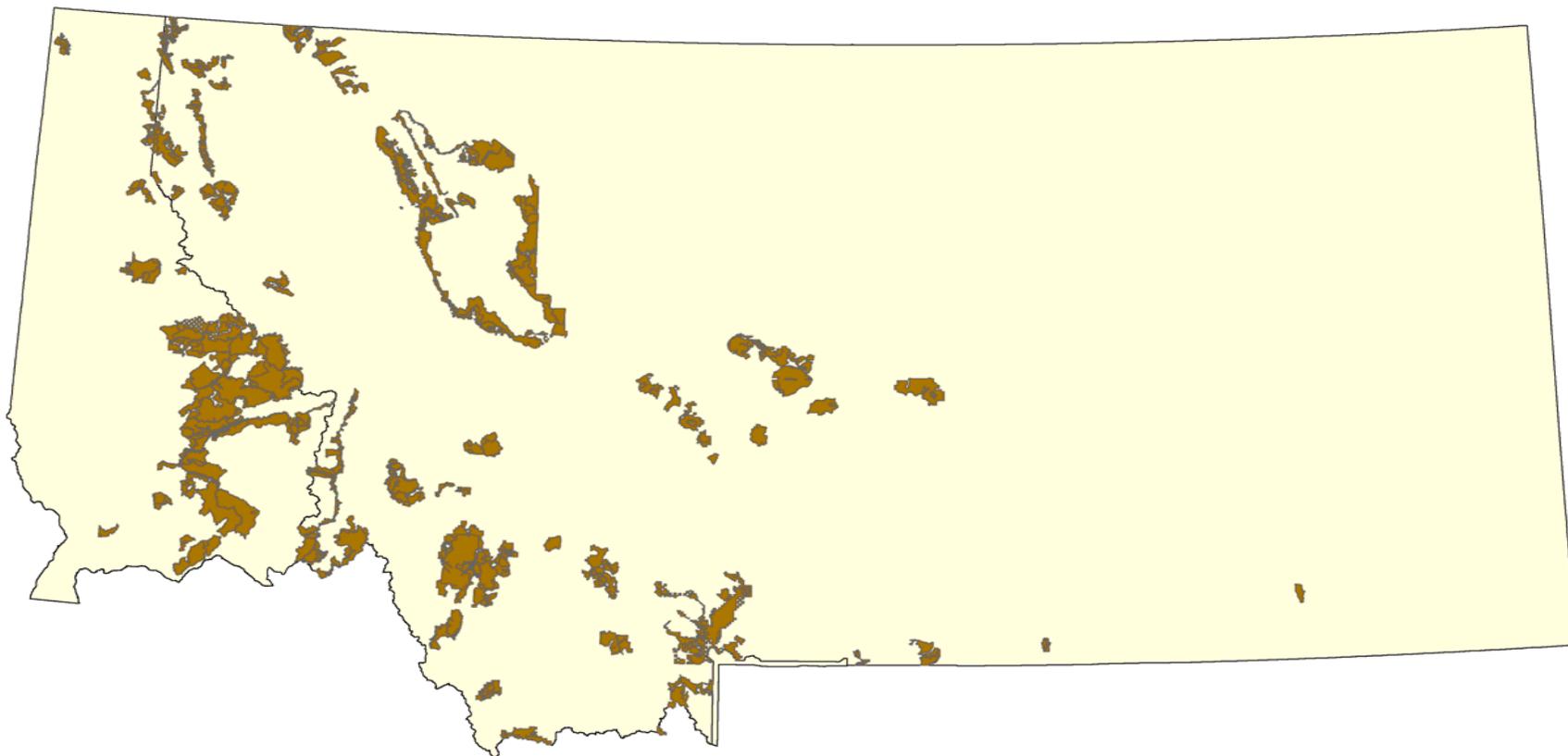
**Roadless Areas containing Forest Service Sensitive Plant Species
Not currently occurring in Designated Wilderness (Set 3)
93 Roadless Areas meet the criteria**



Roadless Area containing Forest Service Sensitive Plant Species which Benefit from Wilderness Designation and do not currently occur in Wilderness (Set 2)
67 Roadless Areas meet the criteria



Roadless Areas containing Forest Service Sensitive Plant Species
which are Globally Rare (Set 4)
99 Roadless Areas meet the criteria



Under-represented Plant Communities

The benefits of wilderness designation on many communities are based on the underlying assumption that natural processes will be allowed to occur without human intervention. Wildland fire, windthrow from high winds and microbursts, insect and disease impacts, and even beaver activity would occur naturally in the wilderness. Most of these natural disturbance processes are well documented in the literature as part of the natural range of variation which benefits and perpetuates these communities. At a broad scale, fire has obvious benefits to lower montane forests and aspen, but it also maintains grasslands and shrublands at the lower montane fringe. At a fine scale, beaver are hydrologic modifiers which create standing water habitat that is critical for maintenance of broad willow valley bottom systems. Amphibians are highly dependent on these systems. However, on managed lands, particularly those near private land, both fire and beaver, along with other processes, are often considered damaging to the resource or in conflict with management, and are not allowed to occur at a natural rate and scale. Humans may not entirely remove the process, but we may decide to limit its extent or rate of occurrence. This in turn affects the landscape patterns of vegetation and fine scale interactions among species and the habitat upon which they depend.

The information on plant communities came from the Montana Natural Heritage Program and the Idaho Conservation Data Center. Those communities are not USFS Sensitive, but are globally rare. They have a global rank ranging from G1 to G3; most are ranked G3, which means that they are vulnerable because of rarity or restricted range and/or other factors, even though they may be abundant at some of their locations. Usually, but not always, the global ranking is the same as the state ranking, so a G3 community will likely have an S3 ranking. Plant communities which are not currently represented in wilderness, but are in the inventoried roadless acres (IRA) are primarily in the non forested and riparian vegetation cover types. Although not all communities are listed, they were used to determine which cover types should be considered for wilderness system recommendation.

The intent of this paper is to identify gaps in the designated wilderness areas, i.e., vegetation types that exist in the region but are not represented in designated wilderness in the Northern Region. The Wilderness Society publication titled: "Roadless Areas: The Missing Link in Conservation" (2002) is the reference for TM satellite imagery cover types. This coverage was obtained from The Wilderness Society, and is a merging of the Idaho, Montana, and Wyoming TM imagery coverage.

Riparian and wetland communities

Riparian vegetation includes all lifeforms: tree, shrub, and herbaceous (graminoids, forbs, ferns) and nonvascular species. These floristically and structurally diverse communities are critical corridors for large mammals, plus providing summer breeding and rearing habitat for neotropical birds. Small mammals such as beaver and river otter are a

functional part of many riparian areas. Amphibians and other aquatic vertebrates and invertebrates depend upon healthy, functioning riparian and wetland areas. Numerous other species use riparian areas and wetlands in some part of their life cycle. Currently riparian and wetland types occupy 46,544 acres of wilderness acres in designated wilderness in the Northern Region. An additional 115,541 acres of riparian and wetland vegetation is within inventoried roadless areas. This is almost three times the amount of riparian currently in designated wilderness. All riparian and wetland types are included in this additional acreage.

Riparian types include both tree dominated cottonwood and conifer dominated types. Notable communities include the Engelmann spruce/yellow skunk cabbage type, which has a global ranking of G2, and a state ranking of S2. This means that it is globally rare, and only found in Montana. Another community that may be rare is the Englemann spruce/red osier dogwood (G3,S3). Plains cottonwood/western snowberry communities are considered rare, and have a ranking of G2/G3, and S2/S3. The tree communities are associated with the "Forest –Dominated Riparian" cover type. Riparian shrub communities include a variety of willows, alder, birch, dogwood, and other shrub species. They occur at all elevations, with varying composition. They can form a complex mosaic with herbaceous species, such as sedges, in the understory.

Herbaceous communities include sedge/grass dominated wetlands and peatlands. Peatlands are specialized and uncommon wetland types that are characterized by a thick peat layer, due to an accumulation of organic matter, which takes many years to develop. They typically occur in cold, wet environments, and usually are dominated by herbaceous species. These unique types warrant additional representation. For example, of the 46 element occurrences of peatlands in Montana, 35 are in FS ownership, and 13% are in IRA. With so few occurrences, it would be of great value to add these peatlands to the wilderness system.

Aspen Woodland Communities

Most aspen communities in the norther region are fire dependent, i.e., the perpetuate under this disturbance because it removes the conifer overstory and stimulates vegetative growth, or suckering. Aspen stands are declining due to fire exclusion, but grazing by hooved ungulates (e.g., cattle, sheep, elk, moose) reduces the amount of suckering stems in the stand and alters the undersory. Tall forbs are mesic grasses are reduced in density and cover or replaced by non-native grasses and forbs (e.g., Canada thistle, Kentucky bluegrass). When animals graze and bed down in these shady groves, in extreme cases there is no understory or aspen regeneration, and bareground may be the dominant ground cover type.

Currently, aspen occupies only 0.3% of the wilderness. However, with the addition of the IRA, this amount increases to 7.1%.

Upland Shrubland and Grassland Communities

Shrubland and grassland communities are well represented in the IRA, but not in designated wilderness, probably because they occupy lower elevations. These critical plant communities are decreasing, due to a number of stressors, including: conifer expansion as a result of fire exclusion, conversion to agriculture or development on private lands, and/or increases in invasive plant species displacing the native vegetation, among other causes. These vegetation types should be a high priority when considering additional wilderness. Many wildlife species, including songbirds, raptors, rodents, small mammals, and large ungulates, depend upon these systems. In particular, grasslands are critical habitat for species such as meadowlark, and vespers, grasshopper and savannah sparrow, among other species.

Currently shrublands and grasslands occupy 195,932 acres in Northern Region wilderness. The addition of IRA would add 341,811 acres in these types, nearly double the current acreage.

Important grass species include: bluebunch wheatgrass, rough fescue, Idaho fescue, Sandberg's bluegrass, among others. Typically a wide variety of forbs occur in both grasslands and shrublands. These include: sticky geranium, bluebells, arnica, lupine, balsamroot, prairie smoke, buckwheat and groundsel, among others.

In addition, several rare species occur in grassland communities. Long-styled thistle, for example, occurs in rough fescue communities. Bladderpod and Lemhi penstemon can occur in grasslands and sagebrush-steppe communities. Important shrublands that are rare and declining include mountain mahogany communities and sagebrush communities. Mountain mahogany is an important browse species for wild ungulates, and since it is at the end of its range in the Northern Region, appears to be declining, with little regeneration. Sagebrush is particularly important for sage grouse and pygmy rabbit. Mountain big sagebrush and Wyoming big sagebrush are critical for sage grouse at various life stages. These shrub communities typically have a grass and forb understory of particular value to small rodents and insects. Ground nesting birds also use these communities frequently. The potential for conversion to other vegetation types is a threat to many species that depend on these shrubland/grassland complexes.

The following figures demonstrate the underrepresented land cover types.

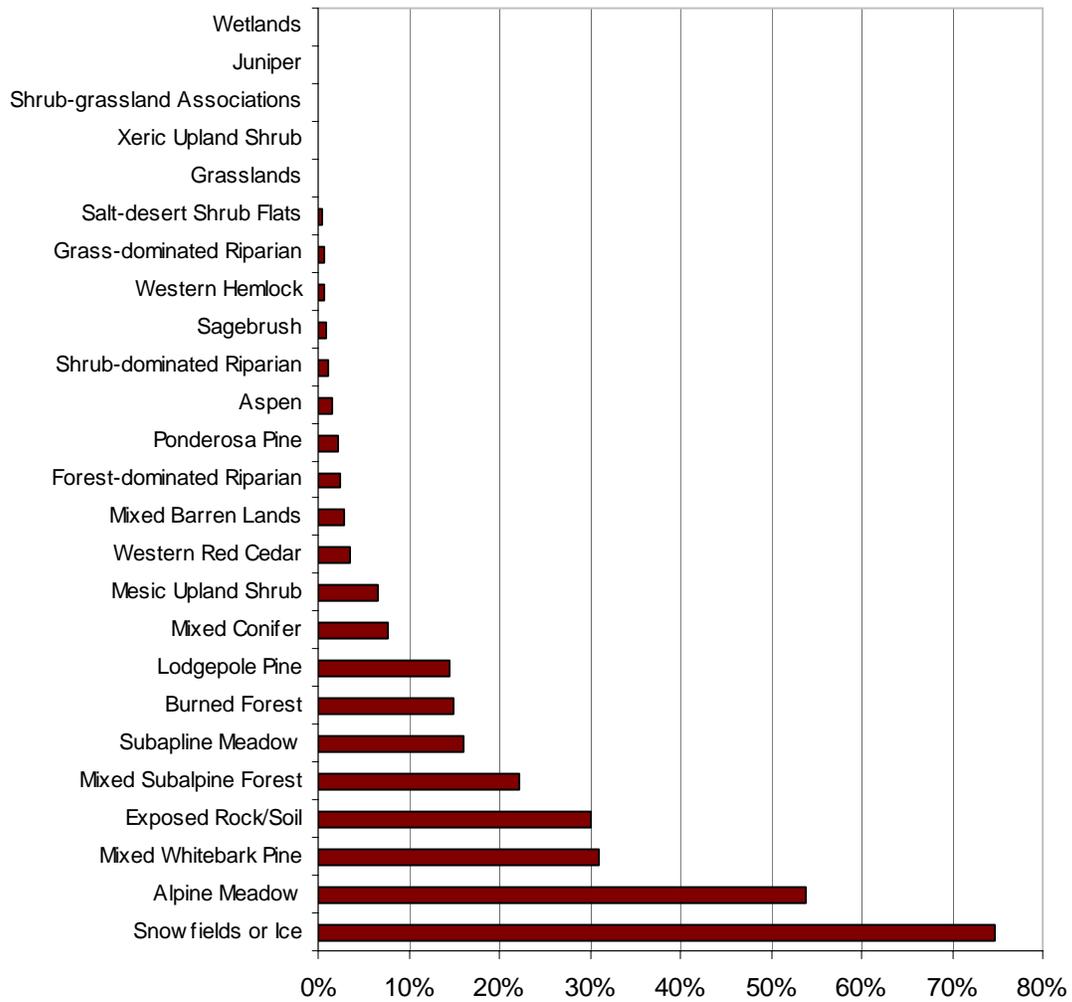


Figure x. Bars represent the percentage of each land cover type in designated wilderness for all lands in Montana and Idaho which are within the Northern Region boundary. For example, there are 3.3 million acres of Ponderosa Pine (all land ownerships) within the Montana and Idaho portion of the Northern Region; of these 3.3 million acres, approximately 70,000 acres are in designated wilderness, (i.e., $0.07 / 3.3 = 2.1\%$)

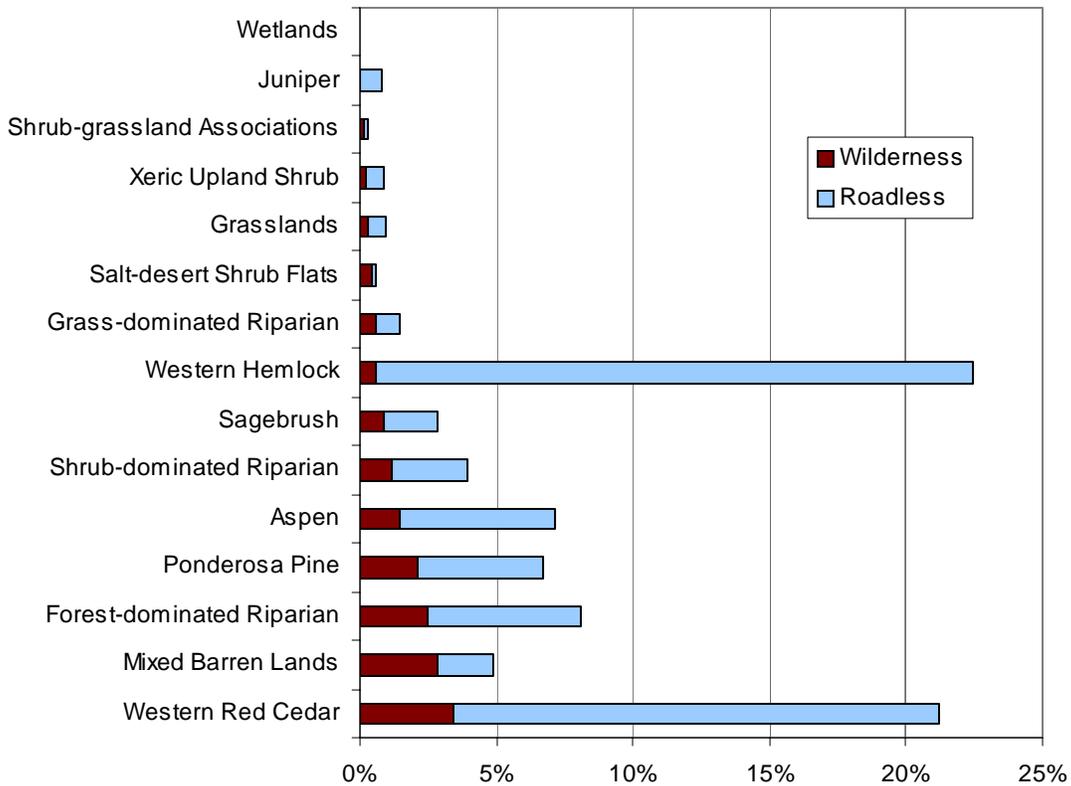


Figure x. Bars represent the percentage of selected land cover types in designated wilderness and inventoried roadless for all lands in Montana and Idaho which are within the Northern Region boundary. For example, there are 3.3 million acres of Ponderosa Pine (all land ownerships) within the Montana and Idaho portion of the Northern Region; of these 3.3 million acres, approximately 70,000 acres are in designated wilderness, (i.e., $0.07 / 3.3 = 2.1\%$) and approximately 151,000 acres are in inventoried roadless (i.e., $0.15 / 3.3 = 4.5\%$)

Wildlife

Natural areas have long been thought to be important to the conservation of biological diversity. As early as 1917, the National research Council made a request to the Ecological Society of America to prepare “a listing of all preserved areas and all preservable areas in North America in which natural areas persist” and to “urge the reservation of such areas as needed immediate action” (cited in Shelford 1926). To develop these ideas further, several more recent authors provide criteria to identify areas important to the conservation of wildlife (and other) resources. Specifically, an understanding of 1) those resources represented in existing reserves (Scott et al. 2001), 2) the practical consequences of managing protected areas as ecological baselines (Arcese and Sinclair 1997), and 3) general reserve design principles in order to evaluate current and future possible reserves for wildlife (Newmark 1995).

Resources represented in existing reserves

From a national viewpoint, habitats of significant value in the Northern Region are 1) globally outstanding: tallgrass prairie (North Dakota); 2) nationally important: northern mixed grasslands (North Dakota and South Dakota), shortgrass prairie (North Dakota, South Dakota, and Montana), and Montana valley and foothill grasslands (Montana and Idaho); and 3) regionally important: Rocky Mountain coniferous forests (Montana and Idaho) (Rickletts et al. 1999). Such endangered or areas tend to be characterized by two traits--low elevation and productive soils--which has lead to extensive conversion of such areas to urban, agricultural, or other uses. Few low elevation areas with productive soils are in protected areas of any form, e.g., parks, refuges, wilderness and so on (Scott et al. 2001).

Practical Consequences

Dasman (1972) proposed that natural/protected areas be managed as ecological baselines and that representative samples of all major ecosystems be included in a national system of parks or equivalent biological reserves. Ideally, these areas should be large enough that the effects of humans--wildlife harvest, recourse use, and so on--would not penetrate the core of the natural/protected area. More specifically: 1) no attempt is made to maintain an ecological status quo; 2) human interference is keep at a minimum; 3) if human activities are an influence, management intervention may be necessary; and 4) monitoring is essential (Arcese and Sinclair 1997).

Reserve Design

The practical consequences of designating natural/protected areas (i.e., no attempt is made to maintain an ecological status quo; and described above) and the primary principles of geometric reserve are similar in several ways. The primary principles of reserve design are 1) large habitat areas are better than small habitat areas, 2) connected habitats are better than isolated habitats, and 3) habitat shape is important (minimize edge) (MacArthur and Wilson 1967). An example may illustrate both the practical consequences and two of the general

principles of reserve design (size and isolation) [see Herkert (1994) and others for the negative role of edge].

Table 1. Relation of habitat area and habitat patch use for five forest species in the forested portions of Idaho and the Northern Region. Estimates of habitat patch area are based on the R1 Regional roadless map (wilderness, wilderness study areas, and Forest Plan recommended wilderness). Habitat patch use is based on known locations (as of 2001), Forest Biologists, personal communication, J. Gore, personal communication) and assumes the successful reintroduction of the grizzly bear to the Selway Bitterroot Wilderness Area.

Area		Wolverine	Fisher	Wolf	Grizzly Bear
Habitat Patches (n)	Area (acres)	Number of patches and percent occupied			
4	>1,000,000	4 (100%)	4 (100%)	4 (100%)	3 (75%)
1	500,000>1,000,000	1 (100%)	1 (100%)	1 (100%)	0 (0%)
11	250,000-<500,000	5 (45%)	2 (18%)	2 (18%)	1 (14%)
7	150,000-<250,000	3 (42%)	1 (17%)	2 (28%)	2 (28%)
32	50,000-<150,000	7 (21%)	4 (13%)	3 (9%)	1 (3%)
80	<50,000	5 (6%)	2 (3%)	8 (10%)	1 (1%)

In the Northern Region, at-risk species considered to need of areas with limited human-related influences are the wolverine, fisher, wolf, grizzly bear, and others. Table 1 illustrates the relationship of habitat area to occupancy for the four species. Presence in large but not small wilderness, wilderness study areas, and Forest Plan recommended wilderness suggests large areas are importance.

According to the reserve design principles, habitat isolation will increase rates of extinction and decrease rates of colonization. Table 2 summarizes the relation of habitat isolation and habitat patch use for four species known to be influenced by human-related activities and suggests

Table 2. Relation of habitat isolation and habitat patch use for four species in the forested portions of Idaho and the Northern Region. Distances between patches (e.g., isolation) is direct (map measurement) and does not account for topography or other factor(s) that may influence movement. Habitat patch use is based on known preservations in the Northern Region (as of 2001), Forest Biologists, personal communication, J. Gore, personal communication) and assumes the successful reintroduction of the grizzly bear to the Selway Bitterroot Wilderness Area.

Isolation		Wolverine	Fisher	Wolf	Grizzly Bear
Habitat Patches (n)	Distance	Number of patches (and percent) occupied			
49	<.5	12 (25%)	8 (16%)	8 (16%)	7 (14%)
24	.5-<1	7 (20%)	3 (13%)	6 (26 %)	0 (0%)
17	1-<1.5	3 (17%)	3 (17%)	3 (17%)	0 (0%)
11	1.5-<2.5	1 (9%)	1 (9%)	1 (9%)	1 (9%)
12	2.5-<10	1 (8%)	0 (0%)	1 (8%)	0 (0%)
21	>10	1 (4%)	0 (0%)	0 (0%)	0 (0%)

small wilderness, wilderness study areas, and Forest Plan recommended wilderness habitat areas are useful as habitat if closely associated in terms of distance to a large habitat area. The assumption is that isolation has reduced the ability of individuals to use the smaller, more isolated patches. It should also be pointed out that human intervention (reintroduction, exchange of individual for genetic conservation and so on) has been necessary to conserve these species in small and or isolated natural/protected areas.

One way to mitigate the habitat loss and isolation is use of a habitat corridor to connect two isolated habitats. As indicated in recent reviews, translating the corridor concept into pragmatic guidelines and appropriate action is limited by limited by confusion in terminology (Blois et al. 2002), role of habitat quality (Fleishman et al. 2002), known negative effects (Hess 1900), limited empirical data (Hudgens and Hadda 2003), to the point that some studies now even recommend habitat fragmentation to improve connectivity (Tischendorf and Fahrig 2000).

Possible guidelines include: 1) what is the time scale—corridors may have positive or negative consequences over time, 2) what is the threat—long-term species population or subpopulation decline (or just a boom/bust cycle); 3) what is the migration rate inside as compared to outside the corridor; 4) what fraction of the migrants are successful in immigrating to another area, and 5) what is the relative role of each habitat patch, i.e., a population sink, population source, stepping stone and some other?

Recommendations

1) If the purpose is to conserve biodiversity at a national or global scale, priorities are clear—the grasslands in the eastern portion of the region and the low elevation/mountain grasslands in the western portions of the Northern Region. For the most part, the grasslands are either too small in area or too highly modified and would be inconsistent with the practical consequences and principles of reserve design. Other methods (Research Natural Areas, Special Interests Areas or very extensive restoration prior to protected area designation) may better serve to protect these endangered resources.

2) Identifying possible wilderness areas and in the forested portions of the Northern Region is a multidimensional challenge, i.e., a simultaneously shift in habitat patch-size distributions and a decrease/increase in the distances separating habitat patches. In general, habitat area is viewed unequivocally as important in the conservation of wildlife—increase where possible the size of current Wilderness Areas.

3) At some point, however, the additive value of increasing the size of a Wilderness Area may diminish. One could use a species-specific wildlife habitat relationships model to estimate the number of individuals (Allen et al. 2001) that could be supported by a particular Wilderness Area. This estimate could be compared to the number thought necessary to maintain a viable population (Thomas 1990:326) and represent the point where the value for wildlife in adding to one Wilderness Area is less than increasing the size of second and separate Wilderness Area.

4) Although habitat loss is viewed unequivocal as important in explaining declines in species populations, the same cannot be said for factors that relate to the arrangement of habitats (Flather and Bevers 2002). A comparison of patch-dependent subpopulation fates is a criterion to fully determine the need for corridors (Elmhagen and Anmgerbjorn 2001).

5) The Minimum Dynamic Area (MDA) is an area large enough to sustain an ecological system with all of its biodiversity (Pickett and Thompson 1978). The MDA is the smallest area with a full complement of ecological processes that continually refresh the natural amount of habitat and maintain approximate number and sizes of patches and their juxtaposition native to the landscape. Analysis of MDAs has helped identify areas important to the long-term persistence of biodiversity on the Great Plains and can help identify approaches that will sustain intervening and other, smaller landscapes (Samson et al. in press). In future Wilderness Area assessments, the MDA concept may be the preferred approach for it would combine major issues—ecological processes, the managed

versus the un-managed landscape, and so on--into a single and comprehensive landscape plan.

Representation of Ecological Sections

A goal for the National Wilderness Preservation System (NWPS) is to build a system of lands that reflect the rich ecological diversity of all of the lands across the United States. Representation of all ecological types on conservation lands helps protect rare, species-rich, and often declining vegetation communities such as aspen, whitebark pine, sagebrush, grasslands, and xeric shrublands, and the living organisms that rely on those communities.

Though the current NWPS contains areas that range in size from three acres to 30 million acres and in diversity from the swamps of the Southeast to the tundra of Alaska, in general, because of demands for other resources, many of the areas within the NWPS are high elevation “rock and ice.” The following assessment provides a discussion, maps, and graphs intended to display the ecological diversity that currently exists in designated wilderness in the Northern Region.

To complete this assessment, the National Hierarchical Framework of Ecological Units was used. In this framework, ecological types are classified and ecological units are mapped based on associations of those biotic and environmental factors that directly affect or indirectly express energy, moisture, and nutrient gradients which regulate the structure and function of ecosystems. These factors include climate, physiography, water, soils, air, hydrology, and potential natural communities.

The four upper levels of ecological units in the National Hierarchical Framework of Ecological Units consist of Domain, Division, Province, and Section. Managers will typically find information on Ecological Domains, Divisions and Provinces useful for broad modeling, sampling and strategic planning and assessment, and for international planning. Strategic planning at the multi-forest or statewide level will typically find information at the Section level useful. For the purpose of a wilderness needs assessment for the Northern Region, it was determined that Ecological Sections is the appropriate level of mapping. This assessment looks at ecological sections across the entire region, which of those sections contain designated wilderness, and then which, if any, of those sections that do not currently have wilderness, or have very little wilderness, are found in roadless. If so, this provides a line officer with an opportunity to recommend wilderness areas so that the ecological section is represented in wilderness.

The Forest Service Northern Region is comprised of twenty different Ecological Sections, which are described in some detail in this section of the assessment. The following are descriptions of each of the ecological sections that comprise the Northern Region, the acres of that section that fall on National Forest, the acres in designated wilderness (all agencies) and the acres in roadless that may provide potential for inclusion in the NWPS (only Forest Service roadless). This section also includes maps

and bar graphs that more clearly display the distribution of wilderness and roadless acres within the ecological sections in the Northern Region. This information was a result of a GIS intersection of the section boundaries, the cover types, and the Inventoried Roadless Areas. As a result, the number of acres of under-represented (those that are currently less than 5% total cover in the region) cover types are displayed by section, and by IRA's within each section. In this analysis, those sections which had little wilderness, but large acres in IRA's could be evaluated based on how many acres of these cover types were contained within the different IRA's in each section. Certain IRA's were shown to contain significant acres of these under-represented cover types. These would emerge as strong candidates for inclusion into the wilderness system.

Ecological Sections Description

Red River Valley Section—This Section is located primarily in the North-Central States with a small number of acres falling within the far eastern edge of the Northern Region. This Section is dominated by alluvial fans, kettles, wetlands and dunes. Vegetation is typically bluestem prairie and northern flood plain forest.

Forest Service Acres: 49,268

Acres in Designated Wilderness: 0 (0% of this section)

Acres in Inventoried Roadless: 31,481 (0.6% of this section)

No significant amounts of under-represented cover types were present in this section.

Palouse Prairie Section—This section falls within the Columbia Plateau province. Elevations range from 1200 to 6000 ft. It is comprised of loess-covered basalt plains, undulating plateaus, some river breaklands and mountains primarily in the southeast part of the section. Mountain grasslands and meadow-steppe vegetation are typical in the Palouse. Grasslands are dominated by bluebunch wheatgrass and Idaho fescue. Meadow-steppe vegetation is characterized by Idaho Fescue and common snowberry. Woodlands and forests occur in the eastern portion on hills and low mountains. Ponderosa pine woodlands and forests form the lower timberline.

Forest Service Acres: 461,809

Wilderness Acres: 166,468 (7.0% of this section)

Roadless Acres: 91,109 (3.9% of this section)

Significant increases in acres of the ponderosa pine cover type (5,724) would result from the inclusion of the IRA into wilderness in this section.

Northwestern Glaciated Plains Section—This section includes level to gently rolling continental glacial till plains and rolling hills on the Missouri Plateau. Steep slopes border some of the rivers. Elevation ranges from 2500 to 5000 feet. Vegetation is generally grama-needlegrass-wheatgrass.

Forest Service Acres: 65,903

Wilderness Acres: 21,628 (0.1% of this section)
Roadless Acres: 58,417 (0.2% of this section)

Significant increases in acres of the ponderosa pine cover type (4,670) would result from the inclusion of the IRA into wilderness in this section.

Northern Glaciated Plains Section—This section includes gently undulating to rolling continental glacial till plains with areas of kettle holes, kames, and moraines. Elevation ranges from 2000 to 6000 ft. Vegetation is wheatgrass-needlegrass prairie.

Forest Service Acres: 113,406
Wilderness Acres: 6,826 (less than 0.1% of this section)
Roadless Acres: 20,331 (0.1% of this section)

No significant amounts of under-represented cover types were present in this section.

Northwestern Great Plains Section—This section includes gently sloping to rolling, moderately dissected shale plains. There are some steep, flat-topped buttes. This section occurs on the Missouri Plateau and High Plains within the Great Plains province. Elevation ranges from 1500 to 3900 feet. Most of this section has natural prairie vegetation, which includes western wheatgrass, green needlegrass, blue grama, needleandthread and buffalograss. Common shrubs in draws and along streams include chokecherry, snowberry and sagebrush. Ponderosa pine, juniper and some aspen occur in North Dakota and on the Pine Ridge in South Dakota.

Forest Service Acres: 1,355,246
Wilderness Acres: 33,861 (0.1% of this section)
Roadless Acres: 224,816 (0.8% of this section)

No significant amounts of under-represented cover types were present in this section.

Powder River Basin Section—This area includes gently rolling to steep dissected plains on the Missouri Plateau. In places, flat-topped, steep-sided buttes rise sharply above the surrounding plains. Elevation ranges from 3000 to 6000 feet. Vegetation includes grama-needlegrass-wheatgrass, ponderosa pine, wild rye and sagebrush.

Forest Service Acres: 531,740
Wilderness Acres: 0 (0% of this section)
Roadless Acres: 39,236 (0.2% of this section)

Significant increases in acres of the ponderosa pine (15,739), grasslands (6,865) and xeric shrubland (3,687) cover types would result from the inclusion of the IRA into wilderness in this section.

Northeastern Glaciated Plains—This is an area of nearly level to undulating continental glacial till and glacial lake plains, with areas of kettle holes, kames, and moraines.

Elevation ranges from 700 to 2300 feet. Section is dominated by prairie vegetation with northern reedgrass, prairie cordgrass, big bluestem, and slim sedge found on wet soils.

Forest Service Acres: 21,015

Wilderness Acres: 5,819 (less than 0.1% of this section)

Roadless Acres: 15,040 (0.1% of this section)

No significant amounts of under-represented cover types were present in this section.

Western Glaciated Plains Section—No acres on National Forests

North-Central Great Plains Section—No acres on National Forest

Bighorn Basin Section—Only 46 acres on National Forest

Yellowstone Highlands—This section includes high rugged mountains with ridges and cirques at higher elevation and narrow to broad valleys. Elevation ranges from 6000 to 13,000 feet. Vegetation is generally Douglas-fir and western spruce-fir between 5500 and 9500 feet, with lodgepole pine being the common cover type. Subalpine vegetation, including whitebark pine and subalpine fir, occurs above 9500 feet.

Forest Service Acres: 1,971,948

Wilderness Acres: 1,050,147 (21.6% of this section)

Roadless Acres: 584,105 (12.0% of this section)

Significant increases in acres of the following cover types would result from the inclusion of the IRA into wilderness in this section: aspen (62,493), ponderosa pine (147,757), riparian shrublands (26,859), grasslands (207,600), sagebrush (105,757) and xeric shrublands (18,601).

Bighorn Mountains Section—This area contains high mountains with sharp crests, rolling uplands, and dissected hills, with alpine glaciation dominating the upper third of the area. The ragged hills and mountains are cut by many narrow valleys with steep gradients. Elevation ranges from 4000 to 13000 feet. Vegetation is generally Douglas-fir, lodgepole pine, subalpine fir, and Englemann spruce forest and Idaho fescue, bluebunch wheatgrass and sagebrush.

Forest Service Acres: 74,077

Wilderness Acres: 0 (0% of this section)

Roadless Acres: 10,424 (1.0% of this section)

Significant increases in acres of the following cover types would result from the inclusion of the IRA into wilderness in this section: grasslands (1,075) and sagebrush (999).

Overthrust Mountains Section—No acres on National Forest

Idaho Batholith Section—This section contains mountains with alpine ridges and cirques at higher elevations. Large U-shaped valleys with broad bottoms indicate that the area has been strongly glaciated. Vegetation is grand fir-Douglas fir forest, western spruce-fir forest and western ponderosa forest. Elevation ranges from 3000 to 10000 feet.

Forest Service Acres: 3,467,822
Wilderness Acres: 1,695,420 (45.6% of this section)
Roadless Acres: 977,205 (26.3% of this section)

Significant increases in acres of the following cover types would result from the inclusion of the IRA into wilderness in this section: western red cedar (49,720), forested riparian (5,451), aspen (2,307), ponderosa pine (24,943) riparian shrublands (2,821), grasslands (8,080), and sagebrush (3,874).

Bitterroot Valley Section—Area includes high, glaciated mountains with alpine ridges and cirques at higher elevations and glacial and lacustrine basins at lower elevations. Steep slopes, sharp crests, and narrow valleys are characteristic. Elevations range from 3000 to 10000 feet. Common vegetation includes western larch, Douglas-fir, subalpine fire, and ponderosa pine.

Forest Service Acres: 2,542,045
Wilderness Acres: 701,425 (14.5% of this section)
Roadless Acres: 927,664 (19.2% of this section)

Significant increases in acres of the following cover types would result from the inclusion of the IRA into wilderness in this section: aspen (4,511), ponderosa pine (7,510), riparian forests (7,350), riparian shrublands (1,269), grasslands (10,058), and sagebrush (5,057).

Rocky Mountain Front Section—These are glaciated mountains with limestone scarps and ridges interspersed with glacial and lacustrine intermontane basins. Alpine ridges and cirques occur at higher elevations. Elevations range from 5500 to 8500 feet. Vegetation is Douglas-fir and western spruce-fir forests. Aspen groves occur extensively, limber pine is also present.

Forest Service Acres: 279,395
Wilderness Acres: 101,299 (5.9% of this section)
Roadless Acres: 172,606 (10.1% of this section)

Significant increases in acres of the following cover types would result from the inclusion of the IRA into wilderness in this section: aspen (6,183), riparian forest (1,768), and grasslands (4,531).

Belt Mountains Section—This section comprises high mountains, gravel-capped benches, and intermontane valley bordered by terraces and fans. Plains and rolling hills

surround the isolated mountain ranges. Elevation ranges from 4000 to 8000 feet. Vegetation is foothills prairie and Douglas-fir forest-eastern ponderosa forests.

Forest Service Acres: 1,803,128
Wilderness Acres: 28,672 (0.4% of this section)
Roadless Acres: 957,841 (12.3% of this section)

Significant increases in acres of the following cover types would result from the inclusion of the IRA into wilderness in this section: aspen (12,090), ponderosa pine (43,379), riparian shrublands (2,032), grasslands (66,668), and sagebrush (6,046).

Beaverhead Mountains Section—This area encompasses complex and high, steep mountains with sharp alpine ridges and cirques at higher elevations, glacial and fluvial valleys, and alluvial terraces and flood plains. Elevations range from 2500 to 6500 in the valleys; 4000 to 10000 in the mountains. Vegetation in valleys consists of sagebrush steppe with areas of alpine vegetation in higher elevations.

Forest Service Acres: 2,924,759
Wilderness Acres: 208,124 (2.5% of this section)
Roadless Acres: 1,693,283 (20.32% of this section)

Significant increases in acres of the following cover types would result from the inclusion of the IRA into wilderness in this section: aspen (14,508), riparian forests (18,429), riparian shrublands (10,442), grasslands (66,886), sagebrush (75,485), and xeric shrublands (12,800).

Blue Mountains Section—A moderately dissected wide, uplifted plateau dominated by landslide and fluvial erosion processes. Elevations range from 1000 to 10000 feet. Vegetation is predominately grand fire-Douglas fire and ponderosa pine forests.

Forest Service Acres: 57,672
Wilderness Acres: 83,226 (includes BLM lands) (19.8% of this section)
Roadless Acres: 16,108 (3.8% of this section)

The only significant increase in acres of cover type with inclusion of the IRA is with ponderosa pine (805).

Okanogan Highlands Section—This sections contains glacial lakes, rivers and streams as well as mountains, and both narrow and broad valleys. Elevations range from 1400 to 7300 feet. Vegetation is strongly influenced by the strong east-west precipitation gradient. Big sagebrush dominates the lower elevations, ponderosa pines the mid-elevations and Douglas-fir occupies the higher elevations.

Forest Service Acres: 572,310
Wilderness Acres: 423 (less than 0.1% of this section)

Roadless Acres: 174,013 (9.6% of this section)

Significant increases in acres of the following cover types would result from the inclusion of the IRA into wilderness in this section: western red cedar (17,399), western hemlock (3,257), and forested riparian (2,630).

Flathead Valley Section—This section contains glaciated mountains, glacial moraines, large glacial troughs, and glacial and lacustrine basins. Elevations range from 2000 to 7000 feet. Vegetation includes Douglas-fir, ponderosa pine, hemlock, cedar, and grand fir.

Forest Service Acres: 2,808,251
Wilderness Acres: 82,891 (1.6% of this section)
Roadless Acres: 692,841 (13.2% of this section)

Significant increases in acres of the following cover types would result from the inclusion of the IRA into wilderness in this section: western red cedar (19,533), western hemlock (7,527), aspen (6,315) and ponderosa pine (2,866).

Northern Rockies Section—This section contains steep glaciated overthrust mountains with sharp alpine ridges and cirques at higher elevations. Some areas of glacial deposition also occur. Elevations range from 3000 to 9500 feet. Vegetation is typically Douglas-fir, hemlock, cedar and grand fir.

Forest Service Acres: 1,569,124
Wilderness Acres: 871,497 (33% of this section)
Roadless Acres: 390,348 (14.8% of this section)

Significant increases in acres of the following cover types would result from the inclusion of the IRA into wilderness in this section: aspen (4,650), riparian forest (4,223), riparian shrublands (1,069), and grasslands (1,778).

Bitterroot Mountains Section—This area comprises steep dissected mountains, some with sharp crests and narrow valleys. Elevations range from 1200 to 7000 feet. Vegetation is cedar-hemlock-pine forest, Douglas-fir forest and western ponderosa pine forest.

Forest Service Acres: 4,541,661
Wilderness Acres: 118,718 (1.4% of this section)
Roadless Acres: 1,908,531 (23.3% of this section)

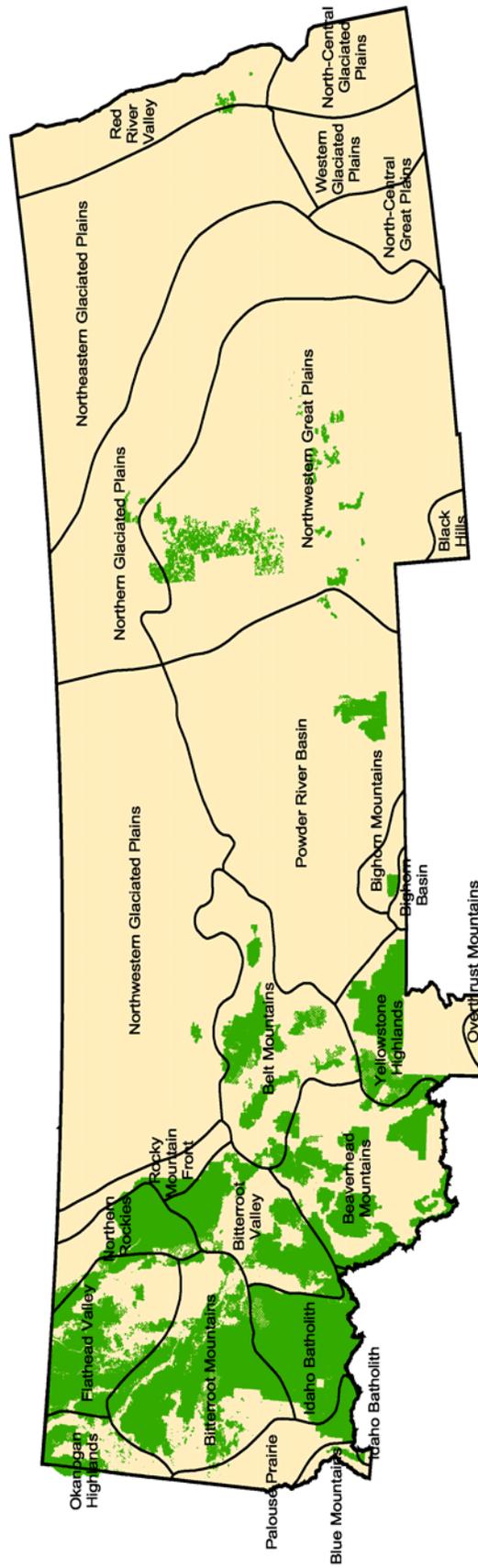
Significant increases in acres of the following cover types would result from the inclusion of the IRA into wilderness in this section: aspen (3,430), ponderosa pine (30,533), forested riparian (17,734), riparian shrublands (5,567), grasslands (9,456), and western red cedar (93,674).

Black Hill Section—No Acres on National Forest

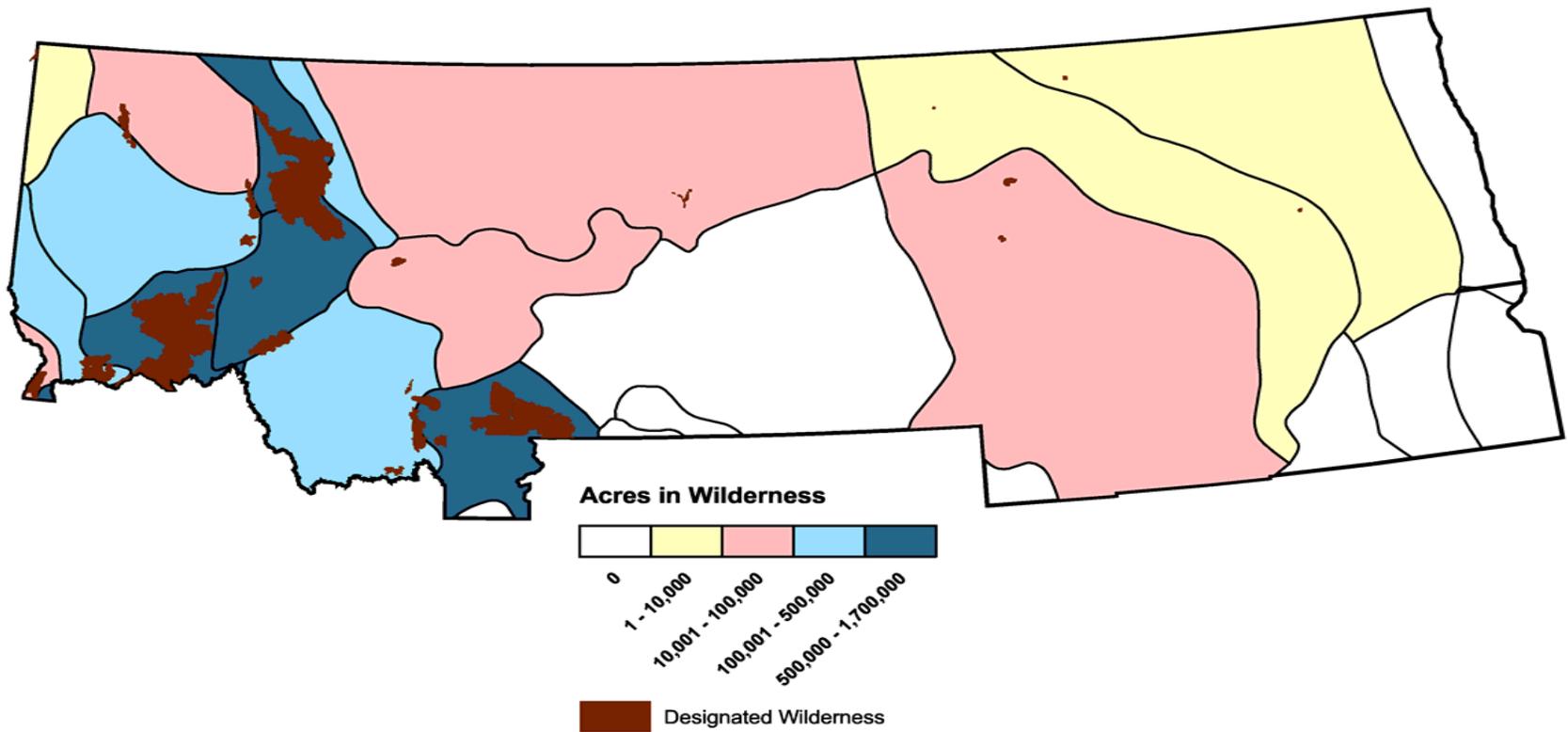
Conclusion

In conclusion, of the twenty ecological sections found in the Northern Region, four of the sections have no acreage in designated wilderness. More importantly, nearly 90 % of the designated wilderness acres in the Northern Region fall within four ecological sections. In addition, five sections which currently have very little wilderness would gain significant acreage of under-represented cover types with the addition of the IRA into the wilderness system. Those sections are: Belt Mountains, Beaverhead Mountains, Okanogan Highlands, Flathead Valley, and Bitterroot Mountains. These sections represent a wide variety of cover types, from warm moist western red cedar and western hemlock forests in north Idaho and northwest Montana, to sagebrush, xeric shrubland and mountain grassland types in southwest and central Montana. Across all sections, riparian types would also add significant acreage with inclusion of the IRA. These systems are inherently small landscape components that have high value. Any addition to wilderness

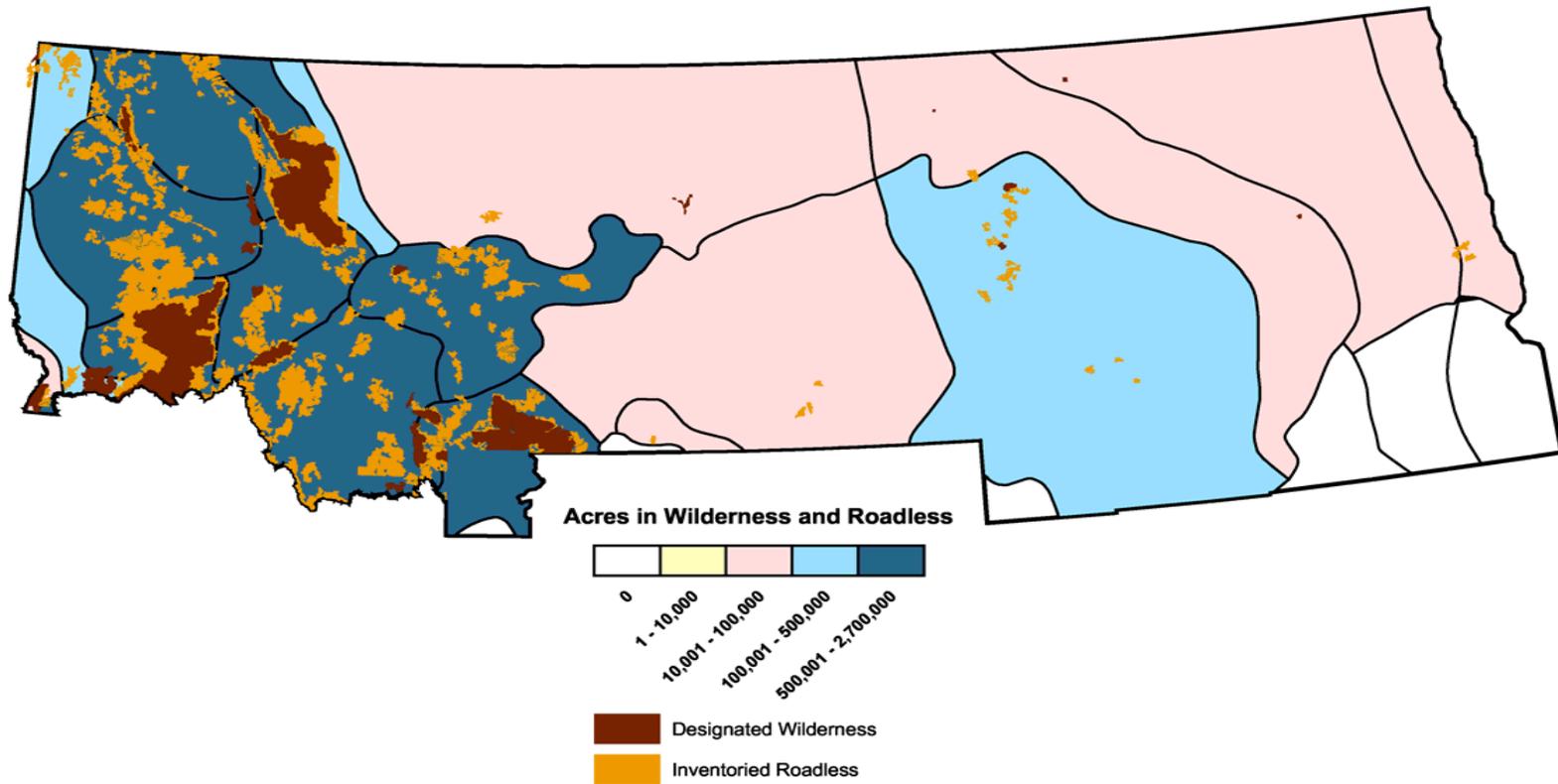
Ecological Sections in the Northern Region showing Forest Service Lands



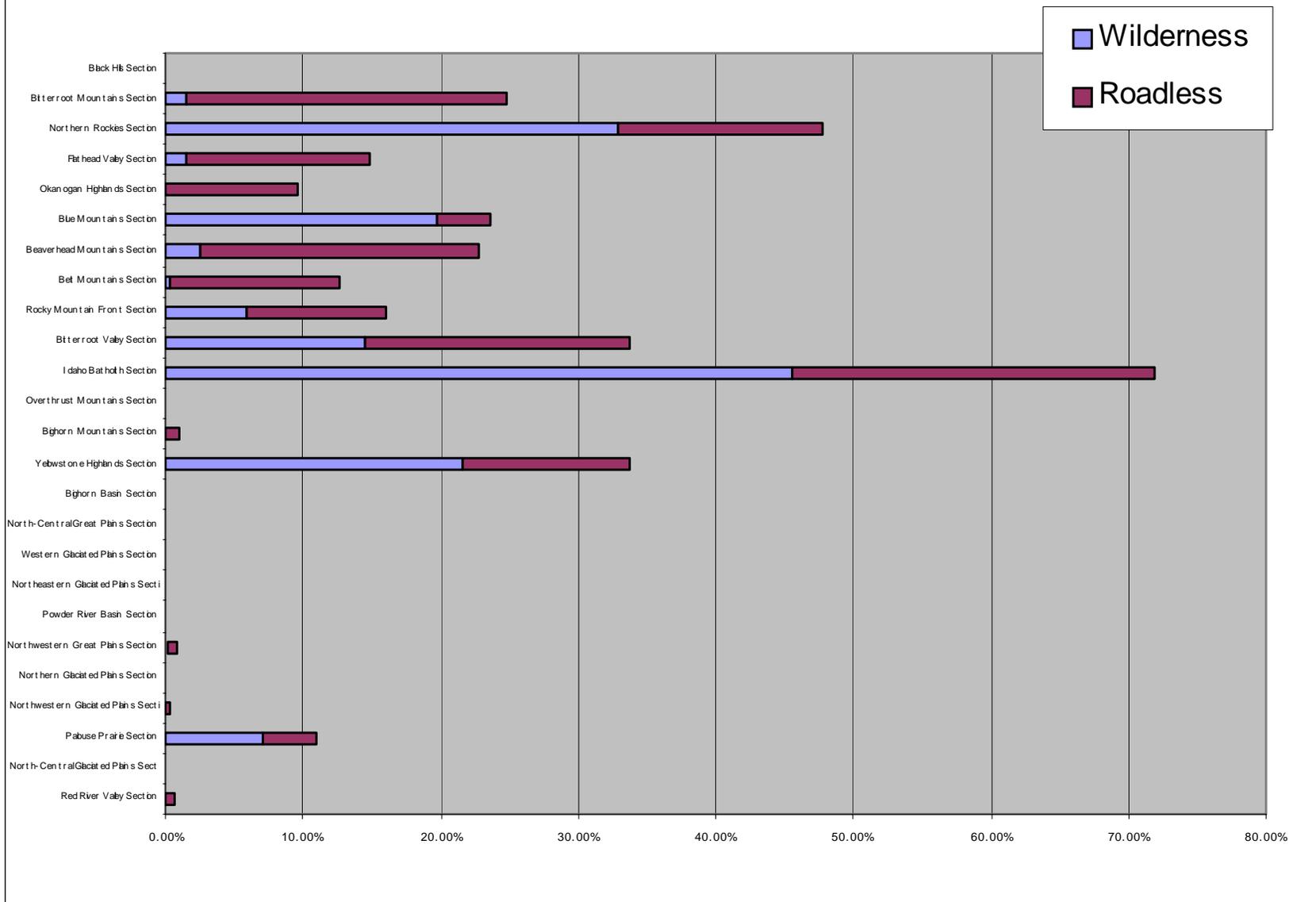
Acres of Ecological Sections within Wilderness



Acres of Ecological Sections within Wilderness and Roadless



Percent of Ecological Sections in Wilderness and Roadless



Ecological Sections acreage for lands within Region 1 Boundary

ECOCODE	Section	Total Acres	Forest Service Lands	Wilderness -		Inventoried Roadless (acres)	% of Section in Inventoried Roadless	
				% of Section in FS Ownership	all ownerships (acres)			
-251A	Red River Valley Section	5,154,815	49,268	1.0%	0	0.0%	31,481	0.6%
-251B	North-Central Glaciated Plains Sect	3,998,819	0	0.0%	0	0.0%	0	0.0%
-331A	Palouse Prairie Section	2,362,588	461,809	19.5%	166,468	7.0%	91,109	3.9%
-331D	Northwestern Glaciated Plains Secti	26,018,845	65,903	0.3%	21,628	0.1%	58,417	0.2%
-331E	Northern Glaciated Plains Section	17,227,667	113,406	0.7%	6,826	0.0%	20,331	0.1%
-331F	Northwestern Great Plains Section	28,853,774	1,355,246	4.7%	33,861	0.1%	224,816	0.8%
-331G	Powder River Basin Section	22,122,671	531,740	2.4%	0	0.0%	39,236	0.2%
-332A	Northeastern Glaciated Plains Secti	17,729,579	21,015	0.1%	5,819	0.0%	15,040	0.1%
-332B	Western Glaciated Plains Section	3,834,756	0	0.0%	0	0.0%	0	0.0%
-332D	North-Central Great Plains Section	2,765,695	0	0.0%	0	0.0%	0	0.0%
-342A	Bighorn Basin Section	274,430	46	0.0%	0	0.0%	0	0.0%
M331A	Yellowstone Highlands Section	4,852,247	1,971,948	40.6%	1,050,147	21.6%	584,105	12.0%
M331B	Bighorn Mountains Section	1,017,126	74,077	7.3%	0	0.0%	10,424	1.0%
M331D	Overthrust Mountains Section	221,954	0	0.0%	0	0.0%	0	0.0%
M332A	Idaho Batholith Section	3,714,919	3,467,822	93.3%	1,695,420	45.6%	977,205	26.3%
M332B	Bitterroot Valley Section	4,830,268	2,542,045	52.6%	701,425	14.5%	927,664	19.2%
M332C	Rocky Mountain Front Section	1,713,778	279,395	16.3%	101,299	5.9%	172,606	10.1%
M332D	Belt Mountains Section	7,812,863	1,803,128	23.1%	28,672	0.4%	957,841	12.3%
M332E	Beaverhead Mountains Section	8,321,197	2,924,759	35.1%	208,124	2.5%	1,693,283	20.3%
M332G	Blue Mountains Section	420,180	57,672	13.7%	83,226	19.8%	16,108	3.8%
M333A	Okanogan Highlands Section	1,809,159	572,310	31.6%	423	0.0%	174,013	9.6%
M333B	Flathead Valley Section	5,229,722	2,808,251	53.7%	82,891	1.6%	692,841	13.2%
M333C	Northern Rockies Section	2,644,812	1,569,124	59.3%	871,497	33.0%	390,348	14.8%
M333D	Bitterroot Mountains Section	8,196,917	4,541,661	55.4%	118,718	1.4%	1,908,531	23.3%
M334A	Black Hills Section	760,334	0	0.0%	0	0.0%	0	0.0%
	Total	181,889,115	25,210,626	13.9%	5,176,444	2.8%	8,985,399	4.9%

Social Factors

To assess the social need for additional designated wilderness in the FS Northern Region the following factors were considered: current situation; including location, distribution and use levels of existing designated wilderness, current population and recreation trends.

Designated Wilderness in the Northern Region

There are currently fifteen designated wilderness areas in the Northern Region that cover approximately 5 million acres. The distribution by forest and size of each wilderness is provided in Exhibits A and C of this document. Anecdotal information, from Wilderness managers on the forests, shows that visitation to designated wilderness in the Northern Region has increased steadily over the past 15-20 years, but the types of use have changed over the past ten years, reflecting changes in recreation uses nationally. The majority of visitation to Northern Region Wilderness used to occur in the fall for hunting. Over the past ten years, visitation has increased in the summer months and decreased in the fall. This reduction in hunting recreation has occurred nationally. Throughout the Rocky Mountain West, outfitters and guides have experienced decreases in demands for fall hunting trips and increases in demand for summer family type trips. Day hiking also has increased, particularly in those wilderness areas that are within short driving distance (less than 100 miles) from major population centers.

National and local trends in Outdoor Activities

Nationally, the number of people engaging in outdoor activities that could take place in Wilderness, specifically hiking and backpacking, grew significantly between 1982 and 1995, the number of people hiking increased 93.5 % and people backpacking increased 72.7 %. 76% of the people who backpack do so in designated wilderness. (Cordell, National Survey on Recreation and the Environment, 1994-1995). This increase in wilderness use is expected to continue throughout this century but with a shift in the type of use. As a result of a decrease in time to pursue leisure activities, day use will account for the largest increase in wilderness use by volume. It is expected that wilderness users will increasingly rely on outfitters, guides and outdoor education services to facilitate ecotourism and wilderness adventures. (William E. Hammitt and Rudy M. Schuster, "Wilderness Use in the Next 100 Years", International Journal of Wilderness, August 2000).

The following is an expanded list of activities that Americans engage in from the National Survey on Recreation and the Environment (1994-95). The survey indicates that nearly ¼ of the people interviewed participate in hiking.

Percent 16 and older participating in selected outdoor recreation by activity

Sightseeing	57%
Visiting an Historic Site	44%
Visiting a Visitor Center	35%
Wildlife Viewing	31%
Boating	29%
Fishing	29%
Camping	26%
Hiking	24%
Off-road Driving	14%
Downhill Skiing	8%
Snowmobiling	3.6%
Cross-country Skiing	3%

In Montana, a study conducted between July 1, 1998 and June 30, 1999, which involved 2,600 Montana resident households, indicated that Montanans engage in the following activities that could take place in Wilderness: Day Hiking (37% of households), Horseback Riding (15%) and Backpacking (12%), Cross Country Skiing (5%) and Snow shoeing (2%). (The Institute For Tourism and Recreation Research, University of Montana, "An Economic Review of the Nonresident Travel Industry in Montana, 2002 Edition).

The Interior Columbia River Basin Recreation Assessment, using 1987 SCORPs for Idaho and Montana, indicates that, on a local level, people participate more in off road recreation than the national survey indicated.

Highest recreation participation levels:

- Day use
- Fishing
- Trail use
- Driving for pleasure
- Camping
- ORV Use
- Non-motorized winter use

- Hunting
- Wildlife viewing
- Motorboating

Travel Trends

A Review of Nonresident Travel in Montana conducted in 2002 concluded that visitation to Montana by nonresidents increased 29.6 % between 1991 and 2001. Over 9.55 million nonresident visitors traveled to Montana in 2001, up from 9.46 million in 2000. Of Montana's 9.55 million visitors, 41 % or 3,916,000 people came to Montana primarily for vacation. Of the top ten attractions to Montana, mountains/forests ranked 4th and open space/uncrowded areas ranked 5th. 27 % of the visitors engaged in day hiking, the 3rd most popular activity of visitors to Montana. The bulk of Montana's nonresident visitors come from Washington State (12.4%) and California (7.7%), with Idaho, North Dakota and Wyoming following closely. (The Institute for Tourism and Recreation Research, University of Montana, "An Economic Review of the Nonresident Travel Industry in Montana, 2002 Edition).

Population

One of the assumptions provided in FSH 1909.12, Chapter 7 is that nationally, the demand for wilderness increases with increasing population. This section displays population statistics for Idaho, Montana and those counties with significant growth (greater than 20 %) in neighboring states. All of this data is from the National 2000 Census.

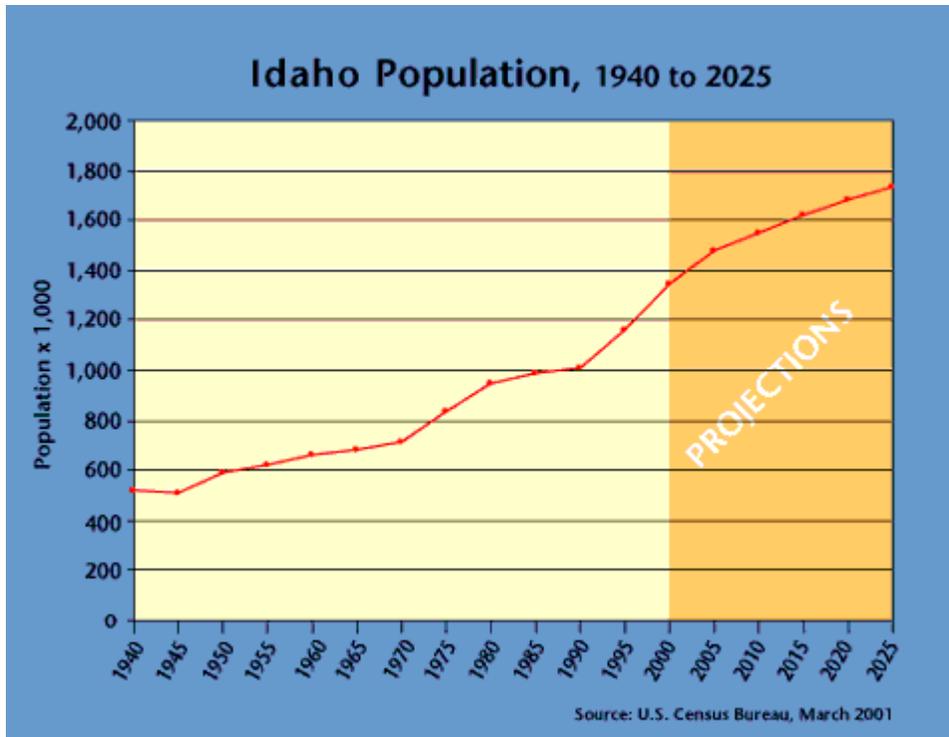
In general, population growth has increased significantly in the West throughout the 1900s. Between 1980 and 2000 growth was greatest in the States that constitute the Mountain Division (MT, ID, WY, AZ, UT, NV).

During the 1990s, areas of the western United States with large concentrations of certain types of public lands saw dramatic increases in net migration. Areas near national forests, wilderness areas, and national parks are seeing marked increases in population largely spurred by shifting migration patterns.

This increase in population has made up for the economic impacts of losses in the longstanding wood products manufacturing industry. In the Mountain Division States, wood products manufacturing's share of total area labor earnings has fallen from nearly 8 percent in 1978 to just over 3 percent in 1998, resulting from large reductions in activity and employment in this industry. While declines of this magnitude would ordinarily portend massive declines in the larger economies of areas dependent upon those industries, this hasn't happened because of the net migration.

In the 1990s, areas of the West near national forests, wilderness areas, and national parks have become increasingly attractive to new migrants, which have resulted in the economies of these areas changing dramatically. Studies indicate that migration patterns in the West are steering more and more people to areas high in environmental amenities and quality of life. (“Montana’s Regionally Diverse Economy”; Dr. Larry Swanson, O’Connor Center for the Rocky Mountain West, University of Montana, 2003).

Idaho



The 2000 census in Idaho showed state population growth of 28.5 % since 1990. The top five counties with the largest populations are:

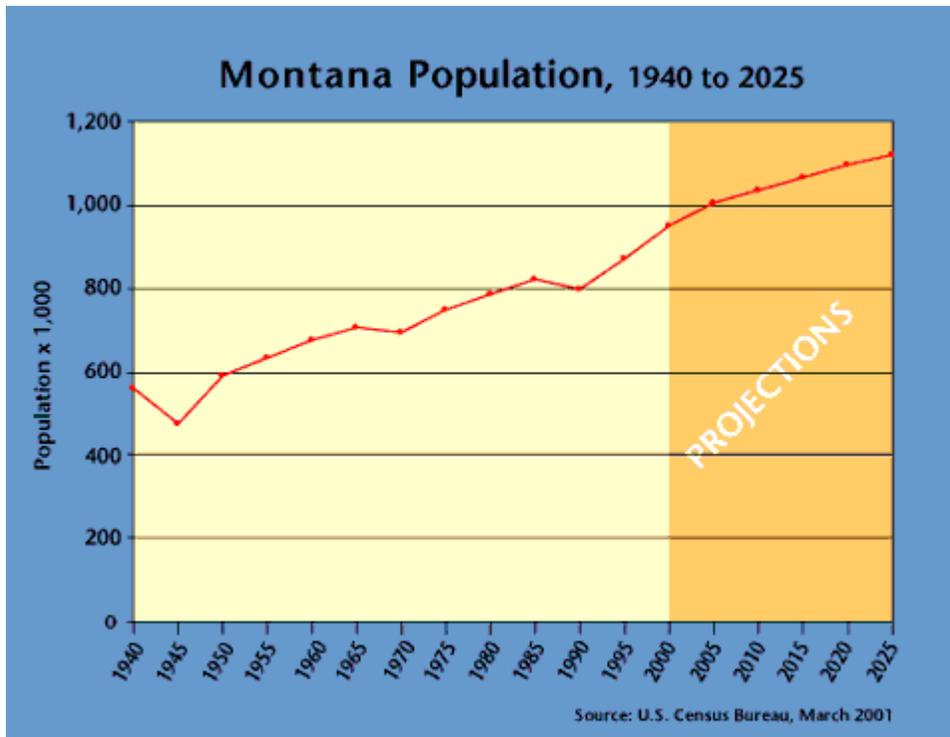
County Name	Census 2000 Population
Ada	300,904
Canyon	131,441
Kootenai	108,685
Bonneville	82,522
Bannock	75,565

Counties with the fastest growing population are:

County Name	Percent of Growth between 1990 and 2000	1990 Population	2000 Population
Boise	90.1%	3508	6670
Teton	74.4%	3439	5999
Kootenai	55.7%	69804	108685
Ada	46.2%	205816	300904
Canyon	45.9%	90089	131441
Bonner	38.4%	26614	36835

Of the six fastest growing Counties in Idaho, only two are within the Forest Service Northern Region; Bonner and Kootenai, though some of the visitation to the Northern Region National Forests is coming from those other counties.

Montana



The 2000 census in Montana showed State population increases of 12.9% since 1990.

Top five counties with the largest populations are:

County Name	Census 2000 Population
Yellowstone	129,352
Missoula	95,802
Cascade	80,357
Flathead	74,471
Gallatin	67,831

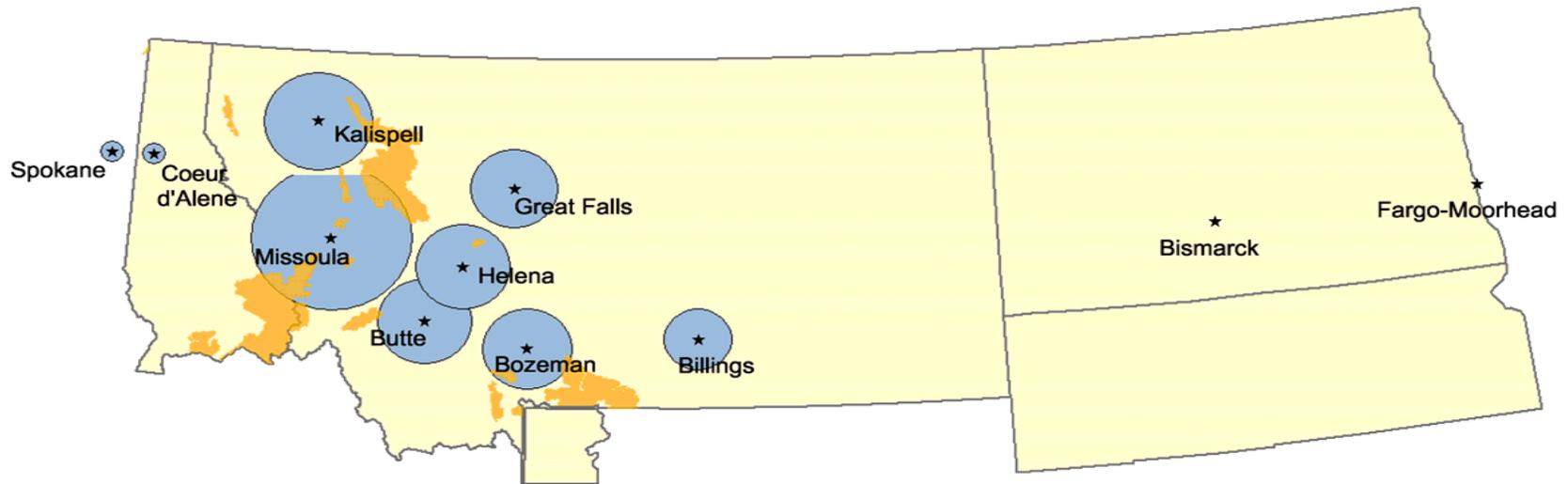
Counties with the fastest growing populations (greater than 20 %) are:

County Name	Percent of Growth between 1990 and 2000	1990 Population	2000 Population
Ravalli	44.0%	25048	36070
Gallatin	34.4%	50469	67831
Broadwater	32.2%	3316	4385
Flathead	25.8%	59197	74471
Lake	26.0%	21037	26507
Missoula	21.8%	78655	95802

The following table includes the cities in the Northern Region with the greatest population as of the 2000 census and the amount of designated wilderness within 100 miles (as the crow flies) of that city. Spokane, WA is included because of its proximity to the Idaho Panhandle NF.

Name of City	Population in 2000 Census	# of Acres of Designated Wilderness	# of Acres of Inventoried Roadless
Spokane, WA	195,629	104,148	1,262,375
Coeur d'Alene, ID	32,200	104,148	2,018,210
Billings, MT	90,500	766,399	463,355
Missoula, MT	57,500	3,309,965	4,355,872
Great Falls, MT	57,100	1,168,343	1,471,915
Butte, MT	34,900	1,292,327	3,405,438
Bozeman, MT	27,700	1,183,531	2,448,807
Helena, MT	26,000	1,286,907	2,854,456

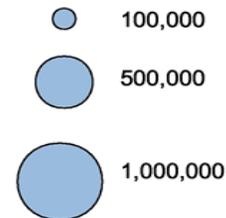
Wilderness within 100 Mile Radius of Major Cities



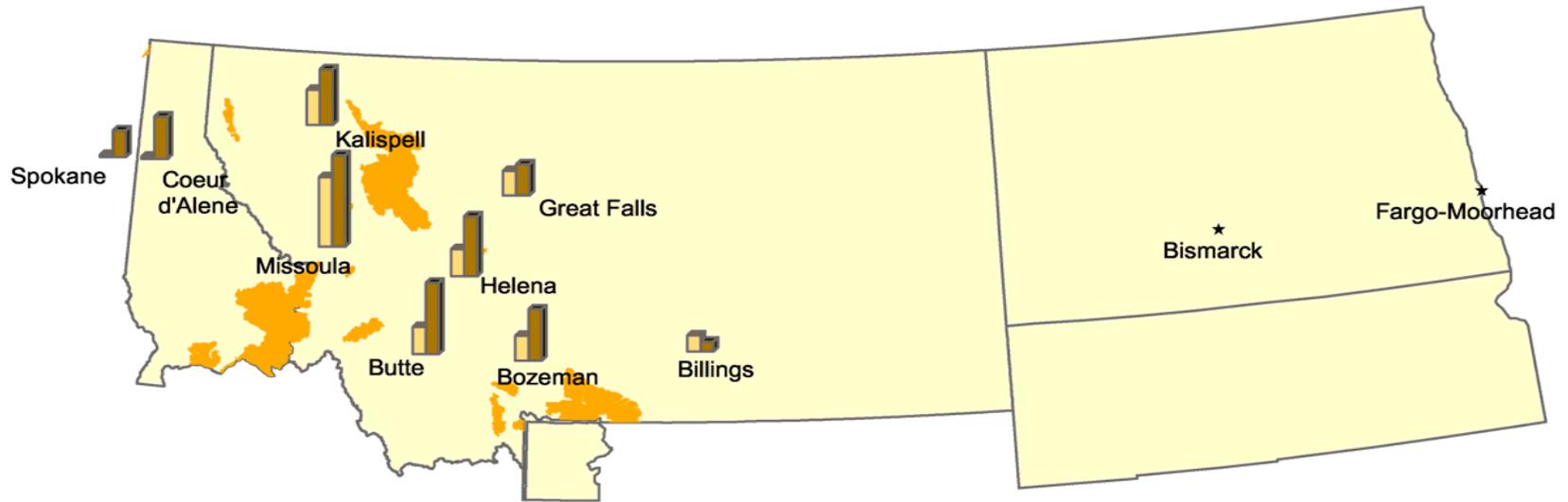
City	Wilderness Acres	Roadless Acres
Billings	766,399	463,355
Bismarck	0	5,290
Bozeman	1,183,531	2,448,807
Butte	1,292,327	3,405,438
Coeur d'Alene	104,148	2,018,210
Fargo-Moorhead	0	0
Great Falls	1,168,343	1,471,915
Helena	1,286,907	2,854,456
Kalispell	1,671,733	2,646,268
Missoula	3,309,965	4,355,872
Spokane	104,148	1,262,375

Designated Wilderness

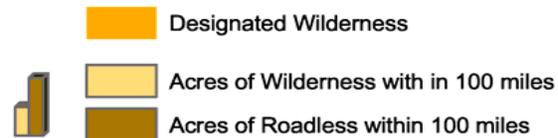
Wilderness Acres



Wilderness and Roadless Acres within 100 Mile Radius of Major Cities



City	Wilderness Acres	Roadless Acres
Billings	766,399	463,355
Bismarck	0	5,290
Bozeman	1,183,531	2,448,807
Butte	1,292,327	3,405,438
Coeur d'Alene	104,148	2,018,210
Fargo-Moorhead	0	0
Great Falls	1,168,343	1,471,915
Helena	1,286,907	2,854,456
Kalispell	1,671,733	2,646,268
Missoula	3,309,965	4,355,872
Spokane	104,148	1,262,375

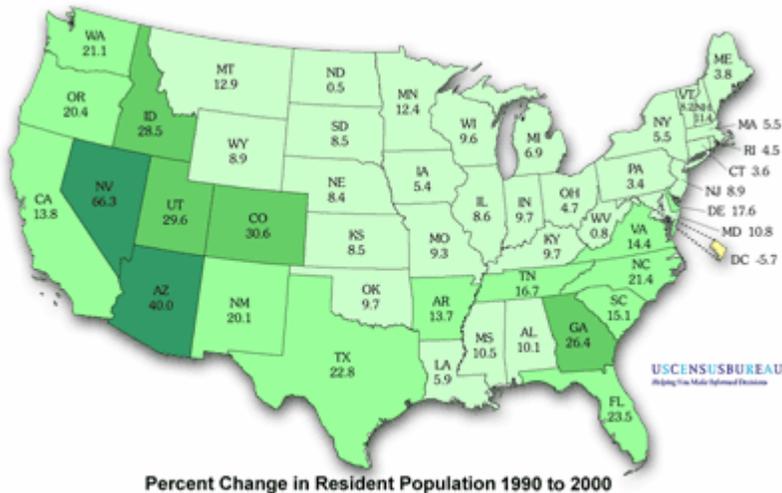


Adjacent States

There are only two counties in adjacent states with population growth greater than 20 % and those are Spokane and Pend Oreille counties in Washington State. Their population and growth percentages are displayed below.

County Name	Census 2000 Population and % of growth since 1990
Pend Oreille	12,208 / 31.6 %
Spokane	427,506 / 20 %

The map below indicates that rate of population change in the United States between 1990 and 2000.



Conclusion/Social

American's have supported and continue to support designated wilderness for the many values those areas provide to us, including the direct values of recreation and protection of wildlife, fisheries and plant communities and the more indirect values of simply knowing these wildlands are legislatively protected for future generations.

Areas of the West near National Forests, wilderness areas, and national parks have become increasingly attractive to new migrants. Studies indicate that migration patterns in the West are steering more and more people to areas high in environmental amenities and quality of life. These studies are affirmed by the population census in Montana and Idaho which show rapidly growing population in counties with National Forests.

Though the Northern Region has nearly 5 million acres of designated wilderness, most of that acreage is in three areas; Bob Marshall Complex, Abaroka-Beartooth and Selway-Bitterroot. The designated wilderness is not well distributed across the region and in fact, some of the areas with the highest and most rapidly growing populations, have no, or very little, designated wilderness.

Two of the fastest growing counties in Idaho; Kootenai and Bonner have less than 10,000 acres of designated wilderness within 200 miles of those counties, though there is a significant amount of National Forest land. The same is true in Montana, where two of the fastest growing counties, Broadwater and Lake have less than 10,000 acres of designated wilderness. Based on the assumption that demands for wilderness increases with an increasing population, we can assume that demand for wilderness is increasing in those four counties. Forests in these counties with rapidly growing populations, should look for opportunities to recommend inventoried roadless for wilderness designation.

Research shows that American's that engage in outdoor activities are seeking opportunities for day hikes. Typically visitors prefer to day hike to a destination; waterfall, lake, scenic vista or unique feature. Many of our designated wilderness areas, because of size, do not offer those destinations that can be reached within a reasonable day hike distance. Those Forests near population centers in Montana and Idaho, that do provide that opportunity, have seen increases in day use on trails over the past ten years. These forests and others that are located near population centers should continue to consider this need for non-motorized hiking trails as they complete their wilderness assessments. Though wilderness is not the only way to provide non-motorized trail opportunities, it is a common way to legislatively provide insurance that those trails will remain non-motorized into the future.

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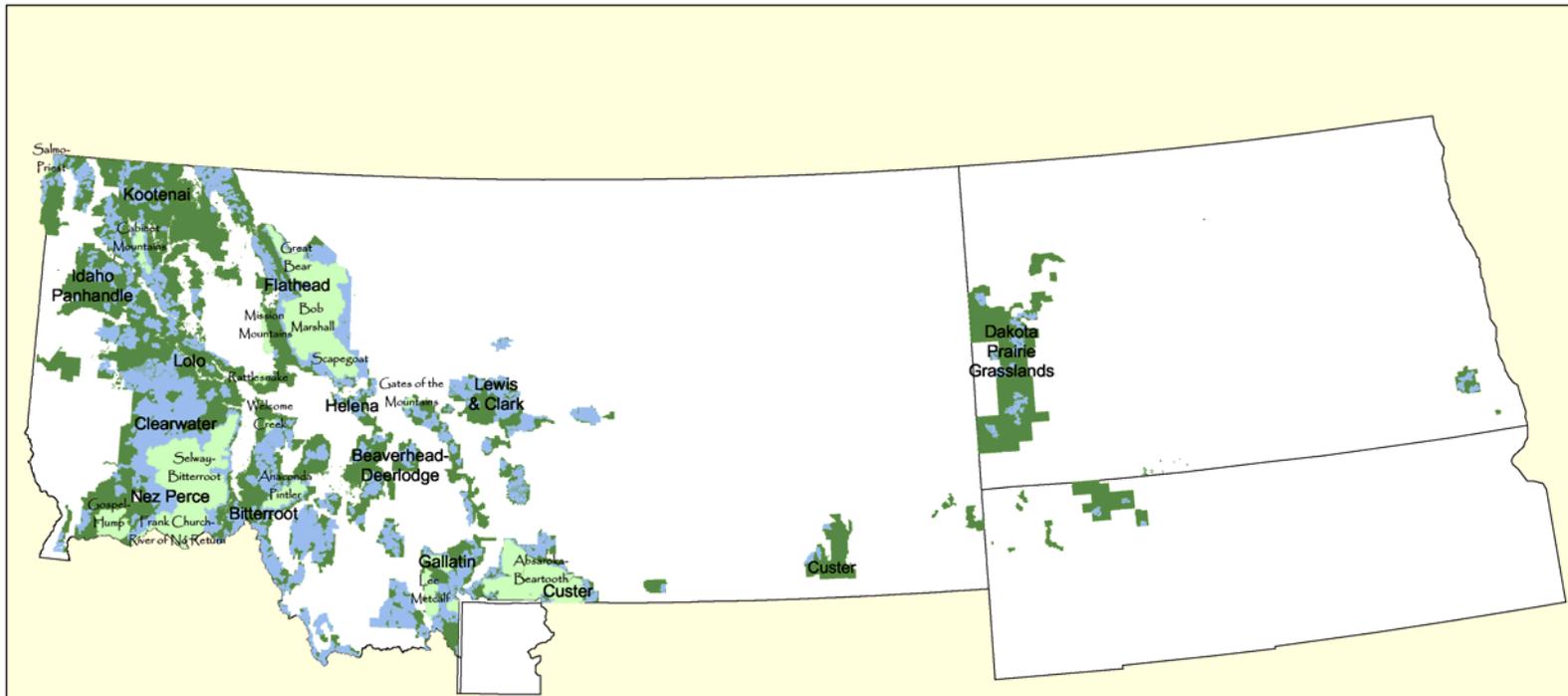
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*Wilderness, roadless and NFS lands
in Region One*

-  Region One
-  NFS lands
-  Roadless
-  Wilderness

