# III. Gap Between Existing and Desired Condition

## *Soils and Geology*

Chemical water quality sampling, BMI and periphyton sampling, riparian assessment and field evaluations of road condition by both the USFS and KirK Environmental (2003) indicates that State of Montana water quality standards, soil loss and sediment delivery are not meeting FP (1987) DFCs in several areas of the landscape.

Specifically, table IIA-1 shows that water quality chemistry in the mid-1990's was less than the desired condition at several abandoned mine locations, including in the vicinity of DEQ priority abandoned mines. BMI data also indicates sediment impacts to streams from roads and cattle grazing of riparian vegetation. The BMI data and field review indicates there are instances of soil loss and delivery to streams and channel structure not meeting FP (1987) and FSP DFCs. This is confirmed in the various riparian assessments which indicate widespread loss of riparian function and in the Rosgen data which indicate that certain riparian areas and stream channels are outside of their potential stream morphology and potential ability to sustain flood waters.

## *Watershed Health and Aquatic Habitats*

Chemical water quality sampling, BMI and periphyton sampling indicate that certain streams are not meeting FP (1987) DFC goals for meeting State of Montana water quality standards and that aquatic ecosystem health is impaired. Water quality in certain areas is impacted by abandoned mine drainage (table IIA-1). Additionally, observations of road sedimentation, BMI and periphyton assessments, and the riparian assessments suggest that State of Montana narrative water quality standards for sediment are exceeded, notably in Dry Cottonwood Creek and Perkins Gulch. The BMI assessment indicates thermal impairment of reaches of Cottonwood, Orofino, Dry Cottonwood, and Perkins Gulch Creeks.

FP (1987) DFCs call for all damaged riparian areas to be restored by 2000. The Hansen riparian assessment indicates that only 19% of the assessed stream reaches on National Forest land are in proper functioning condition (appendix 4). Degraded riparian condition is currently affecting water quality, stream channel integrity, sediment delivery, aquatic habitat, riparian vegetation health and stream shading among other factors. Major causes of riparian degradation include grazing practices, road-stream encroachment, culverts, competition between native riparian vegetation and noxious weeds, and past mining.

Four of the five sub-watersheds in the landscape have a high road density (2.3-2.8 miles/sq. mile on USFS lands). The amount of roads within 300' of streams is also substantial indicating the likelihood that travel management and roads are leading to water quality and habitat degradation.

The future of native westslope cutthroat trout populations is uncertain where non-native species are present (table IIB-7) and where habitat is degraded. In the case of Dry Cottonwood Creek, westslope cutthroats are hybridized with introduced Yellowstone cutthroat (table IIB-8). All of the inventoried culverts for which fish passage has been evaluated fail to provide passage to either juvenile or adult lifestages causing westslope cutthroat trout habitat to be much more fragmented than its potential.

Water quality and habitat degradation in the Upper Clark Fork River and in the lower reaches of larger streams in the landscape greatly limits bull trout use of potential habitat and refugia and their ability to migrate within the river. Lower Cottonwood and Peterson Creeks are chronically dewatered which adds to habitat limitations and thermal impairment issues in these streams and in the Clark Fork River.

## Vegetation

Noxious weeds including spotted knapweed and leafy spurge are present on BDNF lands within the landscape both in large patches and dispersed along transportation corridors (figures IIC-8 and IIC-9). FP (1987) DFCs for range are that noxious weed control will be emphasized. FSP DFCs for noxious weeds are to eliminate the expansion of weed infested areas and eventually to reduce existing weed occurrence.

Specific riparian reaches on the BDNF lands in the landscape were non-functioning when most recently assessed in 2002 (figure IIB-3 and appendix 4). FP (1987) DFCs call for all riparian areas on the BDNF to be functioning by 2000. Grazing will continue to require adaptative management to ensure that riparian condition goals are met.

Photo: Loss of riparian/stream habitat and channel morphological issues from cattle grazing on an unfenced inholding, Dry Cottonwood allotment, Orofino Creek.

FP (1987) DFCs call for returning grassland, sagebrush, and Douglas fir areas using prescribed burning and restoring the natural openings that were present before conifer encroachment. FP (1987) DFCs also call for restoring all rangeland to good-to-excellent condition by the fifth decade. Fire suppression has resulted in conifer encroachment of natural grass and shrub lands and perturbation of grass, forb, and shrub species composition away from fire adapted types. Much of the formerly open Douglas fir stands are dense and multistoried due to fire suppression. FRCC data indicate approximately half of the BDNF managed land within the landscape in FRCC II and III suggesting that forests are more storied and fuel loads higher than under the RNV. This indicates that forest stands that have grown denser, more storied, or with higher fuel loads. This state of vegetation is also not meeting FP (1987) DFCs which call for beetle proofing lodgepole pine stands and harvesting ahead of beetle epidemics.

FSP DFCs envision a restored vegetative composition, structure, and function reflecting natural effects of plant succession, climate, fire, insects and disease landscape-wide. For forest vegetation, these DFCs are based on the RNV which describes the range of conditions that the forest would experience under natural disturbance and succession. For this purpose, DFCs for forest vegetation use the RNV determined in the analysis of historical vegetation studies and SIMPLLE modeling results in section IIC-2.

The widespread timber harvest that fueled smelting operations and provided mine framing timbers in Anaconda and Butte followed by the exclusion of fire over the last century has lead to forest size class distribution that is outside of the RNV. Table III-1 presents the gap between existing condition and the RNV for conifer forest stand size class by forest type. In table III-1, the RNV for size class distribution provides targets for restoration of forest vegetation to reflect the affects of natural disturbance and succession.

RNV acres depicted in table III-1 incorporate the full range of values (modeled and from the historic studies) for percent occurrence of the various size class groups in figures IIC-11, IIC-12, and IIC-13. In the table, the column ‘RNV source’ indicates how the RNV was established given values provided by modeling and historic studies.

Table III-1 indicates that there is an overabundance of pole sized Douglas fir forest type. Mature Douglas fir is near the low end of RNV. The existing condition of the lodgepole forest type is also concentrated in the pole size class in dense stands that are susceptible to mountain pine beetle. Lodgepole pine forest type seedling/sapling size class is within the modeled RNV (near the low end). However, the historic vegetation studies suggest that lodgepole pine seedling/sapling may be below the RNV. The subalpine fir forest type potentially has a lack of mature size stands and similar to the other conifer forest types, there may be an overabundance of pole sized subalpine fir forest. The existing condition of the subalpine fir forest type is considered uncertain because it represents less than 1% of the landscape and at that scale the remotely sensed data is subject to higher statistical error. Aspen communities are in decline and lack age class diversity due to absence of natural disturbances, mainly fire. Objectives for Situation A aspen stands in the 1998 Forest Monitoring and Evaluation Report (BDNF, 1998) call for maintaining current levels of aspen as a minimum by maintaining existing stems on site and protection of the stands.

**Table III-1: Forest size class gap between existing condition and RNV.**

| Forest Type | Size Class | Existing Condition Acres (SILC3) | RNV Acres Low | RNV Acres High | RNV source | Gap Between EC and RNV Low | Gap Between EC and RNV High |
|---|---|---|---|---|---|---|---|
| Douglas Fir | Seedling/sapling | 1,030 | 462 | 1,789 | Low - model; high - historic Beaverhead-Jefferson. | -568 | 759 |
| | Pole | 2,940 | 346 | 2,193 | Low - model; high - historic Beaverhead-Jefferson. | -2,594 | -747 |
| | 9"+ | 1,802 | 1,847 | 4,791 | Low - historic Beaverhead-Jefferson; high - model. | 45 | 2,989 |
| | *Total* | *5,772* | | | | | |
| Lodgepole Pine | Seedling/sapling | 5,649 | 4,225 | 13,731 | Low - model; high - historic Big Hole. | -1,424 | 8,082 |
| | Pole | 15,406 | 4,225 | 11,355 | Low - model; high - historic Clark Fork and Central MT. | -11,181 | -4,051 |
| | 9"+ | 5,351 | 2,377 | 15,051 | Low - historic Big Hole; high - model. | -2,974 | 9,700 |
| | *Total* | *26,406* | | | | | |
| Subalpine Fir | Seedling/sapling | 233 | 0 | 317 | Low - historic Clark Fork; high - model. | -233 | 84 |
| | Pole | 539 | 19 | 391 | Low - model; high - historic Big Hole. | -520 | -148 |
| | 9"+ | 159 | 419 | 829 | Low - model; high - model. | 260 | 670 |
| | *Total* | *931* | | | | | |

## Wildlife

FP (1987) DFCs call for maintaining habitat for current wildlife populations and to increase big game habitat capacity above 1980 levels. FSP DFCs for wildlife call for providing a natural diversity of habitats. The health and diversity of terrestrial habitat is closely tied to the health of the plant communities which comprise them. Fire suppression in forests, grasslands, and shrublands has reduced habitat diversity within the landscape. Departure from natural fire regimes has reduced the amount of habitat available to species which favor early through mid-seral vegetation, which are reliant on habitat and conditions available in burnt forest, and which use open single storied forest.

Riparian health is not meeting FP (1987) DFCs with many reaches in nonfunctioning and functioning at risk condition. The existing condition of riparian areas may have shifted riparian dependent wildlife assemblages towards species which are more compatible with the anthropogenic disturbance affecting riparian areas.

FP (1987) DFCs for recreation state that Hunting Recreation Opportunity will be managed to meet the objectives in Appendix N by controlling the amount of hiding cover removed and the amount of road access. Table IID-1 shows that road density in HROGA #16 Spring-Emery are exceeding FP (1987) objectives. Minimum elk hiding cover meets FP (1987) objectives but is at or very near the objectives in the cases of HROGA #15 and #17. Elk effective cover meets objectives and FP (1987) standards in all cases. FWP records indicate that elk security is a concern in some portions of HD 215 which includes the landscape and low bull numbers reflect this. The overall bull to cow ratio in HD 215 was reported as 5:100 in 2004 and 6:100 in 2006. The FWP population objective is 10:100. Harvest of bull elk by the end of the first week of the general season is exceeding the 40% maximum objective at the EMU scale. The average of 46% in HD 215 is the highest in the EMU indicating that bull harvest rates could be reduced in this HD to meet FWP objectives.

Since adoption of the FP (1987), RMEF (1999) has delineated elk range state-wide. Within the landscape, areas identified as crucial winter range are different than C1 management areas (big game winter range). In other areas of the state, FWP has updated the RMEF delineation based on specific data. Elk winter range within the landscape needs this same evaluation.

Areas managed as winter-motorized in the current travel plan are coincident with C1 management areas. C1 management areas (big game winter range) in Baggs Creek, Dry Cottonwood Creek north of road #85 and #5175, and Sand Creek, Perkins Gulch, and Girard Gulch are area designation 7 (winter-motorized) in the current travel map (revised 2003). The FP (1987) C1 management standards "permit motorized vehicles use during big game wintering periods (generally December 1 to May 15) only on roads needed to access adjacent management areas."

When inventoried as part of the recent Forest Plan revision process, the Upper Clark Fork landscape adjacent to the EDLV contained the lowest snag density on the BDNF due to historical logging. Data presented in the discussion of the existing condition of forest stands indicates that the EDLV landscape saw similar large-scale clear-cutting around the turn of the 20$^{th}$ century. This historical timber harvest as well as a lack of forest fire since fire suppression efforts began suggests that snag density may be reduced in the landscape. The recent mountain pine beetle epidemic has killed many pole size and larger lodgepole pine trees, potentially greatly increasing snag density in the landscape. Recently burned forest is below the RNV in the landscape which may affect species requiring this habitat such as black-backed woodpecker. However, as described under the black-backed woodpecker existing condition in the R1 Sensitive Species discussion in section IID-1, recently burned forest habitat is not limited at the regional scale for species capable of dispersing to recently burned areas.

The increased density and understory growth of Douglas fir forest type in the landscape has reduced potential flammulated owl habitat below the RNV. FP (1987) DFCs call for burning Douglas-fir on a 20-year interval to improve wildlife habitat.

The decline in aspen communities may be negatively affecting species which show a preference for aspen stands, such as red-naped sapsuckers *(Sphyrapicus nuchalis)* and warbling vireo *(Vireo gilvus)*.

FP (1987) goals call for contributing to the longevity of any threatened or endangered species by conducting management activities to prevent mortality. Grizzly bear habitat in the landscape is negatively affected by high open road densities and by the predominance of motorized recreational settings. Additionally, no winter non-motorized area exists. There is increasing conflict between winter motorized use and winter habitat and denning needs for grizzly, lynx, and wolverine.

Western boreal toads which have been observed in recent years on private lands in the landscape adjacent to the BDNF are a R1 sensitive species. FP (1987) DFCs call for providing habitat security needed to sustain the viability of sensitive species indicating the need to provide protection for boreal toad habitat.

## *Cultural Resources and Human Uses*

FP (1987) DFCs call for cultural resources to be inventoried, evaluated, and protected and significant cultural resources to be interpreted when protection can be assured. Additional field visits and data gathering are necessary to bring many of the cultural site inventories up to current standards and make them comparable to current archaeological research. Once systematic archaeological inventories have been completed over the landscape, site protection, enhancement, interpretation, and evaluation for listing with the National Register of Historic Places or for public information display is needed.

FP (1987) DFCs call for travel management of roads, trails, areas, and lakes to be determined through the travel management planning process and displayed on the Forest Travel Map in conformance with the direction of the FP (1987). A revised and corrected travel map needs to be made available to the public. C1 management areas (big game winter range) in Baggs Creek, Dry Cottonwood Creek north of road #85 and #5175, and Sand Creek, Perkins Gulch, and Girard Gulch are area designation 7 (winter-motorized) in the current travel map (revised 2003). The FP (1987) C1 standards call for motorized access only on roads needed to access adjacent management areas. There is an additional need to verify that crucial winter range is correctly identified. Currently, winter range mapping provided jointly by RMEF and FWP is not consistent with areas delineated as C1 management.

The public opinion survey performed by the BDNF in 1998 as part of the Clark Fork-Flints LA indicated that the local public is generally satisfied with the way that recreation is managed within the larger Upper Clark Fork River area. However, more recently, members of the public have expressed a desire for enforcement of summer non-motorized recreational settings and the addition of a component of winter non-motorized recreation setting to the Electric Peak IRA. FP (1987) DFCs call for providing adequate areas for quality motorized and nonmotorized recreation and a wide variety of suitable recreation experiences.

The USDA (1985) DFC for the CDNST would be to have a non-motorized trail meeting Trail Class 3 standards that is in proximity to the Continental Divide and separated from the sounds and evidence of motorized use to the extent possible. The CDNST is currently a mix of motorized and non-motorized travel in the landscape.

# IV. Management Opportunities

The purpose of identifying management opportunities is to achieve a desired condition. The comparison of existing condition with the goals, objectives, and desired condition in the previous section presents resource areas where a management opportunity can be developed to move the existing condition closer to the desired condition. More than one management practice can be identified to accomplish a desired condition goal. And in another instance, one management option will aid in accomplishing more than one DFC.

In certain instances more information is needed to make decisions on alternative management approaches or the exact location where a treatment should be prioritized. In other instances the existing condition is not well known because of time passed since assessments were made, management changes since assessment, and the rapid deterioration of forest health due to drought and insect infestation in the past decade. The opportunities therefore include additional inventory, monitoring, and analysis in addition or in conjunction with project implementation. NEPA assessment has not been completed on many of these opportunities and the NEPA phase of project development is the appropriate time to consider additional analysis needs. This additional background analysis will help to guide management practices to achieve a desired condition.

Management opportunities and approaches are shown in table IV-1. The table identifies project locations where existing data is sufficient to identify the need. The opportunities listed in this table are described in further detail below.

## *Soils and Geology*

Opportunities to move towards FP (1987) DFCs for soils and geology address stream water quality as related to abandoned mines, sediment delivery, and stream morphology. Specific abandoned mine sites (table IIA-1) are contributing to water quality problems. There is an opportunity to monitor and remediate these sites as part of larger watershed health restoration goals. Mine sites in the Middle and North Fork Cottonwood should be prioritized for monitoring and evaluation of remediation options.

Re-establishing functioning riparian zones as well as preventing road sedimentation issues will be critical to meeting FP (1987) DFCs for soil, water quality, and riparian functioning. Locations of projects for road sediment proofing and riparian restoration were identified based on USFS field inventories, discussion of stream impairments in KirK Environmental (2003), and querying the Hansen riparian assessment database for sediment impacts as described under Riparian Health in section IIB-1.

The riparian assessment breakdown for sediment delivery impacts (figure IIB-6 and appendix 4) indicates 2.2 miles of stream riparian areas on the BDNF where sediment delivery impacts are severe and metrics score less than 33%. There is an opportunity to adjust grazing practices and reengineer and sediment proof roads in the area of these streams in Peterson, Orofino, Dry Cottonwood, and Perkins Gulch drainages. In addition to the Hansen assessment, Dry Cottonwood and Perkins Gulch have been identified as serious sediment sources to streams in field inventories. Perkins Gulch, Dry Cottonwood, and Peterson Creek are identified as supporting westslope cutthroat trout conservation populations (MCTSC, 2007) and Orofino Creek contains genetically pure westslope cutthroat. The sediment impacts to these watershed places these westslope cutthroat populations at increased risk. Streams with westslope cutthroat conservation populations should be prioritized for sediment reduction and riparian restoration. There is an opportunity to coordinate replacement of culverts #913 and #914 in Perkins Gulch and #732, 755, 729 in Dry Cottonwood Creek with road sediment proofing. There is an opportunity to remove culvert #516 on Jack Creek in conjunction with obliteration of road #19870 in the Peterson Creek drainage.

There is also an opportunity to perform field inventories of soils where soil loss and erosion are occurring. Soils developed in weathered granite in areas south of Peterson Creek are especially prone to erosion and should be prioritized for field review.

### *Watershed Health and Aquatic Habitats*

All riparian reaches assessed using the Hansen method are tabulated in appendix 4. On the BDNF in the landscape the Hansen assessment identified 7.8 miles of streams that are functional at risk and 4.4 miles that are nonfunctional. Riparian reaches evaluated using the PFC method are tabulated in table IIB-4. The PFC assessment identified an additional 0.3 miles of the Middle Fork of Cottonwood Creek and 0.3 miles of Perkins Gulch which are nonfunctional.

On the BDNF in the landscape, there are riparian reaches in Dry Cottonwood that score non-functioning that contain westslope cutthroat conservation populations (MCTSC, 2007). Headwater reaches of Peterson Creek and Perkins Gulch which hold non-introgressed westslope cutthroat conservation populations also score non-functioning. Orofino, which was not delineated as a conservation population but which has been determined to have non-introgressed westslope cutthroat also has a non-functioning reach on the BDNF. There is an opportunity to restore these non-functioning reaches to protect these high value fisheries (appendix 4). Additionally, there is an opportunity to assess whether Orofino westslope cutthroat should be a designated conservation population and prioritize Orofino Creek for riparian restoration and mining remediation if that population is designated.

Improvement of riparian areas may entail adjusting grazing practices, riparian fencing, reestablishing healthy woody vegetation, road and trail obliteration or closing, road runoff control, noxious weed control, or other management changes. Available data indicates that riparian improvement should be focused on improving grazing impacts and road encroachment of stream and resulting sedimentation. Areas that are affected by past placer mining will take a great deal of time for natural processes to recover and would benefit from active restoration techniques.

An area of the North Fork of Cottonwood Creek is identified in habitat surveys as having active erosion from bank trampling where livestock congregate due to accessibility from the road. As a result, stream habitat conditions are rated as poor. This area should be evaluated for riparian fencing or other mitigation measures.

The riparian assessment breakdown for invasive weed impacts (figure IIB-4 and appendix 4) indicates 1.2 miles of stream riparian areas on the BDNF where weed impacts are severe and metrics score less than 33%. There is an opportunity to emphasize weed control in these areas of Perkins Gulch, Girard Gulch, and lower Dry Cottonwood Creek.

The riparian assessment breakdown for grazing impacts (figure IIB-5 and appendix 4) indicates 8.4 miles of stream riparian areas on the BDNF where grazing impacts are severe and metrics score less than 33%. In these areas, AMPs need to be revised or amended or grazing management changed to provide for better management of riparian areas in Peterson, Orofino, Dry Cottonwood, Perkins Gulch, and Girard Gulch drainages. Specifically, there are 1.9 miles of stream in the headwaters of Peterson Creek on the Indian Creek allotment (Jefferson RD) that are functioning-at-risk and nonfunctioning that show severe grazing impacts. These headwaters feed into Peterson Creek which is a westslope cutthroat conservation population with pure genetics where populations are significantly below potential (MCTSC, 2007). Addressing these allotments is critical to meeting FP (1987) and INFISH objectives.

The riparian assessment breakdown for sediment impacts is discussed above under soils and geology opportunities.

Thermal impairments identified in the BMI survey are shown in table IIB-10. The results of the BMI bioassessment indicate possible mild thermal impairment on the BDNF at Perkins Gulch site PG4. Additionally, Orofino Creek site O3 which is located within a patented mining inholding shows thermal impairment in the BMI assemblage. The riparian breakdown for grazing impacts indicates that the stream riparian zone on the BDNF above site O3 is severely impacted. Probable cause of thermal impairment in both cases is degraded riparian condition. There is an opportunity to eliminate thermal impairment due to riparian vegetation loss or channel alteration by targeting restoration of riparian vegetation in these areas.

There is an opportunity to evaluate reference conditions in the landscape for TSS, streambed substrate particle size, and stream channel morphology.

There are opportunities to improve westslope cutthroat trout habitat in streams containing conservation populations. Meeting riparian DFCs would greatly help channel conditions, water quality, stream shading, and habitat complexity. In addition to meeting riparian DFCs, opportunities for westslope cutthroat habitat improvement that improve the spatial complexity of habitat need to be pursued to increase the resilience of conservation populations.

There are opportunities to reduce road density in the various watersheds in the landscape. Existing data provided in the bull trout habitat assessment in the Upper Clark Fork Section 7 Watershed Baseline Report (Brammer et al., 2000) of watershed road density and roads near streams are based on geographic information system (GIS) analysis and contain errors due to spatial accuracy of data. Therefore it is difficult using that data to accurately target watersheds where road density is high for road obliteration. Reducing road density can be accomplished by obliterating or closing unnecessary roads; priority should be given to removing roads which encroach on streams. There is an opportunity to obliterate road #19870 in the Peterson Creek drainage (and remove culvert #516 on Jack Creek). Road #19870 currently dead ends 100 yards after the culvert in an old timber harvest. Additional unnecessary and problem roads may be identified during NEPA scoping. Roads that are necessary to keep open and which have sediment issues affecting streams with westslope cutthroat conservation populations can be targeted for sediment proofing. INFISH (USDA, 1995) contains standards for roads management which should be applied to these locations.

Culverts on National Forest roads in the landscape prevent fish passage, fragment habitat, and increase demographic risks for westslope cutthroat. There are opportunities to replace old culverts to provide fish passage where westslope cutthroat are not at risk of introgression. The genetic data and culverts which are identified as barriers in table IIB-9 should be used for determining locations for culvert replacement. Additional genetic testing and/or evaluation of the ability of downstream fish passage barriers to protect non-introgressed westslope cutthroat may need to be pursued prior to culvert replacement or as part of NEPA. INFISH and the Cutthroat Trout Conservation Agreement (MCTSC, 2007) contain standards and guidance for improving fish passage for westslope cutthroat.

The Clark Fork River within the landscape is designated critical habitat for bull trout (FWS, 2002). Emphasis in the Upper Clark Fork Recovery Unit is place on restoring connectivity between isolated bull trout populations. Currently, connectivity of isolated bull trout populations in the Upper Clark Fork is limited by water quality in the Clark Fork River, among other factors. Federal CERCLA Superfund cleanup on the Clark Fork River will help to improve chemical and thermal water quality and habitat in the Clark Fork. There is an opportunity for the BDNF to manage streams in the landscape to provide a clean source of water tributary to the Clark Fork River. Riparian and road sediment opportunities identified above will aid in improving sediment, nutrient, and temperature of water tributary to the Clark Fork River. Cottonwood and Peterson Creek both have dewatering issues on private lands below the BDNF. There is also an opportunity for citizen groups to pursue water leasing in these drainages or for water leasing options in conjunction with forest stewardship contracting to be evaluated. Increasing instream flow is necessary to improve water quality in tributaries and to augment flows in the Clark Fork River for bull trout. Instream flows can be increased by working with landowners to finance off-stream water, irrigation efficiency improvements, water diversion improvements, or water leasing.

## Vegetation

Riparian mitigation measures have been in service on allotments in the landscape for a decade. However, riparian areas are not meeting FP (1987) or INFISH DFCs. Riparian vegetation restoration measures are discussed under watershed health and aquatic habitats in the previous section.

There is an opportunity to map old growth lodgepole pine, Douglas fir, Engelmann spruce and whitebark pine stands. To ensure the perpetuation of old growth, younger aged stands of these species should be selectively managed to replace existing old growth as disturbance eliminates older stands. To date, the old growth component of the forest has been calculated by extrapolating FIA plot statistics. The FIA data indicates that old growth makes up approximately 13-27% of the forest vegetation in the larger Clark Fork-Flints landscape suggesting that old growth not limited at this large scale. Mapping old growth specific to the landscape will help to assess where this habitat type occurs as well as the size and continuity of old growth stands; both characteristics are useful for habitat management and meeting FP (1987) standards for individual timber compartments.

Prescribed burning targets (acres per decade by fire regime group) are provided in table IIC-10B. Burn unit fire regime group acreage is provided in appendix 6. The table and appendix should be used to work towards meeting decadal vegetative treatments by burning in designated burn units. Although much of the vegetation in the landscape has missed several fire cycles, the burn targets provided are useful for long range planning. Due to the departure of existing vegetation from natural fire regime condition, prescribed fire may need to be applied to a greater portion of the landscape in the initial stages of this focused burning program than indicated in the burn targets. This will be possible if budgets are sufficient and other factors such as wildlife and watershed impacts can be addressed. The opportunities presented here use the upper end of the range of acres in the decadal burn targets as a realistic objective over the first decade of project implementation. Opportunities for meeting burning targets may also be coordinated with treatments to restore vegetation size class and structure to RNV as described under the discussion of forest vegetation treatment below. Fuels reduction and other fire hazard mitigation burning should consider priority areas identified in the Anaconda-Deer Lodge County and Powell County CWPP (figure IIC-7). Air quality as it relates to prescribed fire is discussed in section IIC-1.

Key to range health will be reintroducing fire into the native grasslands and shrublands in management areas where prescribed fire is allowed per the FP (1987) and Fire Action Management Plan. There is an opportunity to conduct additional rangeland ecosystem burns at regular intervals to maintain and improve the diversity of rangeland seral stages and to halt conifer encroachment of native grasslands and shrublands. In the 1990’s approximately 395 acres of rangeland in burn unit #9 saw prescribed fire in the North Fork Dry Cottonwood Creek. There is an opportunity to evaluate rangeland and shrubland condition in that project to determine the efficacy of the treatment used and noxious weed concerns.

**Table IV-2 Fire regime group acres in all burn units.**

| Fire regime group | Acres |
|---|---|
| I | 363 |
| II | 382 |
| III | 9,066 |
| IV | 2,850 |
| V | 333 |

See table IIC-10B for fire group explanation.

There is an opportunity to address conifer encroachment in burn units where conifer encroachment has been identified from air photos (appendix 6). Landfire fire regime group is summarized for all of the designated burn units in table IV-2. The table illustrates that in the first decade burn targets can be met by burning within the burn units. However, it is anticipated that additional burning will occur outside of the burn units to restore Douglas fir wildlife habitat and in conjunction with silvicultural treatments as discussed further below. In the 1990’s, prescribed fire was applied to 395 acres of rangeland to burn unit #9 in the North Fork Dry Cottonwood Creek. Pintler RD FMO Joe Brabender has indicated that this rangeland burn did not effectively address conifer encroachment in that burn unit.

FP (1987) objectives state that cultural treatments and harvest methods will concentrate on lodgepole pine to help reduce the risk of mountain pine beetle infestation. There is an opportunity to harvest lodgepole pine to help reduce the risk of mountain pine beetle infestation and reduce long term losses from stands. Section IIC-1 describes where mountain pine beetle mortality has occurred since 1999. The existing condition discussion in section IIC-1 also delineates the distribution of mountain pine beetle host trees and where the current epidemic is likely to spread. All areas of host trees are currently considered high risk because the epidemic is affecting trees down into the 4-inch diameter range. The mountain pine beetle epidemic will also continue to kill trees in areas currently infested as additional trees succumb.

Appendix 5 delineates acreage of mountain pine beetle mortality and western spruce budworm defoliation by management area and year. There is an opportunity to apply treatments to these areas designed to reduce further mountain pine beetle infestation and mortality and to salvage beetle killed trees. These treatments should be managed in conjunction with achieving fuels reductions and forest stand structure improvement as described in the following discussion.

The comparison of existing forest size class and the RNV as well as the FRCC departure indicate the opportunity to invoke a structure-based approach to forest vegetation management. Forest stands in the landscape are in need of thinning and fuel reduction if prescribed fire is to be used on a large scale in the future. Structural management will involve applying a combination of mechanical treatments and prescribed fire to modify forest structure and to address the current departure from natural stand size class, structure, and FRCC. The available data from the SIMPLLE modeling and historic vegetation studies in section IIC-2 and table III-1 indicates where large scale departures from the RNV are apparent in forest size class. Specific opportunities identified below address these large scale departures. Negative values in the column ‘Gap between EC and DFC’ in table III-1 indicate a need to reduce the presence of a particular size class. Positive values indicate the need to increase the presence of that size class. In this, the opportunities for vegetation management are quantified using the RNV, with the goal of restoring vegetative communities to reflect the affects of natural disturbance and succession.

**Douglas Fir**

Figure IIC-12 indicates an overabundance of the Douglas fir pole size class. Table III-1 shows that a 750 – 2,600 acre reduction in pole sized Douglas fir would bring this size class in line with the RNV indicated by the historic vegetation studies and the modeling respectively. The historic vegetation studies shown in the figure suggest that the existing presence of 9”+ sized Douglas fir stands is within the RNV, while both sets of modeling suggest the need to recruit more mature Douglas fir.

Figure IIC-12 indicates the opportunity to harvest pole size Douglas fir trees and increase the presence of seedling/sapling size classes towards the percent composition indicated in the historic vegetation studies. Additionally, Figure IIC-12 suggests an opportunity to thin pole size stands to recruit additional mature Douglas fir. Thinning combined with underburning of pole sized trees would aid in recruiting mature stands and increasing the resiliency of these stands to western spruce budworm in the future. Concerns about the short term effects of burning on forest insect activity are discussed further below.

Figure IIC-6 presents stand-level FRCC for the forested vegetation of the landscape. The stand-level FRCC data shown in table IIC-9 indicates that 24% of the Douglas fir cover type is in FRCC II and another 24% is in FRCC III. Due to the absence of fire in these stands they have a much more storied structure than occurred under the RNV. This indicates an opportunity to treat multi-storied mature Douglas fir stands by thinning subdominant trees and leaving dominant mature trees. This opportunity can be realized in conjunction with projects to restore the size class distribution and recruit large sizes of Douglas fir as described above.

Bulaon and Sturdevant (2006) present data from study sites on the Helena National Forest indicating that areas that were thinned showed less budworm defoliation and mortality than similar un-thinned sites and suggest that treatments can be beneficial in areas where budworm populations have historically been very heavy. These authors recommend reducing the number of canopy layers and stand density either by thinning alone or combined with prescribed fire to reduce stand susceptibility by reducing the intermediate tree layer and stocking density.

A 2005 silviculture case study from Poorman Project on the Helena National Forest provides a detailed evaluation of different treatment techniques designed to address departure of forest vegetation structure, fuel levels, and FRCC from natural conditions (USFS, 2005b). The Poorman Project evaluation provides important lessons learned on applying vegetative treatments such as large scale burning in the presence of drought conditions and forest insect infestation. Units in the Poorman Project which were underburned in springtime and contained high levels of ground fuels had higher levels of post-burn Douglas fir beetle mortality than units that received a higher level of pre-burn fuels treatment. The Poorman Project evaluation suggests benefits of commercially harvesting burn units where slash is removed or burned in piles prior to broadcast burning a unit. Other recommendations made in the Poorman Project case study for burning during drought include limiting burning to fall when beetle activity is low. Fall burning allows trees stressed by burning a period of time to recover before increases in beetle activity the following summer.

**Lodgepole Pine**

Figure IIC-13 indicates an overabundance of lodgepole pine in the pole size class. Table III-1 indicates that a reduction of between 4,000 – 11,000 acres of pole sized stands would bring this size class within the range of the historic studies or the low end of the modeled RNV respectively. The SIMPLLE modeling indicates the need to recruit more acres of large lodgepole size classes. However, the historic vegetation studies show consistently smaller percentage of the 9"+ size class than the modeling suggesting that the 9"+ size class is within the RNV. In this, the historic vegetation studies suggest that the modeling may be overestimating the RNV for this size class. There is an opportunity for up to 8,100 acres of regeneration harvest in pole sized lodgepole pine stands to maintain the RNV for seedling/sapling sizes. Regeneration harvest on 2,200 acres of lodgepole followed by underburning in the next decade would meet targets for replacement severity burning in fire group IV shown in table IIC-10B. Options include salvage harvesting beetle killed pole sized lodgepole trees combined with broadcast burning or other methods for regenerating lodgepole. There is also an opportunity to thin or salvage harvest pole sized trees from lodgepole stands and manage trees that remain in the stand to meet the RNV for large size classes or old growth in the future.

There is an opportunity to thin trees in the pole and 9"+ size classes to decrease the susceptibility of these stands to mountain pine beetle. Additionally, there is an opportunity to salvage harvest beetle killed trees in the pole and 9"+ size class where salvage harvest will satisfy fire protection/WUI objectives. Beetle killed trees can be salvage harvested in areas along roads and at recreation sites to mitigate public safety as has recently been done at Orofino Campground.

Different thinning and regeneration harvest methods have proven useful to control beetle epidemics (Furniss and Carolin, 1977; Lotan and Perry, 1983; McGregor and Cole, 1985; VanDenburg, 1989; Amman, 1989 and others). Treated areas should be broadcast burned as appropriate. Burning will need to be managed to mitigate potential increases in post-burn mountain pine beetle activity.

**Subalpine Fir**

Figure IIC-14 suggests that large size classes in the subalpine fir forest type are below RNV and that pole size classes are overabundant. The existing condition size class distribution of the subalpine fir forest type is considered to have high uncertainty because this forest type makes up a small fraction of the landscape. Therefore the comparison between EC and RNV for subalpine fir may not be accurate. These stands may be managed if necessary to satisfy other resource goals including fire protection, by silvicultural techniques designed to mimic natural disturbance processes and to perpetuate the unique habitats that this forest type provides.

**Upland Hardwood**

Aspen stand reinitiation is important to maintain or increase the aspen component of the forest vegetation assemblage in the landscape and to meet habitat needs for wildlife species which use this unique habitat. Figure IIC-15 indicates an opportunity to manage aspen stands to meet the RNV for age class distribution. Currently, aspen occupies approximately 300 acres in the landscape. Field experience indicates that most of this aspen is in a mature to decadent state. There is no data specific to the landscape to indicate if aspen coverage has declined. However, Bartos (2001) indicates a significant decline at the regional scale. Future vegetative modeling specific to the landscape could help to identify targets for increasing aspen cover in the landscape if the cover is determined to be below RNV. Ideally, empirical data from the landscape such as aerial photographs or historical records would be used to identify acreage previously occupied by aspen and would help to calibrate a vegetation disturbance model.

The 1998 Forest Monitoring and Evaluation Report (BDNF, 1998) details a recommended strategy for aspen treatment and monitoring. Treating high risk stands that when fenced have a good chance of treatment success has been identified as a high priority in that report. There is an opportunity to manage 300 acres of aspen in the landscape to limit further decline of these stands. High risk stands are those which are small in extent, have one age class with dead stems present, and conifer competition in the overstory or where evidence of browsing is moderate to high. Treatment for situation A aspen stands, which includes the majority of aspen present in the landscape, will require treatment to remove conifers from within and adjacent to the stand combined with fencing. If sprouting doesn't occur in 2 or 3 years, the BDNF (1998) evaluation recommends ripping the perimeter. Larger treatments with fire and conifer removal are acceptable if some existing clones can be protected from browsing; however individual trees or remnant clones may be sacrificed by larger treatments. Monitoring combined with fencing of successful sprouts should be implemented the first year after treatment. Treatment effectiveness was shown in the 1998 Forest Monitoring and Evaluation Report to be dependent on selecting the right fence design; other recommendations in that report should be consulted.

GIS analysis of SILC3 aspen cover and past burn and harvest activities indicates that 47% of the SILC3 classified aspen on the BDNF in the landscape is in an area which experienced timber harvest or prescribed burning in the last half century. In burn unit #14 (figure IIC-11), a 143-acre clear-cut in 1969 followed by a post-harvest burn/broadcast burn in 1972 appears to have regenerated as aspen as shown by aerial photos and the SILC3 dataset. In burn unit #15 a 52 acre clear-cut in 1964 has partially regenerated as aspen. There is an additional area just east of unit #15 where a 1964 clear-cut and 1967 site preparation burn occurred where aspen is shown on airphotos and SILC3. Field review of these sites is necessary to determine site specific measures to manage aspen in the landscape. Field review should include condition of the aspen with respect to browsing, disease, and conifer shading of the clone. The results of the field evaluation should be used to design effective treatments for other aspen in the landscape.

### *Wildlife*

This landscape assessment brings together data on elk winter range which indicates that the FP (1987) C1 management areas and current travel plan may be missing crucial elk winter range delineated by RMEF (1999). There is an opportunity to review FWP elk flight data and correct the delineation of crucial winter range used in travel planning.

C1 management areas (big game winter range) in Baggs Creek, Dry Cottonwood Creek north of road #85 and #5175, and Sand Creek, Perkins Gulch, and Girard Gulch are area designation 7 (winter-motorized) in the current travel map (revised 2003). Per the FP (1987), these areas should be in a non-motorized designation December 1st to May 15th to protect big game winter range.

The HROGA elk security analysis indicates that hunting recreation opportunity objectives for maximum open road densities are exceeded in area #16 Spring-Emery, which is entirely within the landscape. Additionally, FWP harvest records indicate that bull elk harvest rates are greater than FWP management goals. Based on Christensen et al. (1993), the primary BDNF management tool for elk is vehicle access management. This is echoed in the Montana Elk Management Plan (FWP, 2004) which advocates maintaining elk security during fall hunting season by limiting road access. There is an opportunity to change travel management to increase elk security and reduce bull harvest rates to meet FWP objectives. Specifically, there is a need to meet FP (1987) objectives for maximum open road density in the Spring-Emery HROGA by closing additional open roads during the hunting season. Meeting the hunting recreation opportunity objective of 0.65 miles/square mile open road density will require additional seasonal closure on 8.8 miles of main (passenger car) road or 12.7 miles of secondary (high clearance vehicle) road. Elk security and hunting recreation opportunity objectives can be met in conjunction with road closure or obliteration objectives described under Watershed Health and Aquatic Habitats opportunities above as well as opportunities for revising the travel plan and map described below under opportunities for Cultural Resources and Human Uses. There are currently 15.3 miles of main roads and 13.2 miles of secondary road with no seasonal restrictions in the Spring-Emery HROGA. Therefore the additional seasonal closures identified above would require seasonal restrictions on 58% of the open main roads, 96% of open secondary roads, or some other combination of seasonal restrictions and road obliteration.

Opportunities for meeting FP (1987) wildlife habitat DFCs of maintaining habitat for current wildlife populations and increasing elk habitat capacity are closely tied to maintenance and restoration of vegetative components of the ecosystem, particularly fire adapted habitats that are in decline. There is an opportunity to continue ecosystem burning at regular intervals to improve condition of grasslands and shrublands. Opportunities for ecosystem/rangeland burning, including the need to conduct an evaluation of previous ecosystem burning success, are discussed further under Vegetation opportunities above.

Snag densities have historically been low in the Upper Clark Fork area. The current mountain pine beetle epidemic has greatly increased snag density in lodgepole stands; however whether or not these snags meet FP (1987) standards has not been determined. There is an opportunity to maintain FP (1987) standards for snag management by evaluating snag recruitment during forest vegetation treatments.

There is an opportunity to map old growth lodgepole pine, Douglas fir, Engelmann spruce and whitebark pine stands and to manage all forest stands for the perpetuation of old growth to provide suitable old growth habitat. Old growth management opportunities are presented under Vegetation opportunities above.

There is an opportunity to bring flammulated owl habitat, specifically open Douglas fir stands, back within RNV by use of prescribed fire or mechanical treatment. Thinning combined with underburning of lower elevation, formerly open Douglas fir stands will restore flammulated owl habitat. Douglas fir management is discussed under Vegetation opportunities above.

There is an opportunity to manage the Electric Peak IRA as core habitat for grizzly bear recovery. These roadless lands within the landscape run conterminously with lands managed as recommended wilderness on the Helena NF. Currently, much of the landscape is roaded at a high density which greatly reduces effective grizzly habitat, below what the landscape would support in a presettlement condition. Additionally, there are both confirmed sightings and numerous unconfirmed sightings or evidence of grizzlies using the Electric Peak IRA area in recent years, as well as evidence of grizzlies using adjacent areas of the greater Boulder River drainage.

There is an opportunity to manage grizzly, lynx and wolverine habitat in conjunction with the FP (1987) goal for A4 management areas to "provide a level of primitive and/or semiprimitive recreational settings (consistent with future demands) for trail-oriented nonmotorized recreation while recognizing potential mineral values of an area." Currently, there is increasing conflict between winter motorized use and habitat and denning needs for grizzly, lynx, and wolverine in the landscape. There is an opportunity to include a component of non-motorized winter ROS in the Electric Peak IRA in a revised travel plan. These non-motorized areas should be prioritized based on analysis of lynx, grizzly, and wolverine use, denning, or habitat and designed to protect these areas and reduce conflicts between wildlife needs and recreation.

There is an opportunity to provide protection to western boreal toad nesting sites in the landscape. Recent observations have shown boreal toads to use wetlands associated with the Clark Fork River as well as a small impoundment in the Tertiary bench of the EDLV. Boreal toad presence within grazing allotments needs to be inventoried as part of AMP revision. Opportunities may exist to partner with NHP on amphibian inventories. Livestock exclosure fencing should be used to prevent disturbance of breeding sites.

## Cultural Resources and Human Uses

There is an opportunity to provide a consistent inventory of heritage resources across the landscape. To expedite this process, partnerships with universities, museums, foundations, or other such groups are needed to provide resources necessary for accomplishing this difficult task. Once inventoried, heritage sites can be evaluated for interpretation sites or registry with the National Register of Historic Places. Once inventoried, opportunities to protect, restore, and interpret sites can also be pursued.

Opportunities for management of transportation uses include a need to reduce open road density in the Spring-Emery HROGA to meet hunting recreation opportunity spectrum objectives as described above under Wildlife opportunities. High clearance vehicle road #5172 which crosses the Emery Mine, Rocker Gulch and North Fork Cottonwood Creek is open during hunting season and is redundant with primary road #705 which also has no restrictions. Seasonal restrictions on this road would remove 2.8 miles of open secondary road. Additionally, the current travel map is not compliant with C1 management area standards as described under Wildlife opportunities above. A revised travel plan and map which includes the most recent road inventory and that is compliant with FP (1987) standards for C1 management areas in all areas and meets hunting recreation opportunity objectives needs to be provided to the public.

Public polling performed in 1998 as part of the Clark Fork-Flints LA indicated that people were generally satisfied with the existing range of recreational opportunities provided by the forest. However, more recently, members of the public including MWA have expressed a need for enforcement of the summer non-motorized recreation setting, with emphasis on eliminating motorized trespass within the Electric Peak area. Additionally, these members of the public have expressed a need for including a non-motorized winter recreation opportunity setting component to the Electric Peak IRA. Non-motorized winter use is consistent with the goals for A4 management areas of providing “a level of primitive and/or semiprimitive recreational settings (consistent with future demands) for trail-oriented nonmotorized recreation while recognizing the potential mineral values of an area” (FP, 1987 pp III-8). There is an opportunity to pursue both of these goals.

There is an opportunity to construct additional nonmotorized segments of the CDNST in accordance with national-level goals for this trail of providing for a non-motorized CDNST. Opportunities for the CDNST include reconstruction, relocation, and maintenance and improved signing, maps, design and linkage to meet national goals for providing high quality, scenic, primitive hiking and horseback-riding, non-motorized recreational experiences.

There is an opportunity to reconstruct segments of all the other trails within this landscape to meet current trail standards and to reduce user conflict where non-motorized trails are experiencing motorized trespass. There is an opportunity to emphasize reconstruction, relocation, maintenance and improved signing, maps, design and linkage of non-motorized trails within the Electric Peak IRA. These opportunities would satisfy FP (1987) goals of providing trail-orientated non-motorized recreation in A4 management areas.

There is also an opportunity to inventory and provide minor improvements to existing dispersed recreation sites. There is an opportunity to downsize and upgrade Orofino Campground so that it is more in line with its current use levels while meeting health and safety standards.

Recreation DFCs may also be achieved in part through vegetation treatment. ROS settings in semi-primitive motorized and nonmotorized and roaded natural designation require a "natural appearing environment". However, given the current deviation of forest vegetation in the landscape from a natural range of variability, many of the settings, especially lodgepole pine and Douglas fir forests are no longer natural appearing. This provides incentive for restoration of forest and adjacent rangeland experiencing conifer encroachment. In the semi-primitive nonmotorized setting, vegetative alterations may include sanitation salvage to very small units in size and number that are widely dispersed and in the semi-primitive motorized setting these vegetation alterations are not evident or visually subordinate. Management for visual quality and recreational setting should therefore consider the need for forest vegetation management in addition to the VQOs in section II of the FP (1987).

**Table IV-1: Opportunities.**

| Item | Gap between existing and DFC | Opportunity | Approach |
|---|---|---|---|
| | | | ***Soils and Geology*** |
| A1 | Water quality not meeting state/federal guidelines at abandoned mine sites. | Remediation of mine waste and drainage. | Revisit sites in table IIA-1 listed as exceeding water quality standards. Inventory current environmental hazards; resample using low-level metals analysis techniques. Determine landowner intentions where source exists on private land. Remediate sites on BDNF or at sites with mixed ownership with landowner cooperation.<br><br>Monitor and remediate mine sites in the Middle and North Fork Cottonwood Creek. |

| Item | Gap between existing and DFC | Opportunity | Approach |
|---|---|---|---|
| A2 | Soil loss/sediment delivery out of equilibrium with stream capacity. | Road sediment-proofing and obliteration. | Implement road runoff BMPs and perform engineering evaluation to identify drainage/sediment runoff capture options on forest roads in Dry Cottonwood and Perkins Gulch. Implement riparian restoration and/or road runoff control engineering on 2.2 miles of stream in Peterson, Orofino, Dry Cottonwood, and Perkins Gulch where sediment impacts are identified as severe and westslope cutthroat populations are present.<br><br>Where possible, coordinate replacement of culverts with road reconstruction/engineering. See item #B9 below.<br><br>In Dry Cottonwood Creek, Forest Road #85 and #8634 parallel the stream and are encroaching on the channel. Erosion from the road surface is causing sedimentation on the Main Fork and the South Fork of the creek. This area needs to be targeted for sediment/storm proofing.<br><br>See item #B8 for road obliteration targets.<br><br>Complete survey of locations where roads and culverts are not meeting FP (1987) or INFISH standards or are leading to stream sedimentation issues. |
| A3 | Soil loss/sediment delivery out of equilibrium with stream capacity. | Riparian condition improvement/restoration. | See explanation under items #B2-B3 of Watershed and Aquatic Health opportunities. |
| A4 | Soil loss/sediment delivery out of equilibrium with stream capacity. | Inventory of soil conditions and erosion hazards. | Cursory field inspection of BDNF lands in the landscape to determine where soil erosion is occurring. Inventory sites where erosion is occuring with GPS location and data entered into a soil inventory database. Identify cause of soil erosion and implement appropriate conservation practices. |
| | | | ***Watershed Health and Aquatic Habitats*** |
| B1 | Water quality not meeting state/federal guidelines at abandoned mine sites. | Remediation of mine waste and drainage. | See explanation under item #A1 of Soils and Geology opportunities. |
| B2 | Stream/riparian areas are not meeting functioning status. | Manage allotments to meet riparian DFCs and INFISH objectives and standards. | Adjust management on at least 8.4 miles of stream riparian areas determined to have severe grazing impacts. Determine if 1997 Interim Riparian Mitigation Measures (BDNF, 1997) are having the required affect of improving riparian condition to a functioning status. Alter grazing practices or allotment management to be effective at meeting FP (1987) DFCs and INFISH objectives and standards. Provide implementation monitoring to ensure compliance.<br><br>For each AMP determine stream channel condition, management history, reference Rosgen channel classification, reference watersheds, and restoration opportunities. |

| Item | Gap between existing and DFC | Opportunity | Approach |
| --- | --- | --- | --- |
| B3 | Stream/riparian areas are not meeting functioning status. | Riparian restoration projects. | Implement riparian restoration projects on the BDNF on 5.0 miles of streams identified as non-functioning and 7.8 miles of stream identified as functioning at risk. Prioritize streams with westslope cutthroat conservation populations or which affect potential bull trout waters. Site specific evaluation and engineering planning will be necessary. Construct riparian fencing or promote natural barriers to livestock where effects of grazing impacts cannot be alleviated with grazing management. Where natural processes may not improve riparian or stream channel condition within 5 years consider active restoration techniques such as revegetation, LWD augmentation, or channel reconstruction when protection of restored reaches can be ensured. Implement grazing practices to lessen impacts to riparian areas during AMP revision or with AMP amendment.<br><br>_Specific restoration targets by watershed on the BDNF:_<br>Cottonwood Creek: Restore 0.3 miles of non-functioning and 0.9 miles of functioning at risk stream riparian areas. Reduce sediment impacts from excess riparian cattle use and loss of riparian woody plants in North Fork Cottonwood and at the upper end of the North Fork reach where forest road #5173 encroaches on the channel. Provide riparian fencing and/or off-stream water as necessary. Reduce nutrient concentrations with prescribed grazing and riparian fencing.<br><br>Peterson Creek: Restore 1.7 miles of non-functioning and 2.6 miles of functioning at risk stream riparian areas. Reduce sedimentation from excess riparian cattle use, and loss of riparian corridor woody plants in upper and middle Peterson Creek. Improvement of riparian areas may entail invasive weed species removal/control, riparian fencing, reestablishing healthy woody vegetation, and prescribed grazing. Reduce road encroachment or close roads, and control road runoff. Reduce nutrient concentrations with prescribed grazing and riparian fencing.<br><br>Orofino Creek: Restore 0.3 miles of non-functioning and 1.5 miles of functioning at risk stream riparian areas. Target improving thermal conditions in conjuction with opportunity #B4.<br><br>Dry Cottonwood Creek: Restore 2.1 miles of non-functioning and 1.2 miles of functioning at risk stream riparian areas. Improve riparian areas with prescribed grazing, riparian fencing and reestablishing healthy woody vegetation, and weed control.<br><br>Perkins Gulch: Restore 0.3 miles of non-functioning and 1.1 miles of functioning at risk stream riparian areas. Exclude cattle from the riparian area of Perkins Gulch, due to the extreme instability of its streambanks. Explore innovative methods (e.g. temporary electric fencing) to exclude cattle, due to the difficulty of maintaining traditional fencing in the thick timber along this stream. |

| Item | Gap between existing and DFC | Opportunity | Approach |
|---|---|---|---|
| | | | *B3 continued*:<br>Girard Gulch: Restore 0.6 miles of functioning at risk stream riparian areas.<br><br>Complete riparian assessment of all stream reaches. Additional assessment must be compatible with existing assessments (PFC for USFS or Hansen for KirK Environmental, 2003) for comparison. Evaluate need for riparian improvement projects in Baggs Creek drainage. |
| B4 | Temperature/ thermal impairment of water quality (indicated in BMI assessment). | Riparian restoration projects. | The results of the BMI bioassessment indicates thermal impairment on the BDNF is present at Perkins Gulch site PG4 and Orofino Creek site O3. Probable cause of thermal impairment is degraded riparian condition. Pure westslope cutthroat trout are present in both watersheds and Perkins Gulch is an identified westslope cutthroat conservation population (MCTSC, 2007). These two sites should be prioritized in conjunction with item #B3.<br><br>State of Montana narrative temperature water quality standards compare temperature to reference conditions (ARM 17.30 sub-chapter 6). Reference conditions may need to be assessed for impaired reaches to evaluate improvements in stream temperature conditions. |
| B5 | Habitat degradation / westslope cutthroat populations impaired. | Rehabilitate channel structure and water quality. | Priority habitat restoration reaches should be selected using appropriate guidance in INFISH and the Cutthroat Trout Conservation Agreement. Restoration projects may include channel reconstruction in severely degraded reaches or riparian fencing, revegetation, AMP revision/amendment or channel habitat measures such as LWD augmentation / pool creation in less severely degraded stream reaches. Habitat restoration measures must be considered in tandem with water quality and riparian mitigation measures described in this section. |
| B6 | Streambed sediment and TSS reference conditions unknown. | Evaluate reference conditions. | Using least impaired stream reaches in the landscape in conjuction with data from streams in similar physiographic settings develop a range of natural variability for streambed sediment and TSS. Reference morphology datasets have been developed by BDNF. |
| B7 | Sediment impairment of water quality/stream substrate. Road density high. | Road sediment-proofing. | See item #A2 of Soils and Geology opportunities. |

| Item | Gap between existing and DFC | Opportunity | Approach |
|---|---|---|---|
| B8 | Sediment impairment of water quality/stream substrate. Road density high. | Road obliteration. | Item #A2 identifies an opportunity to inventory problem roads. Additional unnecessary roads may be identified during NEPA scoping. Remove unnecessary roads that encroach on streams or that have identified erosion problems.<br><br>Obliterate road #19870 in the Peterson Creek drainage; remove culvert #516 on Jack Creek on this road.<br><br>See item #E4 for addititional road closure targets.<br><br>Obliterate roads in the Spring-Emery HROGA in conjuction with efforts to achieve hunting recreation opportunity objectives. |
| B9 | Westslope cutthroat passage prevented by culverts. | Culvert replacement. | Replace culverts identified as fish passage barriers using appropriate INFISH standards. Prioritize westslope cutthroat conservation populations; consider risk of introgression.<br><br>Replace culverts #601, 602, 730 in Cottonwood Creek if it can be determined that there is a barrier to upstream migration of rainbow trout below the confluence of Rocker Gulch.<br><br>Replace culverts #732, 755, 729 in Dry Cottonwood Creek if it can be determined that there is a barrier to upstream migration of rainbow trout below the confluence of the north and south forks.<br><br>Replace culvert #913 in Perkins Gulch if it can be verified that lower outwash plain reaches of that stream are a permanent barrier to upstream migration of rainbow trout. |
| B10 | Water quality in Clark Fork River limiting bull trout recovery. | Manage streams for high water quality. | Riparian, sediment, and thermal impairment opportunities will aid in improving water quality of tributary water to Clark Fork River and provide refugia for migratory bull trout in the lower reaches of large streams in the landscape. |
| B11 | Water quality in Clark Fork River limiting bull trout recovery. | Restore instream flow. | Where streams are dewatered pursue water leasing options through forest stewardship contracting.<br><br>Increase instream flows to lower the temperature in the lower reaches of Cottonwood where dewatered by diversions. Instream flows can be increased by working with landowners to finance off-stream water, irrigation efficiency improvements, water diversion improvements, or water leasing. This project is on private land and may need to be pursued by citizen groups.<br><br>Increase instream flows throughout Peterson Creek where possible. Improve/repair water diversions in the lower reaches of Peterson Creek in conjuction with addressing nutrient and sedimentation issues related to cattle use of riparian zone. This project is on private land and may need to be pursued by citizen groups. |

| Item | Gap between existing and DFC | Opportunity | Approach |
|---|---|---|---|
| B12 | Inadequate data to support Orofino Creek as a westslope cutthroat trout conservation population in (MCTSC, 2007). | Assess westslope cutthroat population status. | Use available genetics or additional testing if necessary. If this population is designated, apply goals and objectives in MCTSC (2007). If designated, consider prioritizing riparian restoration or mine remediation in Orofino Creek to protect Orofino cutthroat. |
| | | | ***Vegetation*** |
| C1 | Noxious weeds present. | Implement cooperative weed programs with county emphasizing coordination, prevention and education. | Continue weed occurrence mapping and treatment database. Continue weed control by spray, bio-control, and travel management.<br>Evaluate grazing affects on noxious weed spread. Address grazing affects during AMP revision process or with AMP amendment.<br>Evaluate impacts of travel management on noxious weed spread when revising travel management with emphasis on OHV and snowmobile management. |
| C2 | Riparian vegetation not meeting functioning status. | Riparian restoration projects / AMP revision / mitigation guidelines. | See items # B2 above. |
| C3 | Low elevation Douglas fir forest size class distribution and structure out of RNV due to fire suppression. | Thin 2,700 acres Douglas fir, underburn where appropriate. | Table IIC-9 indicates 2,700 acres of Douglas fir forest type in FRCC II and III. Harvest subdominant trees to provide wood products where access is available. Multistoried mature stands should be prioritized. In old growth stands, use hand or mechanical site preparation without harvest of mature Douglas-fir trees. Underburn all stands when conditions are appropriate, limiting post-burn beetle mortality, considering recommendations in USFS (2005b). Coordinate treatment where possible to meet goals/objectives of CWPP. Allow stewardship contracts to treat vegetation. |
| C4 | Douglas fir size class not meeting RNV. | Increase presence of seedling/sapling and mature size classes. | Treat 750-2,600 acres of pole size Douglas fir stands using silvicultural methods appropriate for specific management area. Use prescribed fire/underburning where standards allow to reduce fuels and improve wildlife habitat. Manage 50-2,600 acres of thinned pole stands to increase mature size class. Coordinate with opportunities to manage for future old growth to meet FP (1987) standards. Allow stewardship contracts to treat vegetation. |
| C5 | Lodgepole pine forest size class distribution and structure out of RNV. Lodgepole pine extremely susceptible to mountain pine beetle. | Lodgepole stand harvest in E1 timberlands. | Thinning or regeneration harvest of 4,100-11,200 acres of pole sized stands in E1 management in areas of rapid mountain pine beetle expansion. Create stand initiation openings in lodgepole on 0-8,100 acres to meet seedling/sapling RNV. Additionally, use salvage harvest in areas of recent beetle kill to reduce fuels/wildfire risk to meet these targets. Acreage for salvage harvest will be determined on a project level basis. Use a variety of silvicultural harvest methods designed to mimic natural disturbance patterns and that are appropriate to meet wildlife needs, watershed protections, VQOs, and ROS setting. Post harvest broadcast burn where appropriate when post-burn mountain pine beetle mortality can be mitigated. Allow stewardship contracts to treat vegetation. |

| Item | Gap between existing and DFC | Opportunity | Approach |
|---|---|---|---|
| C6 | Lodgepole pine forest size class distribution and structure out of RNV. Lodgepole pine extremely susceptible to mountain pine beetle. | Lodgepole stand treatment in areas outside of E1 timber lands to improve stand health, reduce forest insect susceptibility. | Thinning or regeneration harvest of pole sized and larger lodgepole stands in A1, A5, A6, C1, D2 management areas susceptible to mountain pine beetle. Treatment may include a variety of silvicultural methods to reduce mountain pine beetle susceptibility and reduce long term losses from stands. Individual projects will comply with all management area standards. Coordinate thinning with targets for old growth to meet FP (1987) standards. Treatment will alter size class of 4,100-11,200 acres of pole sized lodgepole over all management areas (including E1) to meet size class RNV. Broadcast burn treated areas where and when post-burn beetle mortality can be mitigated. Allow stewardship contracts to treat vegetation. |
| C7 | Sagebrush shrublands and grassland coverage has declined due to the establishment of conifers and lack of natural fire. Existing conditions are not providing a full range of successional stages for plants and animals throughout the landscape. | Prescribed range improvement fire. | Prescribed fire used to reduce fuels and provide a diversity of successional stages in rangeland. Use prescribed fire or mechanical treatment in areas of conifer encroachment to maintain natural grassland and shrubland. Range improvement projects in the late 1990's treated 395 acres in Dry Cottonwood Creek. Range condition monitoring of that project can be used to determine the efficacy of the treatment used and noxious weed concerns. Air photo interpetation indicates conifer encroachment is an issue in multiple burn units with a total area of 11,953 acres (appendix 6). Apply prescribed fire at regular intervals to rangeland to improve forage production. Do not burn areas where noxious weeds cannot be effectively controlled post fire. Allow stewardship contracts to treat vegetation. |
| C8 | Old growth forest stands not mapped. Old growth mapping will aid in protection of existing stands and management for the perpetuation of old growth component. | Old growth mapping and sustainable management. | Map old growth within the landscape. Determine old growth component of forested landscape and spatial continuity of old growth. Field check old growth mapping if by remote technique.<br><br>Manage forest vegetation to meet Forest Plan standards for old growth. Evaluate disturbance intervals to determine and locate younger-age stands to be managed to replace old growth as stand reinitiation occurs. |
| C9 | Aspen on BDNF lands within the landscape are in an over-mature to decadent condition. Age class diversity is missing | Maintain current levels of aspen at a minimum. Maintain existing stems on site and protect the stand. | Maintain the approximately 300 acres of aspen on the BDNF in the landscape using recommended strategies in BDNF (1998). Field review aspen regeneration in burn units #14 and #15. Integrate aspen treatment with targets for conifer treatment. Integrate aspen treatment in riparian areas with riparian restoration goals and opportunities including exclosure needs. |

| Item | Gap between existing and DFC | Opportunity | Approach |
|---|---|---|---|
| C10 | Hazardous fuels accumulation, potential fire severity out of RNV. | Fuel reduction projects. | Develop vegetation/fuels treatments using CWPP fire mitigation priority rankings. Coordinate with goals for meeting vegetation size class RNV and prescribed burning targets. |
| C11 | Fire adapted vegetation out of RNV. Dense forest vegetation is contributing to increased competition for resources and poor forest health. Habitat is reduced/degraded for species such as flammulated owl requiring fire adapted forest. | Prescribed burning. | Table IIC-10B provides burn targets. Apply prescribed fire to at least 200 acres of vegetation in each of fire regime groups I and II in the next decade. Prescribed fire in group I vegetation should mimic the low and mixed severity of natural fires; application in group II vegetation should mimic natural stand replacement fire. Apply prescribed fire to 8,200 acres of vegetation in fire group III in the next decade. Prescribed fire for group III vegetation should mimic the low and mixed severity of natural fires in these vegetation types. Apply presribed fire to 2,200 acres of vegetation in fire group IV in the next decade. Prescribed fire and silvicultural practices in group IV vegetation should mimic natural stand replacement fires. Appendix 6 tabulates acreages in specific fire regime groups in delineated burn units. Coordinate these burn targets with other vegetative treatment opportunities in lodgepole and Douglas fir stands. |
| | | | ***Wildlife*** |
| D1 | Noxious weeds have replaced native plant species that provide forage and cover for wildlife. | Implement cooperative weed programs. | See item #C1 above. |
| D2 | C1 management areas (big game winter range) are not consistent with crucial winter range. Current travel plan allows off-trail winter motorized use in C1 management and identified crucial winter range. | Correct winter big game range and management area designations. Revise travel management plan based on analysis of elk winter and partuition use. | C1 areas in Baggs Creek, Dry Cottonwood Creek north of road #85 and #5175, and Sand Creek, Perkins Gulch, and Girard Gulch currently shown as area designation 7 should be non-motorized Dec 1-May 15. The travel map needs to be revised.<br><br>Travel plan revision. RMEF (1999) delineates elk winter ranges, summer ranges, calving areas and migration areas. FWP winter elk flight data should be used to cross check the delineated crucial winter range. Final winter range delineation will then be used to update travel management plan. |

| Item | Gap between existing and DFC | Opportunity | Approach |
|---|---|---|---|
| D3 | Open road density exceeds FP (1987) hunting recreation opportunity objectives in Spring-Emery HROGA.<br><br>Bull elk harvest rates higher than FWP objectives. | Close and/or obliterate roads. | Additional seasonal restrictions are required on 8.8 miles of main road, or 12.7 miles of secondary road, or some combination of travel restrictions and road obliteration.<br><br>Coordinate with opportunity B8 (road obliteration/closure for watershed health) and opportunity E4 (travel management). |
| D4 | Grassland/shrub land habitat reduced by conifer encroachment, vegetative composition changed due to fire suppression. | Prescribed fire for rangeland improvement. | See item #C7. |
| D5 | Snag density historically low in Upper Clark Fork. | Snag recruitment. | Design vegetation treatments to achieve Forest Plan standards and to meet wildlife needs for snag density. |
| D6 | Flammulated owl habitat below RNV. | Restore condition of open Douglas fir stands. | Thinning and underburning of historically open Douglas fir stands. See item #C3-C4. |
| D7 | Increasing conflict between motorized use and winter wildlife habitat and denning needs. | Reduce motorized conflict in management area A4. | Manage for the FP (1987) goal for A4 of "provide a level of primitive and/or semiprimitive recreational settings (consistent with future demands) for trail-oriented nonmotorized recreation while recognizing potential mineral values of an area." Currently, snowmobiling is allowed throughtout the A4 areas in the landscape. The revised travel plan needs to incorporate a component of non-motorized winter ROS in the Electric Peak IRA. These non-motorized areas should be prioritized based on analysis of lynx, grizzly, and wolverine use and denning. |
| D8 | Grizzly bear secure habitat limited due to high road density. | Manage Electric Peak IRA as core grizzly bear habitat. | Helena NF manages adjacent IRA as recommended wilderness. Coordinated travel planning including snowmobile travel to provide secure grizzly habitat including suitable denning habitat. Reduce open road density in all watersheds by closing or obliterating unnecessary roads in coordination with opportunities for watershed and aquatic health. Consider grizzly bear use in updating travel management plan. |
| D9 | Regional western boreal toad population decline. | Protect boreal toad breeding sites. | During AMP revision or in coordination with NHP amphibian inventory program, determine occupancy by western toads within allotments. Provide livestock exclosure fencing to protect western toad breeding sites. |

| Item | Gap between existing and DFC | Opportunity | Approach |
|---|---|---|---|
| | | | ***Cultural Resources and Human Uses*** |
| E1 | Heritage resource inventory incomplete. | Systematic field inventory of all heritage sites within the landscape. | Systematic field inventory carried out to professional standards by qualified archaeologists. Pursue partnerships with universities, museums, foundations, or other interested entities. Evaluate identified heritage sites for their significance and nominate eligible sites to the National Register of Historic Places where protection can be ensured. |
| E2 | Lack of interpretive sites. | Provide interpretive sites. | Evaluate sites to identify any appropriate heritage sites demonstrating the prehistory or history of the landscape to be selected and developed for interpretation where protection can be ensured. As an alternative to site specific interpretation some aspect of the cultural history of the entire area (e.g. mining history, prehistoric hunter-gatherer use) may be interpreted at a location of high visitor use. |
| E3 | Winter travel management not consistent with winter game range and Forest Plan standards for C1 management areas. | Review and correct travel plan for consistency with management of winter game range. | See item #D2 above. |
| E4 | Open road density high.<br><br>Open road density exceeds FP (1987) hunting recreation opportunity objectives in Spring-Emery HROGA. | Road closure and/or obliteration. Revise travel management plan and map. | Road #9336 in the Black Mountain-Electric peak vicinity is listed in the current BDNF travel database as "open, no legal restriction." Access to this road is limited by hunting season restrictions on road #1518; however the road is in area designation 2 which is closed to wheeled use year-round. The travel restriction status of this road needs to be field verified. Closure of this road to non-administrative wheeled vehicles or obliteration of this road is necessary to comply with the travel plan area designation 2.<br><br>High clearance vehicle road #5172 in the vicinity of the Emery Mine, Rocker Gulch and North Fork Cottonwood Creek is open during hunting season and is redundant with primary road #705 which also has no restrictions. Evaluate options for seasonal restrictions on #5172.<br><br>See item #D3 for additional travel restriction needs. |
| E5 | CDNST Comprehensive Plan (USDA, 1985) indicates presence of user conflict. | Reroute CDNST off of existing motorized travel routes or update travel plan to provide non-motorized use of CDNST. | Current CDNST direction is non-motorized only use (USFS, 1997). Incorporate CDNST direction in travel plan revision. Coordinate with Jefferson RD on rerouting CDNST on Continental Divide off of existing motorized roads/trails. Construct new non-motorized segments of CDNST where consistent with the management area standards. Designate new CDNST segments as yearlong non-motorized travel restriction. |

| Item | Gap between existing and DFC | Opportunity | Approach |
|---|---|---|---|
| E6 | Impacts to dispersed recreation sites unknown. | Inventory dispersed camping sites. Provide facilities or increased oversight where necessary. | Inventory dispersed camping sites, recording both noxious weed presence and impacts. Implement weed control, provide gravel road surfacing, or improved facilities if necessary. |
| E7 | Increasing motorized trespass into non-motorized recreational settings. | Enforcement of trail closures to motorized use. | Enforcement emphasis should be on the Electric Peak IRA, but all areas are in need of increased enforcement. Motorized restriction should occur at the trailhead. Increased public education, better signage, and a revised travel map are needed. |
| E8 | A4 management area goal of providing trail-oriented non-motorized recreation conflicts with winter motorized use. | Revise travel plan to include a component of non-motorized use on A4 in Electric Peak IRA. | Currently, snowmobiling is allowed throughtout the A4 management area in the landscape. The revised travel plan needs to incorporate a component of non-motorized winter ROS in the Electric Peak IRA. These non-motorized areas should be prioritized based on analysis of lynx, grizzly, and wolverine use and denning and based on providing quality non-motorized winter recreation opportunities in a quiet setting. |
| E9 | User conflict between motorized trespass and non-motorized recreation in A4 management. | Trail reconstruction and clear presentation of travel plan to public. | Reconstruct, relocate, provide maintenance and improved signing, maps, design and linkage of forest trails within the Electric Peak Roadless Area to meet forest plan goals for A4 of providing "trail-oriented nonmotorized recreation."<br><br>Additionally revegetate old trail segments and / or tracks not part of the CDNST or forest trail system. |

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