Norwood Land Health Assessment
2005-2006

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Uncompahgre Field Office - B.L.M.

Land Health Assessment
Norwood Area, 2005-2006

SUMMARY

This land health assessment evaluated over 103,000 acres of public land. The evaluation resulted in a determination of the acreage meeting Colorado BLM's Rangeland Health Standards, the acreage not meeting, and the nature and location of the problems on the landscape. A small amount of the landscape area was not evaluated due to inaccessibility, or because it was located on ecological sites which were not commonly occurring in the area. The following table and chart show the amount of land meeting or not meeting the Standards.

Acres Meeting Standards 1, 3,& 4	**Acres Not Meeting Standards 1,3,& 4**	**Acres Unknown Or N/A**
91,575 (89%)	7,894 (8%)	3,840 (<4%)
Stream Miles Meeting Standards 2&5	**Stream Miles Not Meeting Standards 2&5**	**Stream Miles Unknown or N/A**
112.1 (86%)	17.7 (14%)	0 (0%)

In order to make the above determination, the Norwood Area was first rated according to each of the five Rangeland Health Standards separately. The following table better indicates the general nature of problems in the assessment area.

Standard	**Meeting**	**Meeting With Problem Areas**	**Not Meeting**	**Unknown or N/A**
Standard 1-Soils (acres)	82,971 (80%)	15,768 (15%)	730 (<1%)	3,841 (4%)
Standard 2-Riparian (miles)	82.7 (89%)	8.1 (9%)	2.2 (2%)	0 (0%)
Standard 3-Healthy Communities (acres)	66,695 (65%)	24,881 (24%)	7,894 (8%)	3,841 (4%)
Standard 4-T&E Species (acres)	103,310 (100%)	0 (0%)	0 (0%)	0 (0%)
Standard 5-Water Quality (miles)	92 (71%)	22.3 (17%)	15.5 (12%)	0 (0%)

The Norwood Land Health Assessment should serve as BLM's foundation for managing lands in the unit so that health standards are met. To this end, the results of this assessment will be used in the livestock grazing permit renewal process, for Resource Management Plan revision, and as a basis for Budget and Planning System projects ranging from travel management to weed control, to prairie dog colony mapping.

Major Land Health Problems

Standard 1 Soils: Soils across the majority of the area met Standard 1 with no problems. A much smaller area had some soil problems, but still met Standard 1, while less than 1% of the area did not meet this standard. There were few areas observed where soil erosion was clearly accelerated above natural levels. However, many areas were vulnerable to soil erosion because of low plant basal cover, low cover of plant litter protecting the soil surface, and high amounts of bare soil.

Standard 2 Riparian Areas: The majority of stream miles fully met this standard, and exhibited healthy riparian vegetation, and normal channel morphology and hydrologic processes. Around 10% of streams had some problems ranging from minor to significant, and mostly related to the abundance of invasive weeds in the riparian zone. Some of these reaches also had problems with the channel being overly wide relative to its depth, or excessive sedimentation.

Standard 3 Healthy Native Communities: The majority of areas fully met this standard. A little over 20% of the unit had minor problems, and less than 10% of the unit had significant problems. The most common problems involved lack of perennial forbs, and low levels of cool and warm season grasses. Other significant problems included the presence of noxious weeds, and other invasive alien species, particularly cheatgrass. Problems with the existing vegetation mosaic are present in many parts of the unit as well.

Standard 4 Special Status Species: All upland areas met this standard with no problems identified. There was inadequate data for some sensitive species, and recommendations are made to address this data gap.

Standard 5 Water Quality: The majority of streams in the unit and the watersheds they drain met this standard. However, some stream segments failed to meet this standard because the surrounding watersheds had multiple problems with soil erosion, high levels of bare soil and poor vegetation cover. Such watersheds are vulnerable to accelerated erosion and associated sedimentation of waterways.

Recommendations (note that these are paraphrased from the detailed recommendations made at the end of this report.)

Standard 1 Soils

Implement grazing practices that leave more litter on the soil surface, prevent grazing on regrowth by limiting time of use to 2 weeks or less, and minimize instances where livestock graze the same areas in both the spring and fall seasons. Provide for occasional, year-long rest.

Develop complete road map, use GIS to identify road-caused soil loss, and use to direct road maintenance and rehab areas so that road and travel related erosion is reduced. Monitor use to better understand soil impacts from OHVs. Change open designations to limited to existing routes, or limited to designated routes.

Reduce erosion by identifying and maintaining or decommissioning eroding range projects.

Re-introduce fire or simulate its effects on some sites that are losing herbaceous vegetation cover so that communities with more herbaceous plants and higher plant basal area can be established

Implement monitoring system that will address trends in soils indicators.

Standard 2 Riparian
Develop map showing instream flows and water rights. If necessary, develop instream flow recommendations to ensure all perennial and intermittent streams have some flow protected.

Continue and increase weed management in riparian zones, work in coordination with other entities and follow a strategic weed management plan such as that for the Horsefly Weed Management Area.

Reduce grazing use on native riparian woody species to 30%. Identify and enforce non-riparian trailing areas. Limit livestock utilization of woody riparian plant communities during the fall and winter periods. Evaluate cross fencing to assess whether they are causing unnecessary impacts to streams.

Implement a monitoring system that will address trends in riparian indicators.

Standard 3 Native Plant and Animal Communities
Implement grazing practices that improve perennial grass, cool season grass and forb cover by limiting time of use to 2 weeks during the active growing season, minimize instances where livestock graze the same areas in both spring and fall seasons, and provide for occasional, year-long rest.

Reseed fires and similar disturbances with native, adapted species where threat of weed invasion is likely, or native community is depleted.

Improve perennial grass, cool season grass and forb cover, shrub vigor and vegetation mosaic by reintroducing fire, or simulating its effect.

Increase knowledge of small mammals, herptiles, birds, and predators, their habitat needs and the existing condition of their habitats.

Support neotropical migratory birds by improving and maintaining riparian and oakbrush habitat, supporting the Breeding Bird Survey, and following best management practices.

Continue and increase weed management across the unit; work in coordination with other entities and follow a strategic plan. Target spotted knapweed for total eradication as soon as possible. Develop and follow strategic weed management plans such as that for the Horsefly Weed Management Area.

Restore seriously degraded plant communities.

Consider amending the San Juan/San Miguel Resource Management Plan to evaluate special designations for CNHP, TNC or SREP Potential Conservation Areas, biodiversity conservation areas or wildlife movement corridors.

Finalize the Norwood LHA area road and trail map. Implement more intensive monitoring of OHV use to determine if loss of native plant and animal species or increase in invasive plants is

occurring. Change open designations to limited to existing routes, or limited to designated routes.

Standard 4 Special Status Species:
Improve monitoring and inventory data for prairie dog colonies, Mexican spotted owl and Peregrine falcon.

Continue to assess the potential for increasing the amount of suitable habitat within the unit for reintroduction and expansion of Gunnison sage grouse populations.

Consider amending the San Juan/San Miguel Resource Management Plan to evaluate special designations for CNHP, TNC or SREP Potential Conservation Areas, biodiversity conservation areas or wildlife movement corridors.

Enhance the management of those streams that are functioning at risk in order to improve habitat conditions for sensitive fish species (see recommendations for Standard 2.)

Standard 5 Water Quality:
Assess the condition of in-channel structures for possible contribution of sediment to local drainages, and repair/reclaim as necessary.

Implement management strategies to maintain or increase basal vegetation cover across the LHA area, and decrease amount of bare soil surface on the uplands in the watersheds rated as "Meeting with Problems".

Perform road maintenance and/or closures on roads identified with drainage or erosion problems.

Assess identified incised channel systems as to their stage of development and causal factors, and implement corrective actions, if appropriate.

Reseed burns and consider mulching/rollerchopping/hydroaxing burned areas that are prone to accelerated sediment production where existing vegetation is unlikely to stabilize the site within the first 1-2 years post fire, or if the invasion of cheatgrass is a threat.

Continue to assess the condition of stream and riverine environments to identify potential impacts to water quality, including the annual thermal regime (e.g. river icing associated with the Ames Powerplant operations). Additionally, pursue instream flow recommendations to the state of Colorado on streams needing flow protection to sustain flow-related resource values (e.g. complete and implement the San Miguel River Instream Flow Assessment).

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Land Health Assessment
Norwood Area, 2005-2006

INTRODUCTION

Overview

The Norwood Land Health Assessment (LHA) area is located in San Miguel and western Montrose Counties in west-central Colorado. The LHA area takes in much of the southern part of the Uncompahgre Plateau, and the central portion of the San Miguel River watershed. It extends from the confluence of the San Miguel River and the South Fork downstream to the San Miguel's confluence with Dry Creek. The LHA area is bounded on the north and south by the Uncompahgre National Forest (part of the larger GMUG National Forest, see Figure 1.2). The unit encompasses over 303,000 acres within its boundary, and is made up of parts of five Level 5 watersheds: Upper San Miguel River, Beaver/McKenzie Creeks, Naturita Creek, Coal/Cottonwood Creeks, and Dry Creek watersheds. The unit was identified in 1998, prior to the directive to base units on fifth order watershed boundaries. However, it is centered in the southwestern part of the Uncompahgre Field office, and fits within the larger San Miguel watershed, and thereby forms a large and cohesive landscape "chunk".

Land Ownership Pattern

The Norwood Land Health Assessment boundary encompasses a little more than 303,000 acres of which 103,310 acres are public land. These public lands are distributed across the area in dispersed blocks of public land located largely along major drainages feeding into the San Miguel River. The area to the west has more extensive blocks of public land that include substantial areas outside of drainages and canyons (see Fig.1.2).

BLM Resource Management Plan Guidance

All public lands in the unit are covered by the San Juan San Miguel Resource Management Plan (RMP), as shown in Figure. 1.3. The area falls into eleven main RMP management emphasis units, and several combinations of these. One of these is also designated as the San Miguel Area of Critical Environmental Concern. Outside of the ACEC, the majority of the area falls into the RMP's livestock, recreation, and deer and elk winter range emphasis units. Areas around Naturita Creek fall into the aquatic emphasis unit, while bale eagle roost areas are identified along a small portion of the San Miguel River and Dry Creek. A small area south of Nucla is identified for coal leasing, while larger tracts adjoining the forest to the south are in the forestry emphasis unit. Small, scattered parcels throughout the unit are designated for general management or disposal.

Grazing Allotments

There are 43 grazing allotments in the unit that contain public land (See Figure 1.4, and Table 1.1). Sixteen of these are almost entirely made up of public land (Naturita Ridge, Coventry, Parkway, Mud Springs, McKee Draw, Gravel Pit, Dry Park, Maverick Draw, River, Upper Mailbox, Norwood Hill, Uncompahgre Common, Horsefly Common, Far Away, Bolinger Ditch, and Lower Beaver Canyon). Twenty allotments have significant proportions of public land but also contain more than 10% private land: Coke Ovens, Lilylands West, Naturita Canyon, Bramier Draw, Wickson Draw, Broad Canyon, Lower Hamilton, Middle Hamilton Lease, Burn Canyon, Buck, Little Maverick Draw, Hamilton Mesa, Barkelew Draw Common, Mailbox Park, Beaver Rim, Little Baldy, Alder Creek, Leopard Creek, Lee Lands, and Big Bear Creek. The remaining seven are 25% or less public land: North Wickson Draw, Home Ranch, Redvale,

Figure 1.1 Norwood LHA general location map.

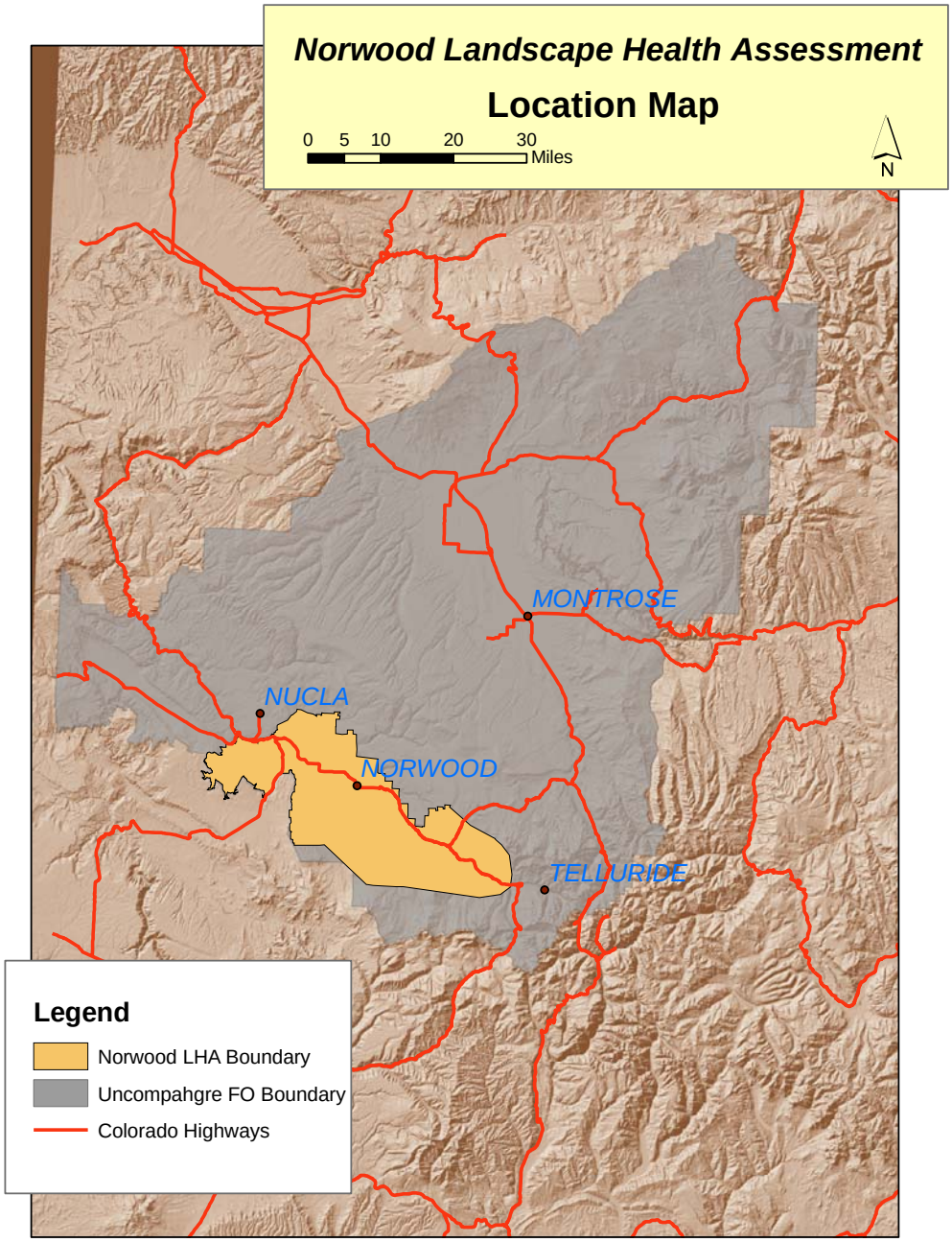


Figure1.2 Norwood LHA land ownership.

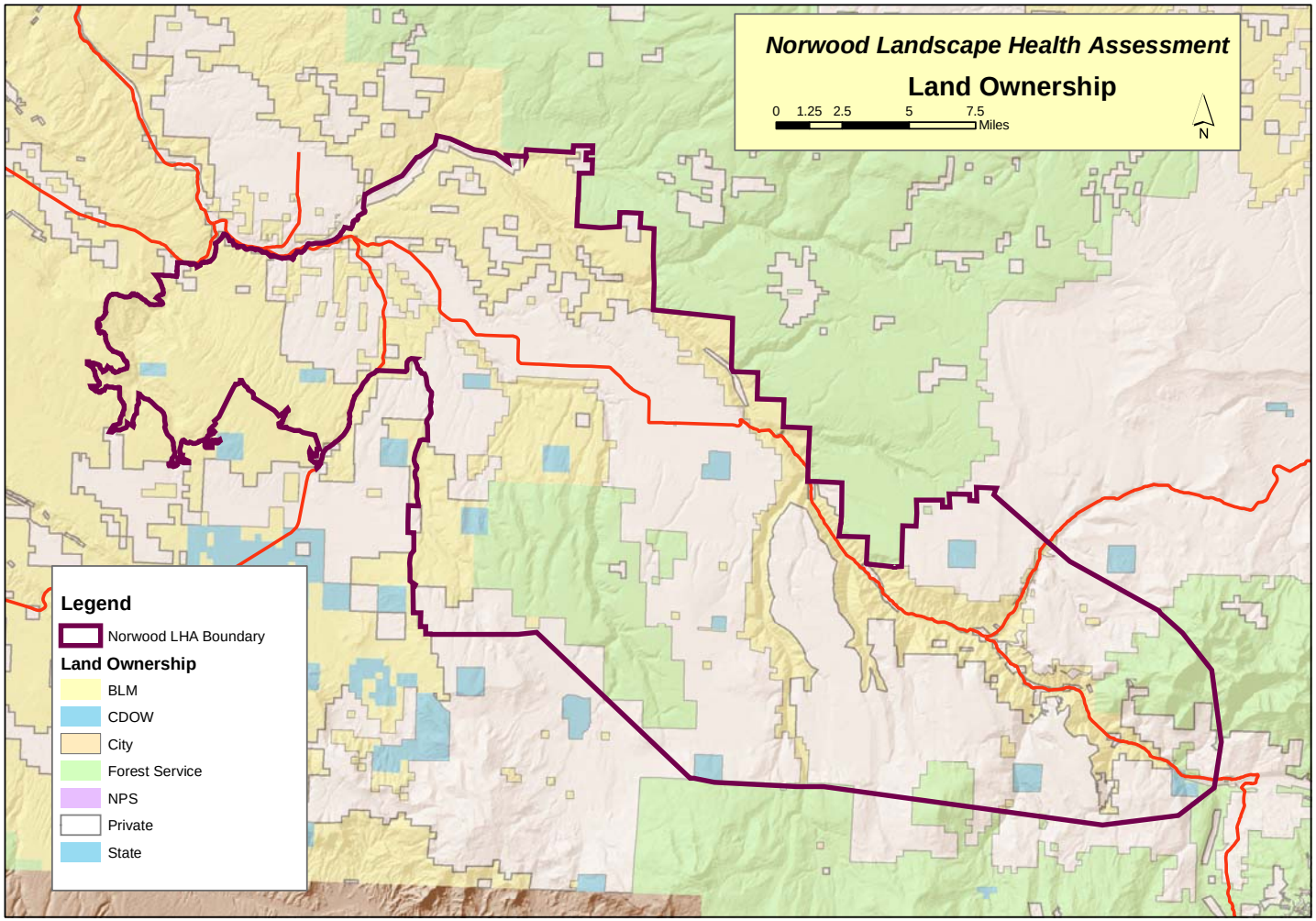


Figure 1.3 Norwood LHA land management designations from the San Juan San Miguel Resource Management Plan.

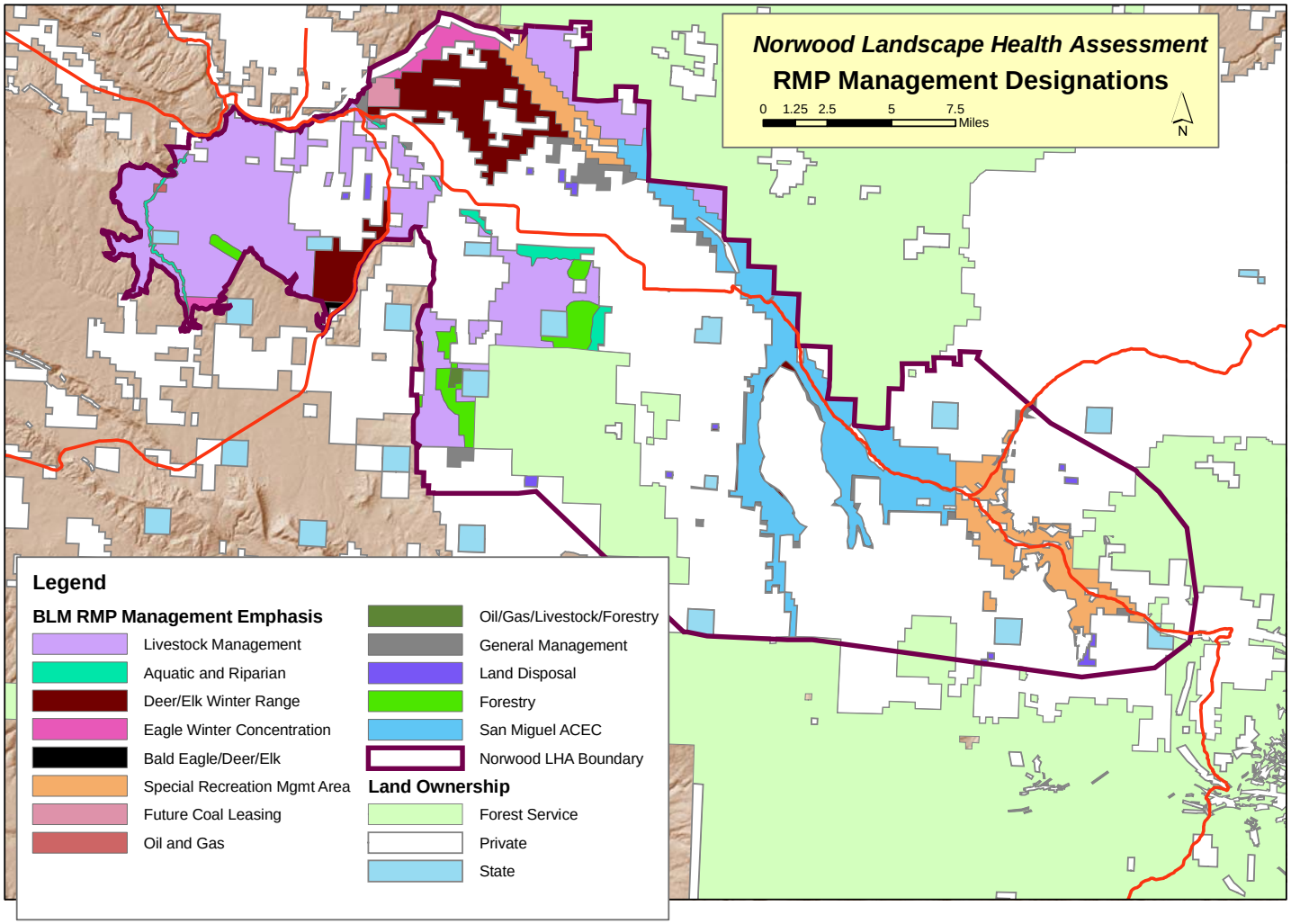
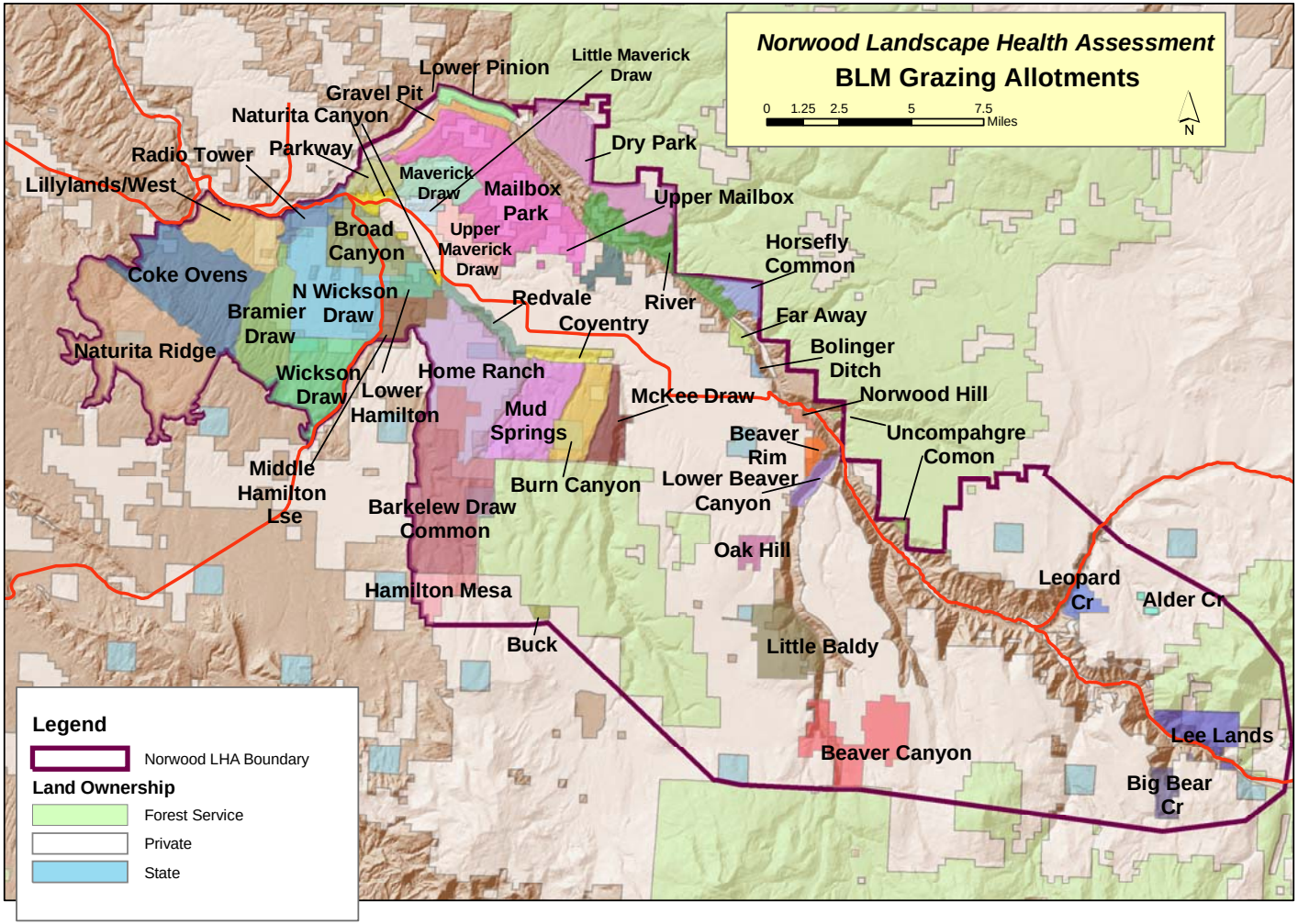


Figure 1.4 Norwood LHA Area grazing allotment boundaries.



Lower Pinion, Upper Maverick Draw, Beaver Canyon, and Oak Hill. All of the allotments are grazed by cattle, except for two which are grazed by sheep.

Table 1.1 Grazing Allotments and Management.

Allotment Name and Number	**Class**	**Season**	**Comments**
Middle Hamilton Lease #7233	Cattle	Winter	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. Use typically occurs for 2 week period in late January/early February.
Home Ranch #7201	Cattle	Fall/Spring	Extended authorization period to allow maximum flexibility in management of unfenced private/public (5%) grazing unit.
Mud Springs #7230	Cattle	Spring	Grazing preference has been reduced by 226 aums. Livestock water a problem. Grazing time controlled by location of hauled water.
Lower Hamilton #7234	Cattle	Winter	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. Use typically occurs for 2 week period in late January/early February.
Bramier Draw #7235	Cattle	Winter	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. Approximately 700 acres of new seeding/fire rehabilitation.
Broad Canyon #17199	Cattle	Winter	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit.
Buck #7232	Cattle	Fall/Spring	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. Recent land trade significantly increased % PL in allotment.
Upper Maverick Draw #7202	Cattle	Winter	BLM (6% PL) dominated by mature Pinion/Juniper. Limited use by livestock.
Naturita Canyon #7203	Cattle	Winter	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit.
Little Maverick Draw #7210	Cattle	Winter	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit.
Maverick Draw #17018	Cattle	Winter	Recent rollerchop and seed. Additional effort necessary to move cows off seeding.
Lilylands West #17024	Cattle	Winter	Old treatments beginning to decline in forage production. Scheduled for fuels reduction treatments.
River #7200	Cattle	Summer	BLM fenced separately but grazing w/ private pastures. Limited to 15 day graze periods and time of use alternated.
Beaver Rim #7204	Horse	Spring	Concerns in recent years with mountain lion activity.
Leopard Creek #7205	Sheep	Spring/Fall	Permittee has taken non-use in recent years but plans to re-activate. Use will alternate between spring and fall.
McKee Draw #7206	Cattle	Spring or Fall	Two use areas that receive maximum of 15 day graze period. Spring and fall use is alternated.
Big Bear Creek #7207	Cattle	Summer	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. 5% PL
Upper Mailbox #7208	Cattle	Spring/Fall	Current permittee is leasing private base and BLM and does not use in the fall. Approximately 400 acres of recent rollerchop and seed.
Hamilton Mesa #7209	Cattle	Spring	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. Portion burned and rehabbed in 2002/2003.

Lower Beaver Canyon #7211	Cattle	Summer	Permittee signed conservation use agreement in 1996. Allotment does not currently fit permittees operation but could change in the future.
Norwood Hill #7218	Cattle	Fall	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. Use typically occurs during a 2-3 week period within 10/1-11/30 window.
Bolinger Ditch #7219	Cattle	Summer	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. Use period is limited to 15 days and occurs at different times within authorization period.
Coventry #7222	Cattle	Winter	Approximately 2.5 miles of Naturita Ck. riparian area. Utilization levels monitored closely on riparian woody species.
Redvale #7227	Cattle	Winter	Allotment is used for a several day period to trail on to adjacent Coventry Allotment.
Little Baldy #7223	Cattle	Spring/Fall	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. Spring and Fall use is alternated.
Oak Hill #7225	Cattle	Summer	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. 4% PL
Dry Park Common #7300	Cattle	Spring/Fall	Approximately 1000 acres of recent Rx and rollerchop and seed. Use in one of two pastures in each spring or fall. Spring and fall use is alternated.
Parkway #17062	Cattle	Spring	Used for 15 days on the way off Mailbox Park private/BLM lease.
Horsefly Common #7301	Cattle	Spring	Used on the way to adjacent FS permit. Twelve day graze period authorized but typically used for about 5 days.
Uncompahgre Common #7302	Cattle	Summer	BLM involves 5 separate parcels along the San Miguel Canyon rim that are not fenced from FS. Managed as part of FS rotation grazing system.
Barkelew Draw Common #7303	Cattle	Spring/Fall	Nearly entire allotment burned in 2002 Burn Canyon Fire. Rehab included seeding and fencing into 4 pasture/use areas that allow for management of 15 day grazing periods.
Coke Ovens #17027	Cattle	Winter/Spring	Recent fence project created 4 pastures that facilitate 15 day graze period and change up in season of use. Also impacted by Bramier Resource benefit fire in 1999.
Radio Tower #02660	Cattle	Spring/Winter	Was previously a pasture in Coke Oven Allotment. Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. Used for 7-10 day periods in April/May and Dec./Feb.
Lee Lands #17003	Sheep	Spring/Fall	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. Recent land trade reduced % PL to 15.
Mailbox Park #17001	Cattle	Spring/Fall	Allotment divided in 3 use areas that are grazed in spring or fall but not both in same year. Approximately 800 acres of recent treatments w/ seeding. Limited livestock water – hauling used to distribute grazing.
Wickson Draw #17010	Cattle	Winter/Spring	Historic use concentrated in Long Draw. Approximately 300 acres of planned rollerchop and seed will improve distribution.
North Wickson Draw #17023	Cattle	Winter/Spring	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. 5% PL.

Burn Canyon #17022	Cattle	Spring/Winter	Portion burned and rehabbed in 2002 Burn Canyon Fire. New boundary fence built in 2003. Permittee has not used in fall in recent years.
Naturita Ridge #17035	Cattle	Winter	Active grazing preference reduced to 440 aums. Recent rollerchop/RX and seeding has increased forage production significantly.
Far Away #17213	Cattle	Spring/Fall	Spring and fall use alternated – not in same year. Some issues with recreation/ATV use.
Lower Pinion #7213	Cattle	Spring/Fall	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. 5% PL.
Alder Creek #17253	Cattle	Spring	Extended authorization period to allow maximum flexibility in management of unfenced private/public grazing unit. Recent land trade resulted in reduction of % PL. Grazing period in pasture w/ BLM typically limited to 10 days.
Beaver Canyon #17060	Cattle	Spring/Fall	All use is in Beaver Creek riparian. Spring and fall use alternated from year to year. Use on riparian woody vegetation monitored.

Landform and Topography

Elevations range between 5,400 feet in the western part of the unit along the San Miguel River to 9,400 feet along Big Bear Creek at the eastern end of the unit (Figure 1.5). The San Miguel River Canyon and associated drainages dissect the LHA area into several distinct mesas. These include Hastings, Iron Springs, Wrights, Hamilton, Beaver, Specie and Wilson Mesas. The steeply sloping Uncompahgre Plateau defines the northern edge of the unit, while Naturita Ridge and the slopes leading up to it dominate the eastern portion (Figure 1.6).

Geology

The LHA is located in the Canyon Lands section of the Colorado Plateau Geomorphic province on the western slopes of the Uncompahgre Plateau. The area is typical of Colorado Plateau geology: gently dipping sedimentary rocks, altitudes exceeding 5,000 feet, the climate is semi-arid to arid, erosion has produced innumerable escarpments and structural benches and relief is the result of the incision of deep canyons below moderately flat terrain.

The primary formation that outcrops on the mesa tops in the eastern portion of the LHA is the Mancos Shale and on the western portion of the LHA is the Dakota sandstone, outcropping on the slopes is the Jurassic Morrison formation and the remaining formations outcrop along drainage channels (Figure 1.7). The geologic formations exposed in the area range in age from Paleozoic (oldest rocks) to recent alluvial deposits. They are the Permian Cutler formation, the Triassic Chinle, Dolores, Wingate and Kayenta formations, the Jurassic Entrada, Summerville and Morrison formations, the Cretaceous Dakota Sandstone and Mancos shale formations as well as quaternary alluvium, colluvium and landslide deposits.

Soils

Soils on public lands in the LHA area reflect the diverse geology and climate of the area. The soils are described in detail in the San Miguel Soil Survey (UDSA, NRCS 2001). The soil units in the LHA area are listed and briefly described in Table 1.2 and are shown in Figure 1.8. The soils at the lower elevations of the LHA area are dominated by soils classified in the orders of Aridisols and Entisols. These soils have limited development from their parent material due to

low climatic intensity, and have a limited potential for plant establishment and growth. At the higher elevations of the LHA area the soils are in the orders of Mollisols and Alfisols. These soils have a higher degree of development with distinct horizons in the soil profile. Surface soil horizons are typically darkened by accumulations of organic matter. The potential for vegetation production on these higher elevation soils is much greater than the lower elevations soils.

Soil resource issues the resource staff was aware of prior to the LHA evaluation, include: several sites exhibiting plant cover and composition insufficient to protect the soil surface from accelerated erosion, the occurrence of incised drainages which often result from accelerated upland runoff, poorly located and maintained roads that are commonly a source of erosion and concentrated runoff. Three wildfires (Burn canyon, Naturita Ridge, and Bramiers) also occurred within the LHA area in recent years that initially reduced plant/watershed cover. However, by implementing fire stabilization efforts (seeding and mechanical treatments) plant cover on much of the burned areas has been restored to conditions that provide greater soil surface protection that pre-burn conditions. Several vegetation treatments have also been implemented within the LHA area that has resulted in greater plant and litter cover on the soil surface.

Figure 1.5 Norwood LHA Area elevations, from 30 meter Digital Elevation Model (US Geological Survey).

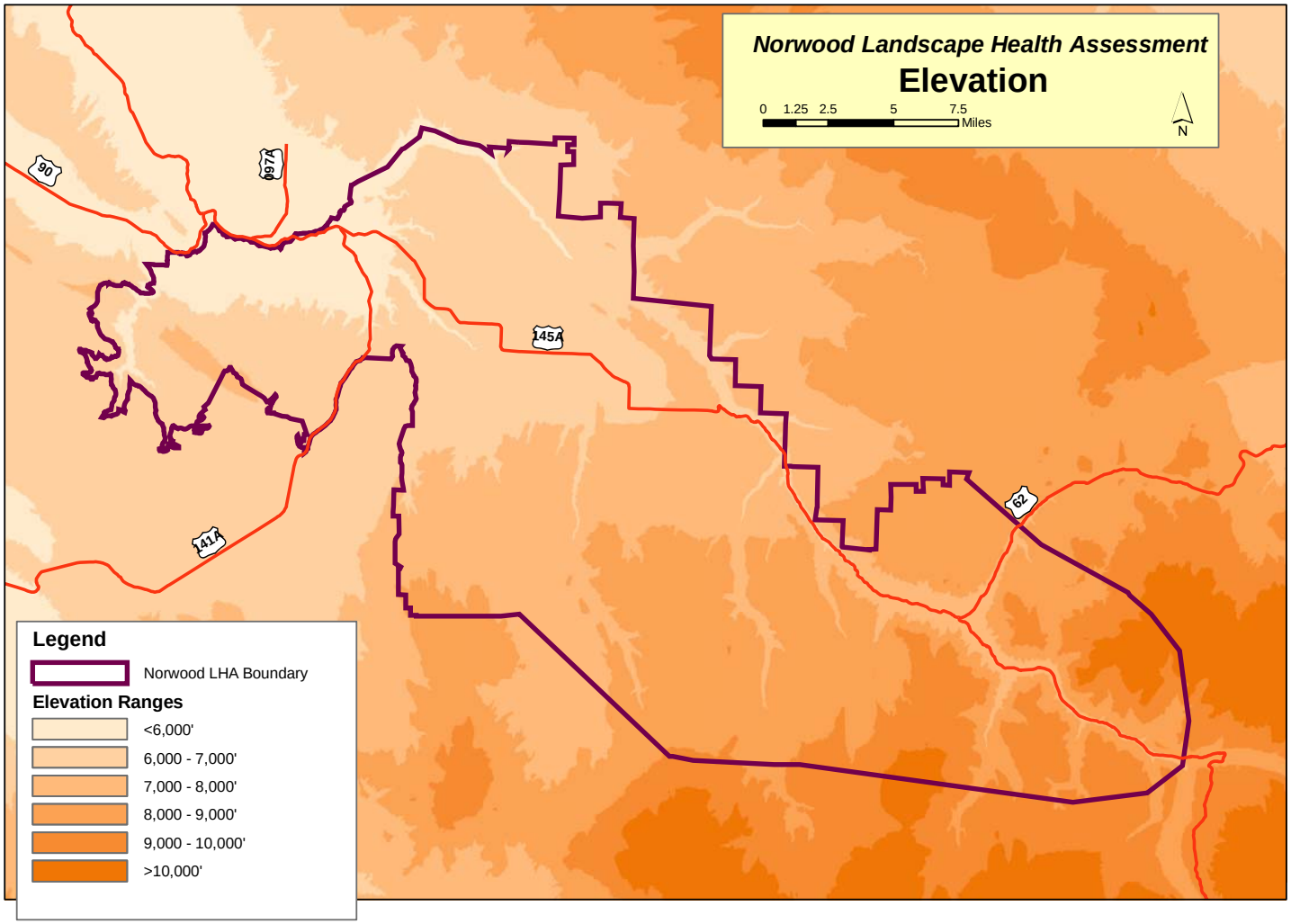


Figure 1.6 Norwood LHA Area slopes and landforms. From 30 meter Digital Elevation Model US Geological Survey).

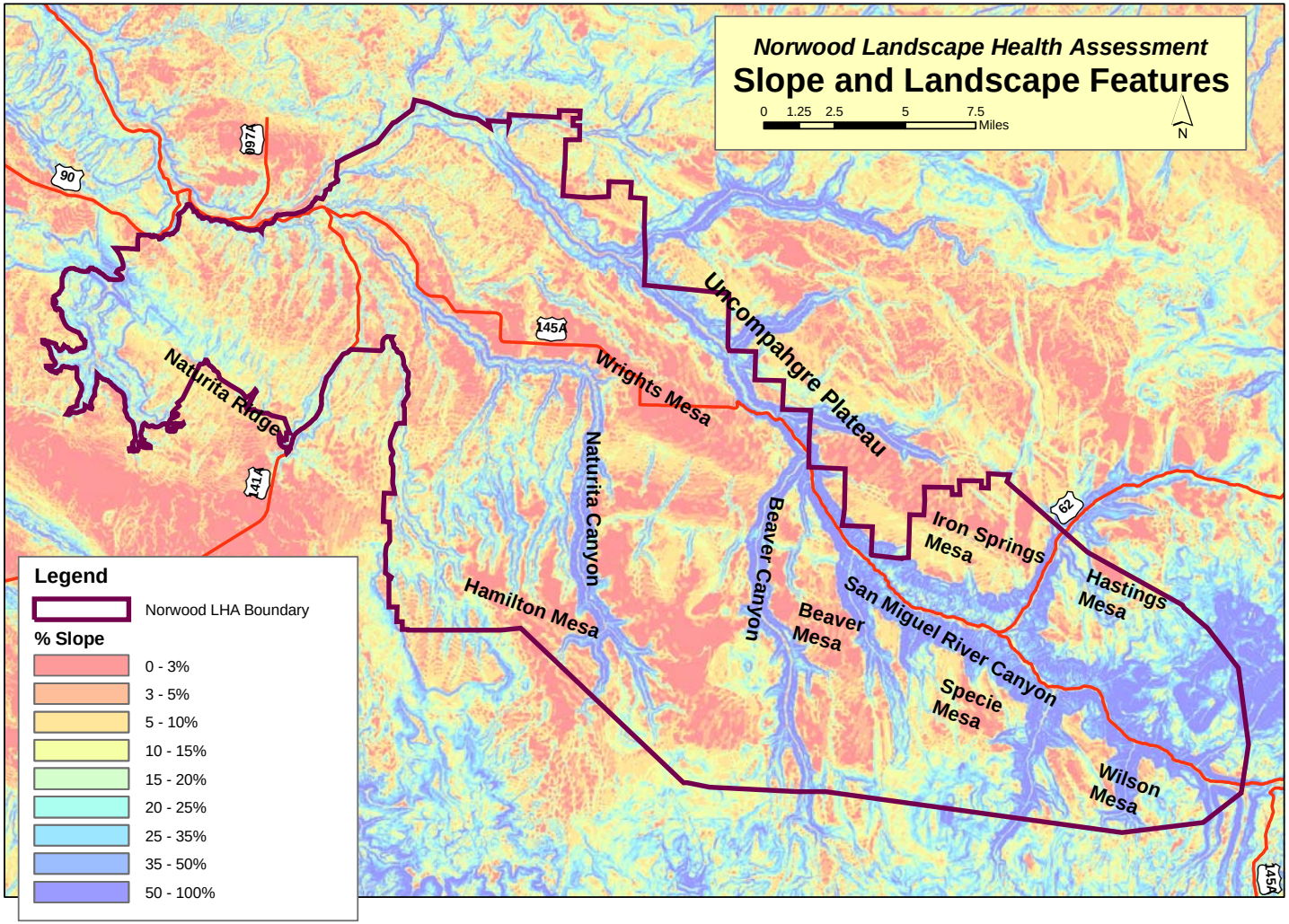


Figure 1.7 Surficial geology of the Norwood LHA area.

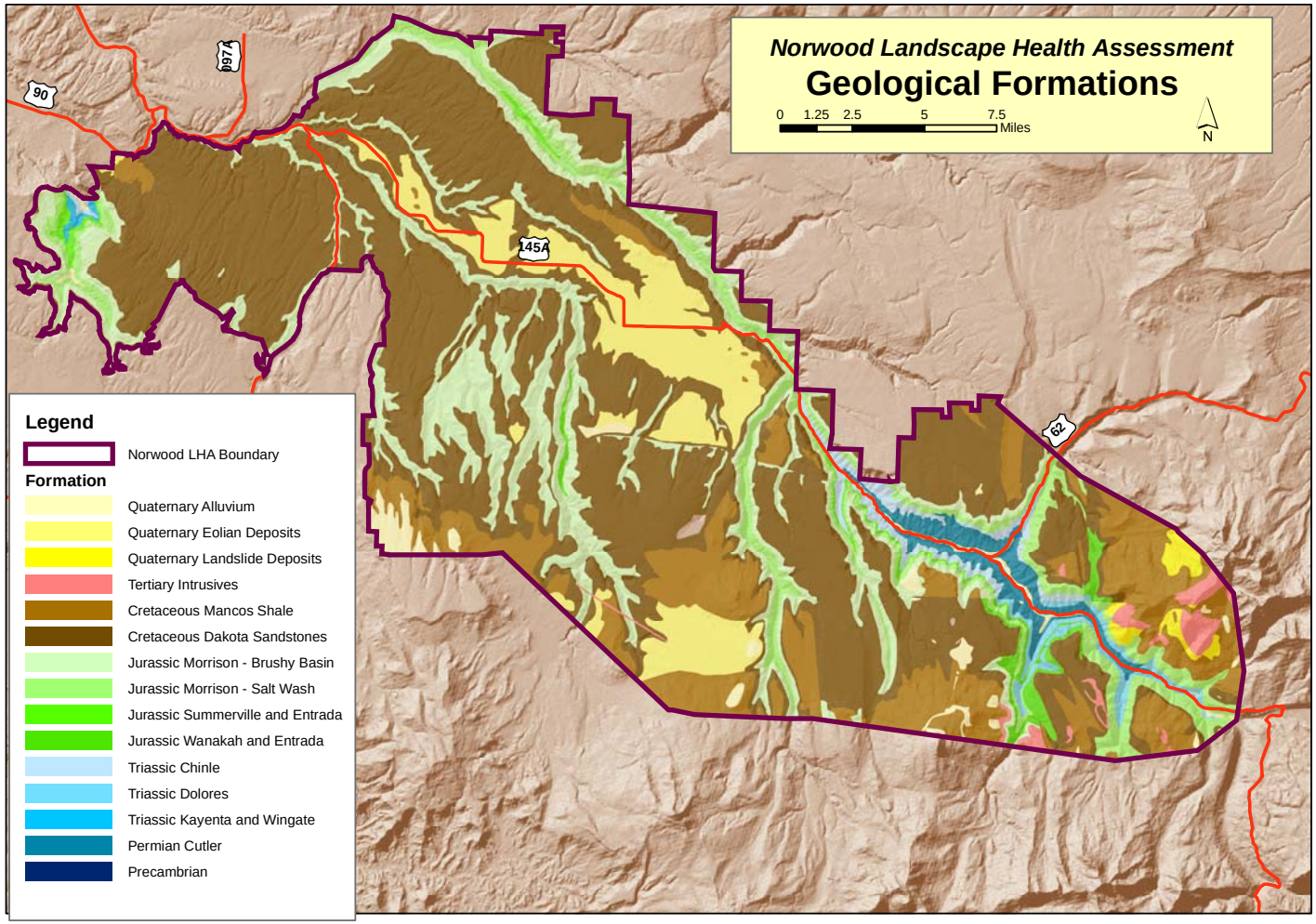


Figure 1.8 Soils of the Norwood LHA Area (From San Miguel Soil Survey NRCS 2001).

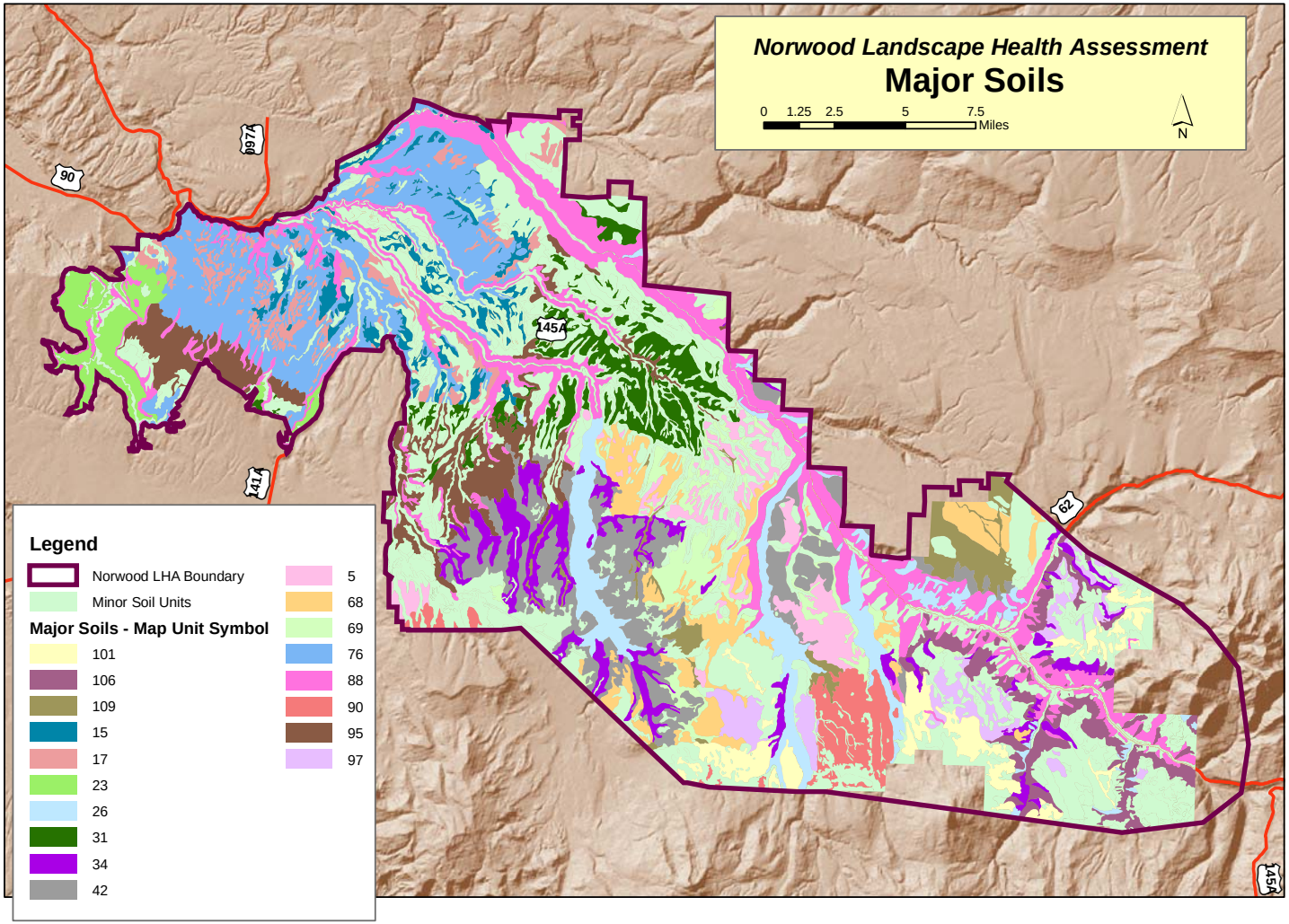


Table 1.2 Important soil map units in the Norwood LHA area and descriptions of their characteristics.

Soil Map Unit	Name	BLM Acreage in Unit	Characteristics
88	Rock Outcrop, Orthents complex, 40 to 90% slopes	27,130	Located on canyon sideslopes, mesas, and structural benches between 4,700 and 9,200 feet. The orthents are typically greater than 60 inches to bedrock and stony or gravelly loams throughout the soil profile. These soils are well drained, have moderately slow permeability, low available water capacity, and a high runoff potential. The soil erodability is low to moderate, having a Kw factor of 0.20. Ecological site:Douglas-fir
76	Pinon-Bowdish-Rock outcrop complex, 3-30% slopes	17,794	Located on escarpments, mesas and structural benches between 5,400 and 6,800 feet. These soils are shallow (10-40 inches to bedrock) and have surface horizons with a loamy texture. Both the Pinon and Bowdish soils are well drained, have moderately slow permeability, low water holding capacity, and a high to very high runoff capacity. The soil erodability is low to moderate, having a Kw factor of 0.20. Ecological site: Pinon-Juniper
95	Skein-Rock outcrop complex, 3-65% slopes	8,554	Located on mesas and canyons between 6,800 and 7,400 feet. These soils are shallow (10-20 inches to bedrock) and have surface horizons with a loamy texture. The Skein soil is well drained, have moderate permeability, very low water holding capacity, and a very high runoff potential. The soil erodability is moderate, having a Kw factor of 0.28. Ecological site:Pinon-Juniper
26	Borolls-Rock outcrop complex, 40 to 90% slopes	7,020	Borolls are located between 6,600 and 9,200 feet on mesas and in canyons. These soils are typically 60 inches or greater in depth before encountering bedrock. Borolls are well drained, have moderately slow permeability, low water holding capacity, and a very high runoff capacity. The soil erodability is low, having a Kw factor of 0.15. Ecological site: Douglas-Fir
23	Bodot, dry-Ustic Torriorthents complex, 5 to 50% slopes	5,702	Both the Torriorthents and Bodot soils are located on benches and landslide deposits between 5,400 and 6,800 feet. The Bodot soils and Torriorthents are typically 20-40, greater than 60 inches to bedrock, respectively. The soils are well drained, have slow to moderately slow permeability, low water holding capacity, and a very high runoff potential. The soil erodability is low, having a Kw factor of 0.15. Ecological site: Bodot – Basin Shale, Torriorthents – Pinon-Juniper

106	Winz-Rock outcrop complex, 20 to 90% slopes, very stony	3,349	The Winz soils are located on mesa tops between 8,000 and 9,200 feet. The depth to seasonal water table is greater than 72 inches. This soil are well drained, have a moderately slow permeability, a low water holding capacity, and a very high runoff capacity. The soil erodability is low, having a Kw factor of 0.15. Ecological site: Winz – Douglas-Fir
17	Barx-Progresso complex, 3 to 12% slopes	2,914	These soils are located on mesa tops and old terraces between 5,300 and 6,800 feet. Both soils are well drained and have a depth to seasonal water table at 72 inches. The Barx soil has a high available water capacity and a medium runoff potential. The Progresso soil has a low available water capacity and a high runoff potential. The Barx soil has a moderate erodability potential, having a Kw factor of 0.24 and the Progresso soil has high erodability potential with a Kw factor of 0.37. Ecological site: Barx - Semidesert Sandy Loam, Progresso – Semidesert loam.
25	Bond-Progresso complex, 3 to 30% slopes	2,641	These soils are located on mesas and benches between 6,000 and 6,800 feet. Both soils are well drained, have moderately slow permeability, high to very high runoff potential, a low to very low available water capacity, and a depth to seasonal water table at greater than 72 inches. The Bond soil has a moderate erodability potential, having a Kw factor of 0.24 and the Progresso soil has high erodability potential with a Kw factor of 0.37. Ecological site: Bond – Pinon-Juniper, Progresso – Semidesert loam.
48	Gurley-Skein loams, 3 to 20% slopes	2,099	These soils are located on mesas and terraces between 6,800 and 7,400 feet. Both soils are well drained, have a very high to runoff potential, a low to very low available water capacity, and a depth to seasonal water table at greater than 72 inches. Both soils have a moderate erodability potential, having a Kw factor of 0.28. Ecological site: Gurley – Loamy Foothills, Skein – Pinon-Juniper.
31	Callan loam, 3 to 6% slopes	1,872	These soils are located on mesas and terraces between 6,800 and 7,400 feet. The soil is well drained, exhibits slow permeability, has a high available water capacity, and a very high runoff potential. Callan soils have a moderate erodability potential, having a Kw factor of 0.24. Ecological site: Callan – Loamy Foothills
99	Specie, moist Rock outcrop complex, 15 to 60% slopes	1,734	The Specie soil is found on mesa tops between 7,600 and 9,000 feet. The soil is well drained, has a low available water capacity, permeability is moderately rapid, and the potential for runoff is medium. Specie soils have a low erodability potential, having a Kw factor of 0.15. Ecological site: Specie – Douglas-Fir

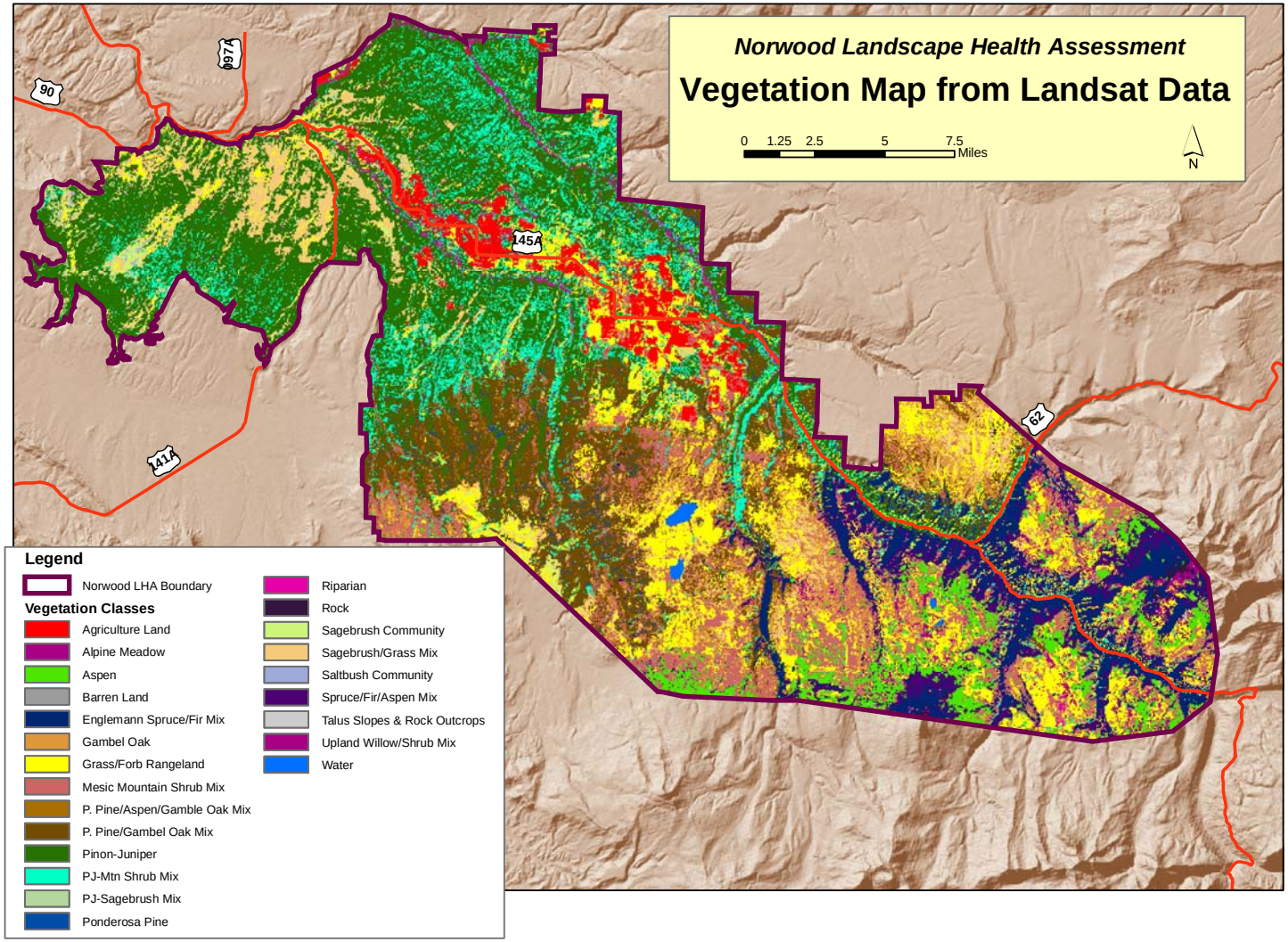
41	Fivepine-Nortez-Rock outcrop complex, 12 to 30% slopes	1,724	These soils are located on mesa tops between7,400 and 8,500 feet. Both the Fivepine and Nortez soils are well drained, have a low available water capacity, a high to very high runoff potential, and a depth to seasonal water table at greater than 72 inches. . Both soils have a moderate erodability potential, having a Kw factor of 0.28. Ecological site: Fivepine – Ponderosa Pine, Nortez – Pine Grasslands
32	Callan loam, 6 to 12% slopes	1,629	These soils are located on mesas and terraces between 6,800 and 7,400 feet. The soil is well drained, exhibits slow permeability, has a high available water capacity, and a very high runoff potential. Callan soils have a moderate erodability potential, having a Kw factor of 0.24. Ecological site: Callan – Loamy Foothills
33	Callan-Gurley loams, 3 to 20% slopes	1,613	These soils are located on mesa tops and terraces between 6,800 and 7,400 feet. Both the Callan and Gurley soils are well drained, a high to very high runoff potential, and a depth to seasonal water table at greater than 72 inches. Both soils have a moderate erodability potential, having a Kw factor of 0.24 and 0.28, respectively. Ecological site: Callan and Gurley – Loamy Foothills
85	Radersburg gravelly loam, 3 to 30% slopes	1,556	This soil is located on mesa tops ridges and terraces between 7,000 and 8,100 feet. The soil is well drained, has a moderately slow permeability, a high runoff potential, and a low available water capacity. Radersburg soils have a low erodability potential, having a Kw factor of 0.15. Ecological site: Radersburg – Loamy Slopes

Vegetation

At least 16 distinct vegetation classes occur on BLM land in the landscape unit. These are tied to soil type as well as elevation and precipitation (Figure 1.9). Of the 16 classes, 14 cover substantial acreage, or are otherwise notable within the LHA unit.

The drainages with intermittent or perennial water contain riparian vegetation. Riparian vegetation is most prevalent along the streams with perennial flow—the San Miguel River and Big Bear, Leopard, Fall, Specie, Saltado, Beaver, Naturita, and Dry Creeks. Small pockets of riparian vegetation are also present along some of the ephemeral drainages. Within the broad category of riparian vegetation are many distinct, interwoven plant communities. These include numerous communities dominated by narrowleaf cottonwood (*Populus angustifolia*) (or Rio Grande cottonwood (*Populus deltoides*) at lower elevations) and distinguished by various associated shrubs and trees including thinleaf alder (*Alnus tenuifolia*), blue spruce (*Picea pungens*), Douglas fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), water birch (*Betula occidentalis*), and red osier dogwood (*Cornus sericea*). Several willow dominated communities are also present with various combinations of sandbar willow (*Salix exigua*), Driummond willow (*Salix drummondiana*), strapleaf willow (*Salix liguifolia*), Geyer willow (*Salix geyeriana*), and mountain willow (*Salix monticola*). Thinleaf alder forms a very common community alongside the water's edge. Small pockets of sedge communities are also present with water sedge (*Carex aquatilis*) or beaked sedge (*Carex utriculata*). Ephemeral and lower

1.9 Norwood LHA Area vegetation classes derived from 1993 Landsat Imagery.



elevation drainages are often dominated by tamarisk (*Tamarix chinensis*). Detailed descriptions of these communities can be found in the Field Guide to the Wetland and Riparian Plant Associations of Colorado (Colorado Natural Heritage Program 2003). The drought tolerant vegetation class described as saltbush community occurs at the very lowest elevations of the LHA unit as isolated occurrences. This community includes the following shrubs: shadscale (*Atriplex confertifolia*), black sage (*Artemesia nova*), winterfat (*Krascheninnikovia lanata*), black greasewood (*Sarcobatus vermiculatis*), four-wing saltbush (*Atriplex canescens*), snakeweed (*Gutierrezia sarothrae*) and prickly pear cactus (*Opuntia polycantha*) in varying amounts. Galleta grass (*Hilaria jamesii*) is the most common perennial grass species found in this vegetation class, with bottlebrush squirreltail (*Elymus elymoides*), Indian ricegrass (*Achnatherum hymenoides*), needleandthread grass (*Heterostipa comata*), Sandberg bluegrass (*Poa secunda*), and blue grama (*Bouteloua gracilis*) commonly occurring as well. Many different forbs occur, but some of the most common are rose heath (*Chaetopappa ericoides*), and scarlet globemallow (*Sphaeralcia coccinia*).

With increasing elevation and precipitation, the saltbush community class grades into pinyon-juniper woodland class on shallower, steeper soils and the pinyon-juniper/sagebrush mix, sagebrush community, and sagebrush/grass mix classes on the deeper soils. This zone contains many of the vegetation classes shown on the map—various mixes of sagebrush, pinyon and juniper, grass, and mountain shrubs. The pinyon-juniper woodland is dominated by Colorado pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) with a sparse and variable understory that may contain green Mormon tea (*Ephedra viridis*), black sage, yucca (*Yucca harrimaniae, Yucca bacata)*, snakeweed, potato cactus (*Opuntia fragilis*), muttongrass (*Poa fendleriana*), and bottlebrush squirreltail. The sagebrush community is dominated by Wyoming big sagebrush (*Artemesia tridentata wyomingensis*), with isolated occurrences of Basin big sagebrush (*Artemesia tridentata tridentata*). Frequently snakeweed or four-wing saltbush is a secondary shrub in these communities, and there is an understory of the same native grasses found in the saltdesert shrub zone. At lower elevations, pinyon-juniper woodland occurs together with sagebrush on many sites. These may be areas with a mixture of shallow and moderately deep soils that are subject to tree invasion in wet climatic cycles, and tree death during drought cycles, or they may be a successional stage that follows fire or other major natural disturbance.

At higher elevations the PJ/mountain shrub mix, mesic mountain shrub mix, and Gambel oak classes are found. The pinyon-juniper community contains birchleaf mountain mahogany (*Cercocarpus montanus*), Utah serviceberry (*Amelanchior utahensis)*, and Gambel oak (*Quercus gambelii*). With increasing elevation, pinyon trees drop out of the community, and the mountain shrubs dominate the vegetation, with a productive understory of forbs and grasses such as elk sedge (*Carex geyeri*), Junegrass (*Koeleria macrantha*), Kentucky bluegrass (*Poa pratensis*), bromes (*Bromus carinatus, Bromus anomalus*), slender and western wheatgrasses (*Elytrigia trachycaulis, Pascopyrum smithii*), and needlegrasses (*Heterostipa* spp.) Forbs are numerous with many species including lupine (*Lupinus* spp., mule's ear (*Wyethia amplexicaulis*), wild strawberry (*Fragaria spp*.), and yarrow (*Achillea millefolium*). On steep slopes and shallow soils, ponderosa pine, ponderosa pine/Gambel oak mix, ponderosa pine/aspen/Gambel oak mix classes are found, with the spruce/fir/aspen mix class on the mesic aspects. The understory in these communities is typically sparse or made up of many of the same grasses and forbs found in the mountain shrub communities.

Grass-forb rangeland is a vegetation class that occurs across the range of elevations. In some cases it is related to soil characteristics, in others it is a result of disturbance, and is a successional stage to other vegetation classes. The species are typically those grasses and forbs found in each of the different community types listed above.

Many of the native vegetation communities and classes listed above contain some level of invasive, nonnative species as well. The most widespread are Eurasian annuals, chiefly cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola kali*), burr buttercup (*Ceratocephala testiculaa*), Jim Hill mustard (*Sysimbrium altissimum*) and filaree (*Erodium cicutarium*). In areas where there have been past vegetation treatments--especially chainings-- crested wheatgrass (*Agropyron cristatum*) is a common species, with alfalfa (*Medicago sativa*), and yellow sweet clover (*Melilotus officinale*) also present. State listed noxious weeds are scattered across the unit, with Russian knapweed (*Acroptylon repens*) the most common in disturbed areas at lower elevations, together with some incidence of whitetop (*Cardaria draba*) near cultivated areas. The area around the CC ditch along the lower part of the San Miguel River is the most notable of the Russian knapweed infestations. Tamarisk (*Tamarix chinensis*) is present in many drainages, oxeye daisy (*Leucanthemum vulgare*) has recently spread through most of the San Miguel River and is on many of its tributaries, and spotted knapweed (*Centaurea biebersteinii*) has been found as an isolated occurrence along the upper part of Beaver Creek.

Prior to the land health assessment, the staff considered the extent of noxious weeds and invasive species to be a substantial vegetation problem in the area. The Nature Conservancy has undertaken a tamarisk control project along nearly all of the streams in the LHA area. BLM has worked with San Miguel County to control some of its other weed infestations as well, but treatment has not been comprehensive. The Horsefly Weed Management Plan has recently been implemented, and is a more comprehensive, interagency effort to control weeds in the middle and lower parts of the watershed.

The UFO staff also believes that fire suppression, extensive chaining treatments and historic grazing have impacted the vegetation, leading to age class distribution problems. A number of habitat improvement projects have been completed in the LHA area. These were designed to improve habitat for big game and livestock, to reduce fuels, and protect powerlines. These treatments have resulted in more early and early-mid successional (age class) patches across the landscape, and less acreage of middle age classes. These projects have also targeted the declining conditions of browse stands in an effort to improve overall shrub vigor and productivity. A concern over low levels of desirable grasses and forbs has also been addressed by seeding these habitat projects with native seed.

Wildlife

The Norwood LHA area supports a large variety of upland, riparian, and aquatic wildlife species. Table 1.3 below shows a list of the most common or noted wildlife species, their occurrence, and the basic habitat types in which they are found. Some species are yearlong residents, while others are migrants. A variety of small mammal, bird, and herptile species are scattered throughout the unit where their specific habitats are present. Habitat variety in this unit is great, and is created by diversity in topography, slope, aspect, vegetation, soils, and climate. The description of the existing vegetation in the vegetation section of this report provides a good description of most wildlife habitats that occur in the management area.

Mule deer and elk are probably the most noted wildlife species that occur in the LHA area due to their historic prominence in the ecosystem and their high social and economic value to the area and region. Both species use the area year long, but primarily they use it as winter range, coming from higher elevation summer ranges on the Uncompahgre Plateau to the north and the San Juan Mountains to the south. The intensity of use by each species varies widely from year to year, and is controlled primarily by population size, and the variation in timing and amount of snowfall. During most winters there is a high degree of overlap in mule deer and elk use on winter ranges, however, the extent of competition is unknown. The Colorado Division of Wildlife has classified all the LHA area, except the upper reaches of the San Miguel River drainage as winter range for mule deer and about two thirds of the LHA area as winter range for elk. The CDOW's mapping of severe winter range, and winter concentration areas for these two species are shown on Figure 1.10. The severe winter range and winter concentration areas constitute BLM's crucial winter range. Winter habitat condition on much of the LHA area, where the vegetation has not been recently treated to reset succession is only moderate to poor, and the trend appears to be declining. Specifically the browse stand condition, the amount of cool season grasses and forbs in the vegetative community, and the arrangement of feeding and cover areas. Both the number of acres supporting browse, and the quantity of forage being produced are declining. Plant communities that provide winter browse plants are aging, resulting in fewer, older browse plants with less annual forage production. The influence of maturing plant communities on productivity and diversity can be demonstrated by measuring the responses of a site before and after disturbance. BLM data collected on the Uncompahgre Plateau in 1988 to evaluate vegetative treatments shows a significant increase in browse stand condition, and vegetation composition and productivity after setting back succession (Tables 1.4 & 1.5).

Table 1.3. A list of Norwood Area most common or noted terrestrial wildlife species, groups of species, their occurrence, and basic habitat types in which they are found.

Species (Common Name)	Habitat Type	Occurrence
Mule deer	Pinyon-juniper, oak-mountain shrub, riparian, sagebrush, grassland.	Common, year long, mostly during winter
Elk	Pinyon-juniper, oak-mountain shrub, riparian, sagebrush, grassland.	Common, mostly during winter.
Bighorn Sheep	Canyon benches, mesa tops, and valley bottoms	Uncommon, may be present in the Sawpit area.
Cougar	All types, mostly along rim-rock areas.	Common, year long
Bobcat	All types	Uncommon, year long
Coyote	All types	Common, year long
Cottontail rabbit	All types	Common, year long
Porcupine	Pinyon-juniper, riparian	Common, year long
Prairie dog (White Tail)	Sagebrush, desert shrub	Common, year long
Raptor; Eagles, Hawks, Falcons.	All types	Common, year long
Merriam's Turkey	Riparian forests, Pinyon-juniper, Oak-mountain shrub	Riparian communities and PJ in the winter and oak-mountain shrub spring and fall.
Blue grouse	Oak/Serviceberry	Common, year long
Chukar	Salt desert	Uncommon, year long
Neo-tropical birds	All types	Common, warm season

Small mammals	All types	Common, year long
Amphibians-Reptiles	All types	Common year long
Bats	All types	Common year long, mostly warm season

Table 1.4. A comparison of Uncompahgre Plateau browse stand condition on untreated and treated BLM areas. Treatment ages ranged form 3 to 40 years. Data were collected in 1988. The weight estimate method was used.

Treatment Class	Average Number Species	Seedling	Young	Mature	Decadent & Dead	Crown Sprouts	Hedging* % Moderate and Severe	Plants per Acre
		Age Class - %						
Untreated	2.7	1.9	5.1	67.2	25.1	0.7	51.4	2460
Treated	3.4	3.7	6.9	79.3	8.9	1.2	46.9	3048
Difference	+0.7	+1.8	+1.8	+12.1	-16.2	+0.5	-4.5	+588 (+24%)

*Hedging is the form taken on by the browse plants due to foraging by animals over several years. It is judged in classes of light, moderate, and heavy.

Table 1.5. A comparison of annual herbaceous vegetation production (lbs/ac), and % vegetative class composition on untreated and treated BLM areas on the Uncompahgre Plateau. Treatment ages ranged from 3 to 40 years. Data were collected in 1988. The weight estimate method was used.

Treatment Class	Grass (%)	Forb (%)	Shrub (%)	Total
Untreated	84 (18.7%)	55 (12.2%)	310 (69.1%)	449 (100%)
Treated	262 (39.1%)	68 (10.1%)	340 (50.8%)	670 (100%)
Difference	+178 (212.0%)	+13 (24.0%)	+30 (10%)	+221 (+49%)

The Colorado Division of Wildlife manages big game on a herd, or population basis, using Data Analysis Units (DAU), with sub-regions of Game Management Units (GMU). The Norwood LHA area is within two DAU areas: DAU E-20(elk) D-19(deer) north of the San Miguel River, and DAU E-24(elk) D-24(deer) south of the San Miguel River. The area north of the San Miguel River is in GMU 61, and the area south of the river is in GMU 70. Unit 61, is a special draw unit, and is managed as a "Quality" hunting area. In contrast, Unit 70 has been managed as an unlimited, over the counter license unit for bull elk, and a less restrictive limited draw for bucks. In recent years Unit 70 has been one of the most heavily hunted units in the state.

Since 1980, the Uncompahgre Plateau mule deer population trend is down, and the elk population trend is up (Figure1.11a). Deer numbers have declined 31% since the early 1980's, while elk numbers have doubled. Similar changes have also occurred in the Groundhog/Disappointment mule deer and elk populations (Figure. 1.11b). In both areas mule deer mortality was extremely high during the severe winter of 1983-1984, there has been a recent increase in mule deer numbers, and a decline in elk numbers, which probably are a reflection of more restrictive hunting regulations for mule deer and more liberal hunting regulations for elk. The levels of mule deer and elk use on the respective summer and winter ranges in the Norwood LHA area are believed to be at least proportional to that for the rest of the DAUs.

The Norwood LHA area provides some mule deer fawning and elk calving habitat at the

higher elevations in the oak/serviceberry vegetation. Most of the deer fawning and elk calving occur off the area to the north on the Uncompahgre Plateau, and to the south in the higher San Juan Mountains. The CDOW's current elk and mule deer population management targets for the Uncompahgre Plateau DAU are 8,500–9,000 elk, and 38,500 mule deer. The Groundhog/Disappointment DAU targets are 17,000 – 19,000 elk, and 34,000 mule deer.

Figure 1.11.a. Uncompahgre DAU Mule deer and elk population trends 1980 – 2003.

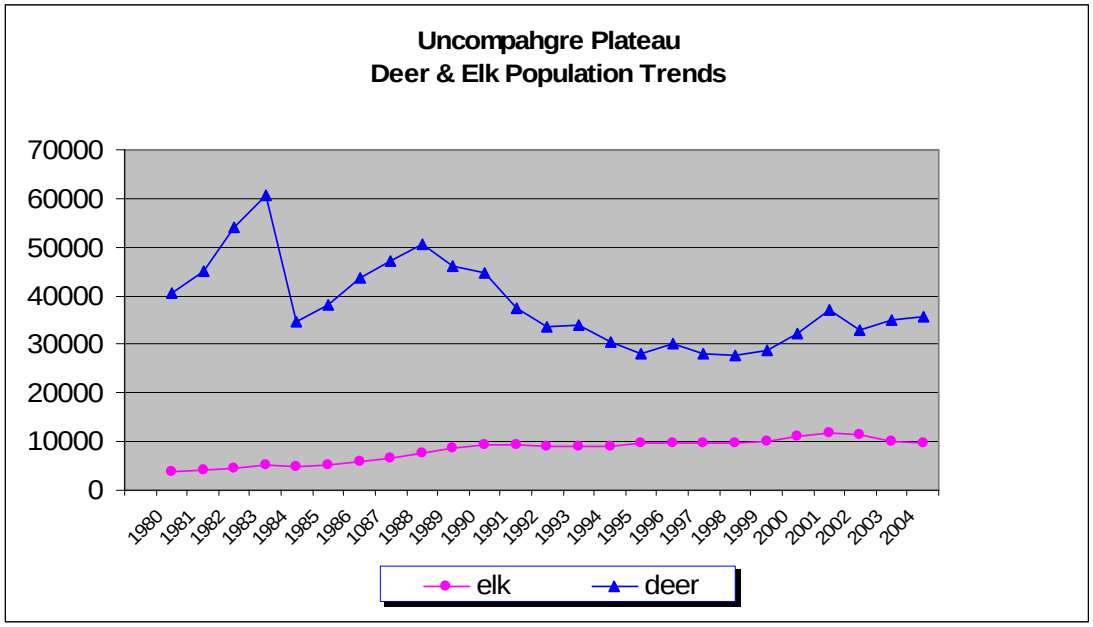
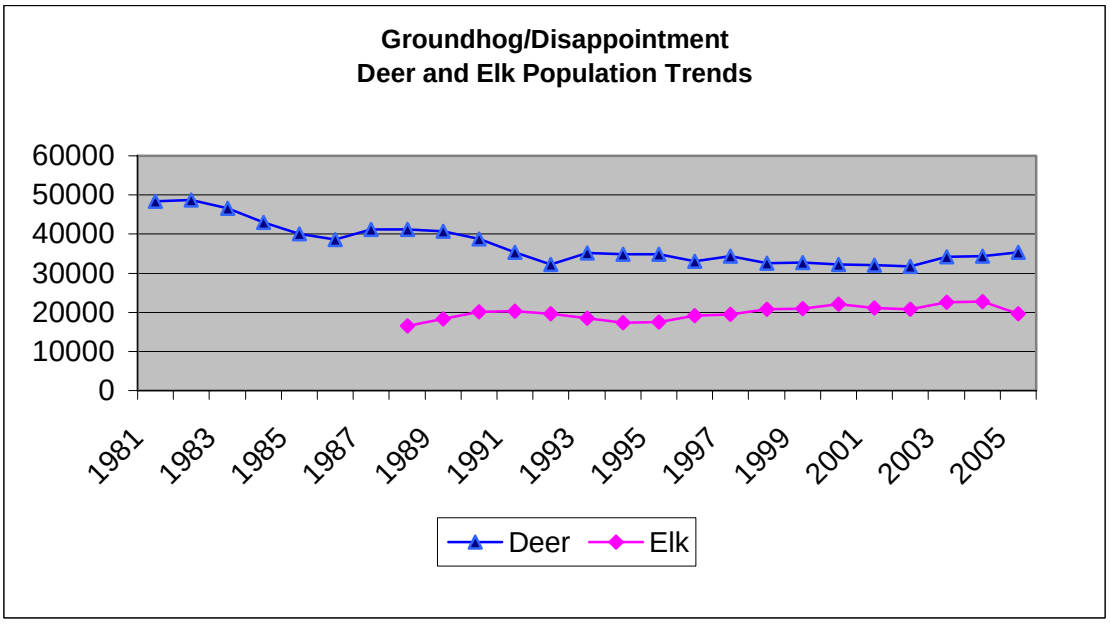


Figure 1.11.b. Groundhog/Disappointment DAU Mule deer and elk population trends 1981 – 2005.



There is a bighorn sheep herd in the Sawpit area in the upper San Miguel drainage.

However, its present status is unknown, but it is suspected to not be doing very well. To date, in spite of the close proximity of domestic sheep, there have been no known cases of pneumonia, scabies, blue tongue, and other pathogens in this population.

Merriam turkey habitat within this LHA area is limited mostly to the higher elevations along both sides of the San Miguel River, and along the major stream drainages. They use the larger canyon bottoms at lower elevations as winter range and the pinyon-juniper, oak/serviceberry areas at higher elevations for breeding, nesting, and brood rearing. Since the 1880's there has been a long history of great fluctuations in turkey numbers on the Uncompahgre Plateau side. Turkeys were reported to be plentiful before settlement, but disappeared in the mid 1880's from several hard winters in a row, and disease contracted from domestic fowl. In the 1930's, turkeys were re-introduced, and did well until the mid 1960's, when again a significant decline occurred. And, again the cause of decline was hard winters and "micoplasma" a bacterial disease causing respiratory problems, and which is passed from hens to their eggs, or through direct contact with other birds. In the 1980's turkeys were again transplanted, which have resulted in the current recurring high population. No specific mapping of seasonal use areas, or assessment of habitat quality is available for this species at this time.

Large predators, such as coyotes, cougars, and black bears use the LHA area regularly as parts of their larger overall ranges. Of the predators, coyotes are the most numerous and widespread. Black bear primarily use the major drainages with well developed riparian vegetation, and the higher elevation oak/serviceberry areas, especially during spring, late summer, and fall for feeding. Black bear densities and total numbers on the Uncompahgre Plateau may be the highest in Colorado. Cougars probably use nearly all of this area at some time or another while hunting, or raising young. The number of cougars present is probably very low, limited mostly to the ones who have established their territories, or parts of their territories in this area. High hunting pressure appears to be the cause of low numbers. There appears to be suitable denning habitat in the rocky cliffs and drainages that are distributed throughout the LHA unit. While the status of these predator populations is unknown, they are all believed to be doing well. An in-depth lion population study was started by the CDOW in 2004, but results will not be available for a year or more.

White-tailed prairie dogs are found in the lower elevation areas of the LHA. Potentially they may occur anywhere there is open grassland, grass/sagebrush or salt desert shrub areas. BLM mapped some of the prairie dog colonies in the 1980s, but there has been no follow-up mapping. Plague-caused fluctuations in the prairie dog populations have resulted in some of the previously mapped sites being abandoned. It also appears that there has been a general reduction in the total number of prairie dogs living in the area, but there is no quantified data to support this observation.

Aquatic wildlife species and their habitats are limited to perennial streams and some intermittent streams (see Standard 2 for locations of perennial streams and more information on functional condition). Native fish species including white sucker, speckled dace, longnose sucker, and others are known to be present in the San Miguel River and other major streams. The non-native rainbow trout and brook trout are found in the upper reaches of most streams in the San Miguel drainage. Some frogs, including northern leopard frogs, toads, and snakes are known to be present, but their status is unknown.

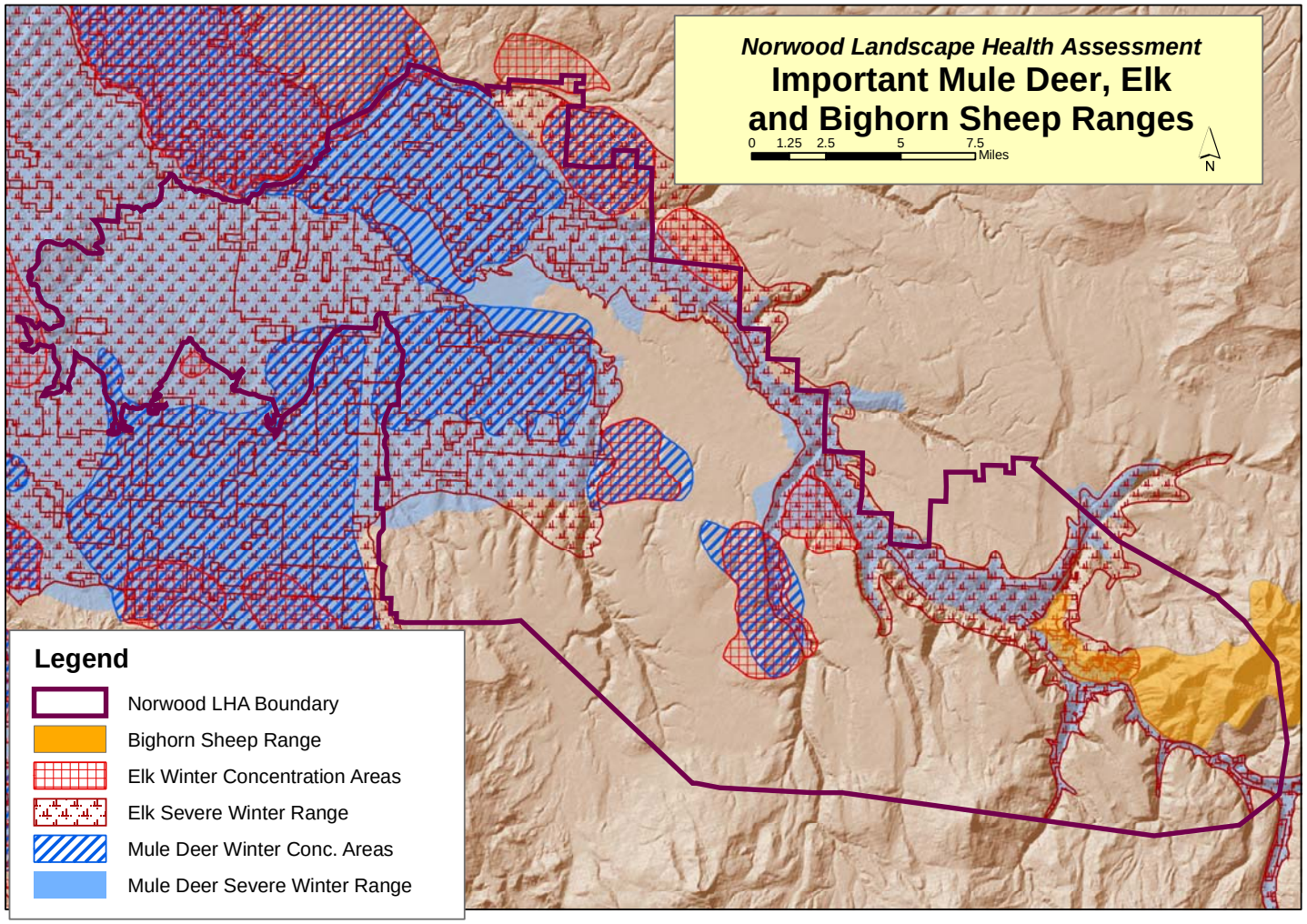
Riparian habitat is present along the perennial and intermittent streams listed in the above

sections, and is extremely important for many of the wildlife species, especially small birds, mammals, reptiles, and raptors. However, the status of most of these species is unknown. Most public land riparian systems are in fair condition, but flow alterations for irrigation and other uses, along with the invasions of salt cedar, Russian knapweed, and other State listed noxious weeds have degraded the usability of some areas for native wildlife, especially non-game birds. Some tributary streams are also incised--likely due to historic events--and many of them are still in the process of maturing; establishing a wider flood plain, and riparian system.

Tamarisk has established itself on many of the lower elevation tributary streams, irrigation canals, BLM water impoundments, and other locations where runoff water may be temporarily detained. In addition to the establishment of Tamarisk, Russian knapweed has also become heavily established along many streams, further decreasing habitat quality for terrestrial native species. The Nature Conservancy has been treating tamarisk in the San Miguel Watershed for several years. Most of the main stem and its tributaries in the Norwood LHA unit have received treatment, but some tamarisk still persists, and native vegetation has not yet reclaimed these areas.

The limited amount of ponded open water within the analysis area limits its potential for waterfowl production. There are small numbers of waterfowl, including mergansers, Canada geese, mallards, green-winged teal, etc. that utilize the area seasonally and some nesting may occur along major streams.

Figure 1.10 Norwood LHA Area mule deer and elk crucial winter ranges and overall bighorn sheep range.



Threatened, Endangered and Special Status Species

Within the LHA area there are several species listed as threatened or endangered, as well as species that are candidates for listing under the Endangered Species Act, as amended. A list of these species is located in the UFO 6840 file. Also, based on the inventory data maintained by the UFO, and the inventory data available from the Colorado Natural Heritage Program, there are other special status species present in the LHA area. Table 1.6 below presents a list of the T&E, and special status species that are found, or potentially found within the LHA area.

Table 1.6 Potential Special Status Species in Norwood LHA area

Threatened Endangered, and Special Status Species			
Common Name	Scientific Name	Status[1]	Occurrence
Black-footed Ferret	*Mustela nigripes*	FE, SE	Not known to occur, but prairie dog host is present in the analysis area.
Canadian Lynx	*Lynx canadensis*	FE, SE	Introduced by CDOW in the Telluride area in San Juan Mt. in 1999, and may use some of the habitat in the upper San Miguel drainage.
Bald Eagle	*Haliaeetus leucocephalus*	FT, ST	Present during winter, use much of area for foraging, concentrations along the San Miguel River; and roosts along San Miguel and Wrights Mesa.
Mexican Spotted Owl	*Strix occidentalis*	FT, ST	Potentially in the deep canyon areas, with closed canopy conifer forests on the canyon slopes or adjacent mesa tops.
Colorado Pikeminnow	*Ptychocheilus lucius*	FE, ST	Occupied and critical habitat downstream of LHA area in the Colorado River.
Razorback Sucker	*Xyrauchen taxanus*	FE, SE	Occupied and critical habitat downstream of LHA area in the Colorado River.
Bonytail Chub	*Gila elegans*	FE, SE	Occupied and critical habitat downstream of LHA area in the Colorado River.
Humpback Chub	*Gila cypha*	FE, ST	Occupied and critical habitat downstream of LHA area in the Colorado River.
BLM Sensitive Species and Other Special Status Animals			
Common Name	Scientific Name	Status[1]	Occurrence
Yellow-billed Cuckoo	*Coccyzus Americanus*	FC, BLMS	Potential habitat along the lower elevation cottonwood gallery riparian communities.
Gunnison Sage Grouse	*Centrocercus minimus*	BLMS	Occur on Beaver Mesa and in the Miramonte area south of the San Miguel River. A part of the San Miguel Basin population.
River Otter	*Lutra canadensis*	SE	Occurs in the San Miguel River upstream of the Pinyon bridge.

BLM Sensitive Species and Other Special Status Animals--continued			
Townsend's Big Eared Bat	*Corynorhinus townsendii*	BLMS	Potentially present
Big Free-tailed Bat	*Nyctinomops macrotis*	BLMS	Potentially present
Fringed Myotis	*Myotis thysanodes*	BLMS	Potentially present
Yuma Myotis	*Myotis yumanensis*	BLMS	Potentially present
Western Burrowing Owl	*Athene cunicularia*	ST	Dependent on prairie dog colonies. BLM has not recently mapped prairie dog colony distribution within this LHA area.
Peregrine Falcon	*Falco peregrinus anatum*	SC	No Eyre's known in the LHA, but hunting occurs over much of the LHA area.
Ferruginous Hawk	*Buteo regalis*	BLMS, SC	Present during migration, no nesting in the LHA area.
Flannelmouth Sucker	*Catostomas latipinnis*	BLMS	Found in the San Miguel River and some tributary streams.
Roundtail Chub	*Gila robusta*	BLMS, SC	Found in San Miguel River and some tributary streams.
Bluehead Sucker	*Catostomus discobolus*	BLMS	Found in the San Miguel River and some tributary streams.
Midget Faded Rattlesnake	*Crotalus verities concolor*	BLMS	Present in PJ, rocky areas, greasewood/sage and sagebrush/rabbitbrush
Northern Leopard Frog	*Rana pipiens*	BLMS SC	Ponds and irrigation canals.
Canyon Tree Frog	*Hyla arenicolor*	BLMS	Major canyon bottoms
BLM Sensitive Plant Species and Other Special Status Plants			
Common Name	Scientific Name	Status[1]	Occurrence
Naturita milkvetch	*Astragalus nautritenis*	BLMS	Found in pinyon-juniper woodlands, in areas with shallow soils over exposed bedrock.
Payson lupine	*Lupinus crassus*	CNHP	Found in pinyon-juniper zone, often in dry washes with little other vegetation.
Little Penstemon	*Penstemon breviculus*	CNHP	Occurs in desert sagebrush and Pinyon-Juniper communities.

[1] Status is as follows: FE.= Federally Endangered; FT.= Federally Threatened; FEx. = Experimental Non-essential Population; FP.= Federal Proposed for listing; FC. = Federal Candidate for listing; SE. = Colorado Endangered; ST. = Colorado Threatened; BLMS = BLM Sensitive Species; CNHP = Species considered sensitive or rare by the Colorado Natural Heritage Program. Sources: A Natural Heritage Assessment (Lyon and Sovell 2000) , Colorado Bald Eagle Inventories, BLM 1980, BLM Rare Plant inventories, Various Years, Federal Register: December 28, 2000 (Volume 65, Number 250), Colorado Natural Heritage Program, Spatial Data for the Uncompahgre Field Office, Colorado Division of Wildlife, Breeding Bird Atlas (Kingery 1998), CDOW Web Site

Field data collected for this LHA did not include a specific mission to identify new locations of rare plants or animals, or to determine their status. However, if conflicts with rare plants or animals on public land had been detected, they would have been documented, and discussion presented here.

From early December through early April, wintering bald eagles forage throughout the LHA area. Helicopter and ground surveys, conducted by BLM in the early 1980's located only one communal night roost site, within this LHA area on public land. Several day roosts were located and recorded. There are no known nest sites on public land in the LHA area. At the national level, populations have recovered well enough since it was listed as Endangered in 1973, that in July of 1999 the USFWS proposed to remove the bald eagle from the threatened list (Federal Register, July 1999).

There are no known peregrine falcon aeries on public lands in the LHA area. However, there probably is some suitable habitat along the San Miguel River or other tributaries. Several aeries are present in Paradox Canyon to the west, and Peregrine's use much of the LHA area as hunting habitat.

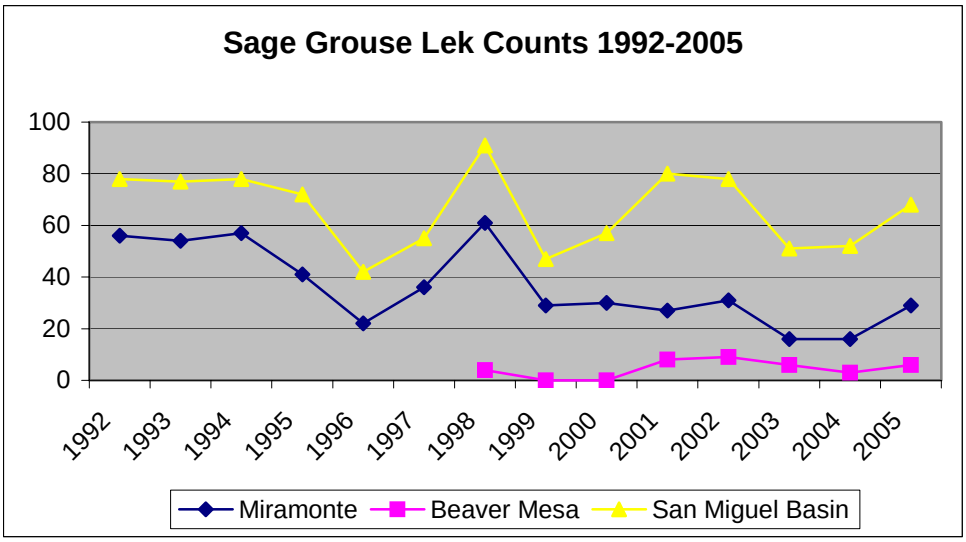
Black-footed ferrets have not been documented in the area, and BLM has not done extensive mapping of the distribution of prairie dogs within this LHA area. It is unlikely there are black-footed ferrets in this area at this time.

Canadian Lynx have not been documented recently in the LHA area. However, in 1999 the CDOW released 41 Lynx in the State, and three females are known to have established residence in the San Juan Mountains, one near Lizard Head Peak/Telluride area. There is some travel corridor habitat in the lower Horsefly canyon, and some potential low value habitat on the steep slopes of canyons in the upper San Miguel River canyon.

Yellow-billed cuckoos are not known to exist in the LHA area at present; however potential habitat appears to be present in the lower reaches of the San Miguel River, and several of its larger tributaries. (Kingery, 1998).

Gunnison sage grouse are present within the LHA area, and are part of the larger San Miguel Basin population. In the April 18, 2006 Listing Determination the US Fish and Wildlife Service report this population size to be 206- 446 birds in 2005. The number of males attending leks in spring is used to determine population size. Figure 1.11 shows DOW lek counts for the San Miguel Basin population, and the Miramonte and Beaver Mesa areas, 1992-2005. Land status of sage grouse habitat in the LHA area is largely private, with only a few scattered parcels of public land. In 2005 the Division of Wildlife showed data for 3 active leks within the LHA area, one at Miramonte, one near Gurley Reservoir, and one on Beaver Mesa. All are on private land. These lek counts indicate the trend for the overall population appears stable through this time frame. However, it is believed that the current population level is much lower than in historic times. For greater detail see the San Miguel Basin Gunnison sage grouse Conservation Plan in the UFO (1998). Additional historic and potential habitat is present within the LHA area, and may include the larger sagebrush areas south and east of Broad Canyon, including some of the burn canyon burned area, and in Mailbox Park. The greatest threat to Gunnison Sage Grouse is loss of habitat due to agricultural conversion, encroachment of pinyon-juniper forests, residential development, and other activities, which create a fragmented sagebrush landscape. Excessive livestock grazing reduces nesting success and brood survival. The genetic effects of population isolation may eventually result in demographic problems including reduced fertility and hatching success.

Figure. 1.11 Sage grouse lek counts 1992 – 2005 for San Miguel Basin population, the Miramonte and Beaver Mesa leks.



Burrowing owls may be found within the prairie dog colonies in this LHA area. BLM has no records of this bird being sighted within this LHA, and there were no breeding individuals found during the work done for the Breeding Bird Atlas (1998). Populations of this species are believed to be declining throughout its range (CDOW, 2005). The species is vulnerable to human disturbance, avian and mammalian predation, dogs and reductions in prairie dog colony size and density.

Ferruginous hawks are known to occur in the area during migration, but there is no evidence that this species nests in the area or over-winter here.

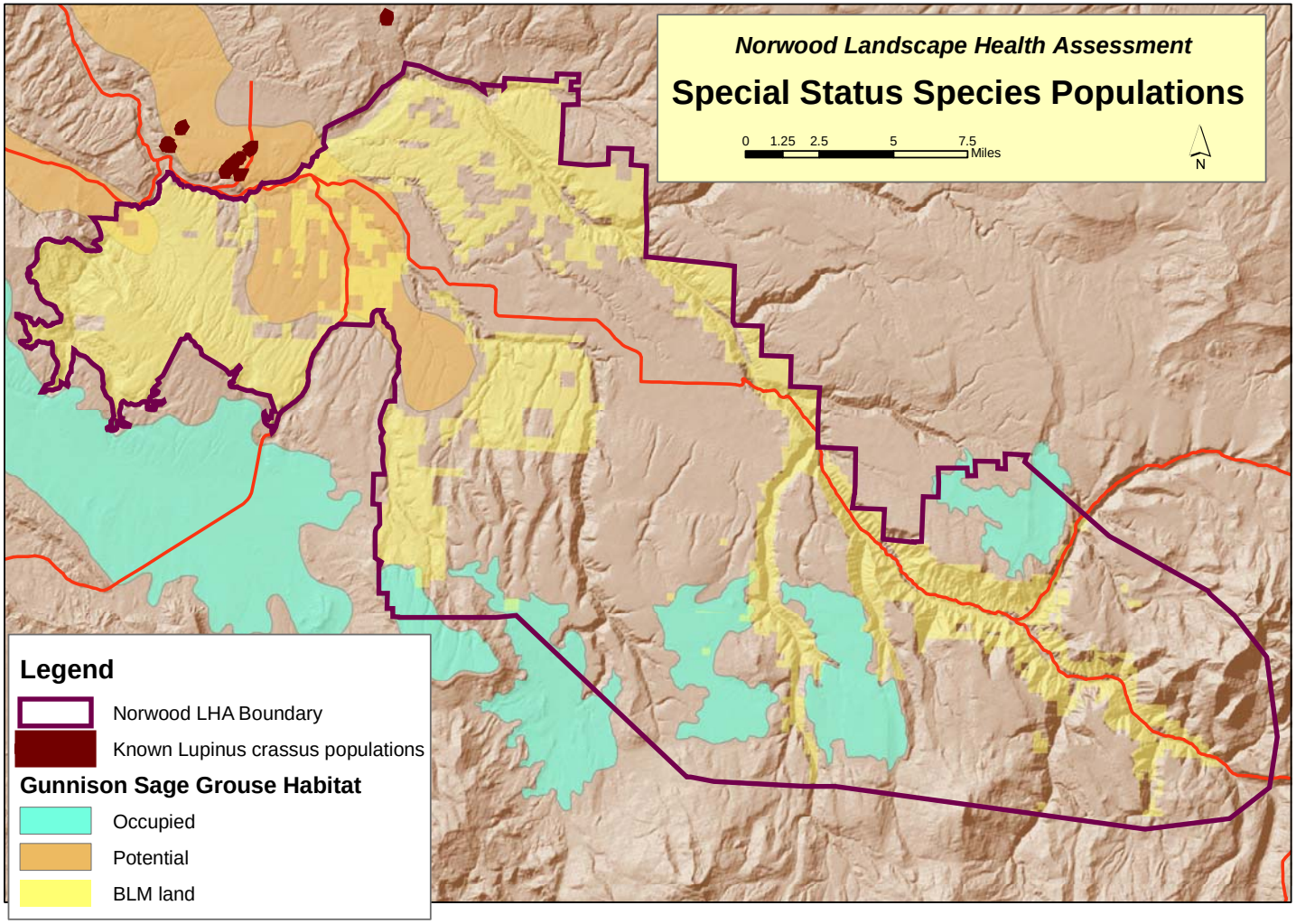
Midget faded rattlesnakes and northern leopard frogs are present, but no data is available on population health or trends.

The Naturita milkvetch is restricted to the Four Corners area (Utah, Arizona, and Montrose, San Miguel, and Montezuma counties in Colorado), and is known to occur in the Mailbox Park area. It is found in areas with shallow soils over exposed bed rock in pinyon-juniper woodlands. This plant seems to tolerate and even thrive on some disturbance. This species is not typically impacted by livestock grazing on open rangelands (Lyon, 2000).

Payson's Lupine is known to occur in the uplands near Naturita, and is found in the pinyon-juniper zone, often in dry washes with little other vegetation. The two main areas where it is found have very different geological substrates, the Chinle formation with its dark red soils near Paradox, and the Mancos Formation, with light colored clay soils near Naturita (Lyon, 2000).

The Little Penstemon occurs in the uplands south of Naturita, and grows in the desert shrub, sagebrush and pinyon-juniper communities in Utah, Colorado and New Mexico. In Colorado, it is known only from Montezuma, San Miguel and Montrose counties (Lyon, 2000).

Figure 1.12 Norwood LHA Area known populations of special status species.



Biodiversity Focal Areas

Several efforts to identify and conserve regional and global biodiversity have been initiated by non-governmental groups. The Colorado Natural Heritage Program has been inventorying Colorado counties for the past six years to identify sites that contain high quality plant communities, or assemblages of rare plants, and/or animals that they feel warrant protection and management for biodiversity conservation at a statewide level. San Miguel and Montrose Counties were inventoried in 1998 and 1999 (Lyon, 2000). Each PCA was ranked for its biodiversity values, protection urgency, and management urgency.

The Nature Conservancy (TNC) has sponsored ecoregional assessments to identify areas important for regional biodiversity conservation. The Norwood LHA area falls into two of these assessments, the Southern Rocky Mountains, and the Colorado Plateau (The Nature Conservancy, 2002). While similar to the CNHP effort in many respects, these assessments are broader in scope in that a region-wide network for biodiversity conservation is identified using computer-based optimization models to identify areas which would most efficiently and cost effectively conserve all of an ecoregion's biodiversity. Because the ecoregional assessments are done at a large scale and not ground-truthed, the areas identified provide only loose guidance as to what the targets are for conservation in a given area, and as to what the actual location on the ground might be.

The Southern Rockies Ecosystem Project (SREP) is focused on preserving and restoring connectivity across the ecoregion, primarily to provide for the safe movement and migration of various wildlife species (Southern Rockies Ecosystem Project, 2005). Using wildlife experts from throughout Colorado, they have put together a map of important corridors and landscape linkages across the state. These linkages are not highly detailed, but indicate the general locations, types of animals using the corridors, the degree of threat and statewide priority for securing or enhancing each of these corridors.

Figure 1.13 shows all 11 PCAs, the TNC recommended conservation areas, and the SREP important landscape linkages displayed on a map of the assessment area. Table 1.7 shows the important resource values in each of the identified areas, and their relative ranking in terms of conservation importance.

At the present time, the San Juan/San Miguel RMP, as amended, does not place any of these areas or linkages into special management categories that directly benefit the specific resources of the PCA, other than the San Miguel ACEC. The San Miguel ACEC limits some activities in an effort to conserve values associated with the river and riparian area, however multiple use management still takes place there, including mineral leasing. BLM land outside of the ACEC is open to off highway vehicle use, mineral material disposal, locatable mineral activity, location of rights-of-way, and all are subject to livestock grazing.

Figure 1.13 Norwood LHA area locations identified as being important for biodiversity conservation across the ecoregion, as recommended by the Colorado Natural Heritage Program, The Nature Conservancy, and Southern Rockies Ecosystem Project.

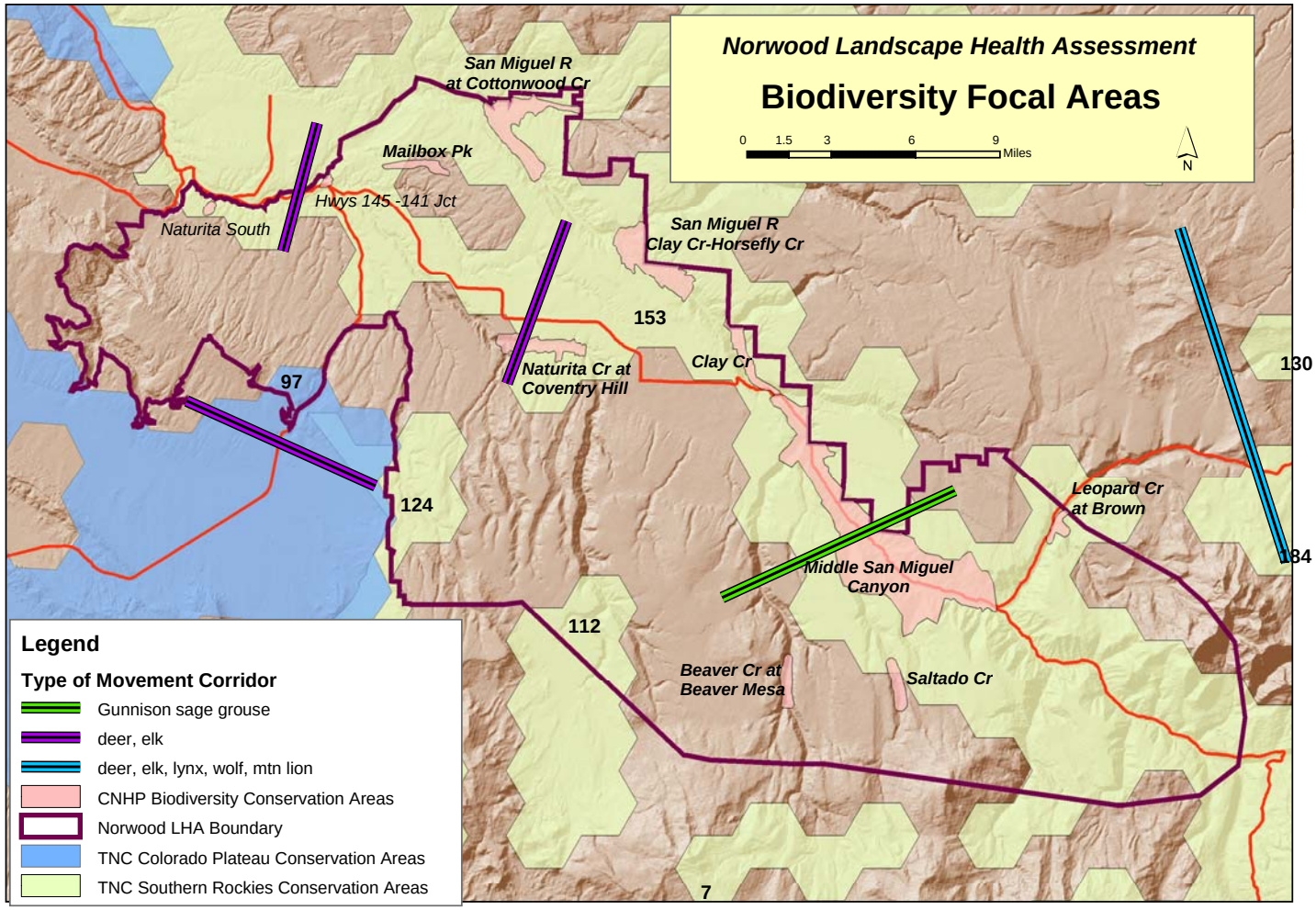


Table 1.7 Recommended Conservation Areas and Linkages in the Norwood LHA Area

PCA Name	Resource Values	Biodiversity or Conservation Value Rank [1]	Management/ Protection Urgency Rank [2, 3]
CNHP: Naturita South	Little penstemon, Naturita milkvetch	B3	M4, P4
CNHP: Highways 145-141 Junction	Payson lupine, Naturita milkvetch, little penstemon, needle and thread Great Basin herbaceous vegetation	B2	M4, P4
CNHP: Mailbox Park	Naturita milkvetch	B3	M4, P4
CNHP: San Miguel River at Cottonwood Creek	Skunkbush/coyote willow riparian shrubland, narrowleaf cottonwood/skunkbush association, coyote willow/mesic graminoid community	B3	M3, P4
CNHP: San Miguel River Clay to Horsefly Creeks	Lower montane riparian shrublands dominated by river birch, blue spruce/thinleaf alder montane riparian forest, narrowleaf cottonwood/thinleaf alder riparian forest, blue spruce/red osier dogwood, thinleaf alder riparian shrublands, narrowleaf cottonwood-blue spruce/thinleaf alder community, silver buffaloberry riparian shrubland, communal bald eagle roost.	B3	M4, P4
CNHP: Naturita Creek at Coventry Hill (Naturita Upland)	Not specified	B5	U
CNHP: Clay Creek	Wetherill milkvetch	B3/or B4?	M4, P2
CNHP: Middle San Miguel Canyon	Lower montane riparian shrublands dominated by river birch, Narrowleaf cottonwood/river birch riparian forest, narrowleaf cottonwood-blue spruce/thinleaf alder montane riparian forest.	B3	M4, P4
CNHP: Beaver Creek at Beaver Mesa	Not specified	B2	U
CNHP: Saltado Creek	Geyer willow-Rocky Mountain willow/mesic forb community.	B4	M4, P2
CNHP: Leopard Creek at Brown	Geyer willow-Rocky Mountain willow/mesic forb community.	B4	M4, P2
TNC #97 Disapointment / Dry Creek	Greasewood shrubland, Mixed Salt Desert Scrub, Pinyon-Juniper and Juniper woodland, sagebrush shrubland, and various streams and rivers differing in gradient, elevation, and substrate, *Forestiera pubescens* shrubland, Dolores River Skeletonplant, peregrine falcon, bald eagle	Low to moderate	Overall moderate with very high threat from energy and minerals, high threat from fire regime alteration, moderate threat from habitat loss, roads and recreation, improper grazing and invasive plants

TNC #124 Disappointment Valley	Gambel's oak shrubland, Juniper savanna, Pinyon-Juniper woodland, Ponderosa pine woodland, various streams and rivers differing in gradient, elevation, and substrate, Gunnison sage grouse	NA	Not identified
TNC #153 San Miguel River	Various streams and rivers differing in gradient, elevation, and substrate, American dipper, black swift, bald eagle, Colorado River cutthroat trout, Gunnison's prairie dog, wild-privet community, narrowleaf cottonwood-water birch community, skunkbrush riparian shrubland, Wetherill milkvetch, reflected moonwart, northern moonwart, San Juan whitlow-grass, Colorado Divide whitlow-grass, Altai cottongrass, alpine dry tundra and alpine /subalpine wet meadow, aspen forest, Douglas fir-ponderosa pine forest, Gambel's oak shrubland , intermontane-foothill grassland, lower montane-foothills shrubland, mountain sagebrush shrubland, pinyon-juniper woodland, ponderosa pine woodland, spruce-fir forest (dry-mesic and moist-mesic)	NA	Ranges from low to high with potential threats from dams development, commercial and residential development, diversions, fire management, weeds, mining, hunting/fishing, pathogens, recreational use and road and utility corridors
TNC #112 Naturita Creek	Various streams and rivers differing in gradient, elevation, and substrate, Gunnison sage grouse, Gambel's oak shrubland, montane grassland, ponderosa pine woodland	NA	Moderate-single species management
SREP deer and elk	Deer and elk migration from summer to winter ranges and from one herd area to another	High	Constrained, Moderate threat level
SREP Gunnison sage grouse	Gunnison sage grouse movement from active lek to/from brood rearing areas, and between adjacent populations	High	Constrained, Moderate threat level
SREP deer, elk, lynx, wolf, mountain lion	Crucial linkage between large habitat areas for these species	High	Constrained, Moderate threat level

[1] Biodiversity Rank: B1= Outstanding significance such as the only known site for a globally species. B2= Very high significance, such as one of the best examples of a community type, or good occurrence of a globally imperiled species or a species with very restricted range. B3= High significance, such as an excellent example of any community type or a good occurrence of any species with very restricted range or a good occurrence of a state rare species.

[2] Management Urgency Rank: M1=Management action required at once to prevent the loss or irreversible degradation of one or more of the species or communities for which the PCA was identified. M2= Management action required within 5 years to prevent the loss of one of the items for which the PCA was identified. M3= Management action needed within 5 years to maintain the current quality of identified resources. M4= Management actions may be needed in the future to maintain the quality of the identified resources. M5= No serious management needs identified. U=Uncategorized.

[3] Protection Urgency Rank: P1: Immediately threatened by severely destructive forces, within 1 year of rank date; protect now or never. P2: Threat expected within 5 years. P3: Definable threat but not in the next 5 years. P4: No threat is known for the foreseeable future. P5 Land protection complete or adequate reasons exist not to protect the site; do not act on this site.

Surface Water and Groundwater

The Norwood Landscape Unit is entirely with the San Miguel River Basin, 4th field Hydrologic Unit 14030003. Table 1.8 shows the Hydrologic Unit subdivision of the LHA area to the 5th field watershed level and the associated area included in this assessment. See Figure 1.14 for a map of the streams and watersheds.

Table 1.8 Watershed Subdivisions (Hydrologic Unit Codes) and Water Quality Classifications, and Standards for the Norwood Landscape Unit.

5th Field Watershed	*Land Status Acres*		*Stream Segment*	*Stream Designation*	*Stream Classification*
	BLM	*Other*			
1403000347 Beaver/McKenzie Creeks	20,551	41,720	Beaver and Saltado Creeks		Aquatic Life Cold 1 Recreation 1a Agriculture
			Other tributaries to the San Miguel River	Use Protected	Aquatic Life Cold 2 Recreation 1a Water Supply Agriculture
			San Miguel River		Aquatic Life Cold 1 Recreation 1a Water Supply [4] Agriculture
1403000345 Coal/Cottonwood Creeks	20,551	6,933	Cottonwood Creek and tributaries	Use Protected	Aquatic Life Cold 2 Recreation 1a Water Supply Agriculture
			San Miguel River		Aquatic Life Cold 1 Recreation 1a Water Supply [4] Agriculture
1403000304 Dry Creek	15,613	739	Dry Creek and tributaries	Use Protected	Aquatic Life Cold 2 Recreation 1a Water Supply Agriculture
1403000361 Naturita Creek	32,978	106,261	Naturita Creek Aquatic Life		Aquatic Life Cold 1 Recreation 1a Water Supply[4] Agriculture
			other tributaries to Naturita Creek	Use Protected	Aquatic Life Cold 2 Recreation 1a Water Supply Agriculture
1403000363 Upper san Miguel River	12,766	44,488	San Miguel River and all tributaries		Aquatic Life Cold 1 Recreation 1a Water Supply [4] Agriculture

1 Waters are designated either warm or cold based on water temperature regime. Class 1 water's are capable of sustaining a wide variety of cold or warm water biota, while class 2 waters are not.
2 Recreation 1a waters that are suitable for recreational activities, when the ingestion of small quantities is likely to occur, and Recreation 2 are waters that are not suitable for recreational purposes.
3 Waters that are suitable for irrigating crops usually grown in Colorado.
4 Waters that are suitable or intended to become suitable for potable water supplies.
5 The Colorado Water Quality Control Commission designates waters of the state, "Use Protected" if they do not warrant special protection provided by the outstanding waters designation or the antidegradation review process.

The major waterways in the assessment area include: the San Miguel River, Naturita Creek, Maverick Draw, Beaver Creek, Leopard Creek and Fall Creek. The major drainages in the landscape unit experience high flows from both snowmelt and rainfall events. The snowmelt is typically generated from the high elevation headwater areas. Short duration flood flows occur

from high intensity precipitation events associated with Monsoonal air flow patterns in mid to late summer. Typically, these summer floods are localized and more significant on low order drainages.

Annual precipitation varies from less than 10 inches at the lower elevations to more than 25 inches at the higher elevations. From 25 to 50% of the annual precipitation falls as snow during the colder months, depending on elevation. Most of the precipitation outside of the mid to late summer season occurs from frontal type storm systems, which are typically regional in size. Precipitation from frontal events occurs over a relatively long duration but at low intensity rates. In contrast, summer precipitation is commonly associated with the southwest monsoon air flow pattern, which can produce localized, short duration, and intense precipitation events.

Tables 1.9 shows chemical water quality characteristics of the LHA areas surface waters. The electrical conductivity (EC) values, which correlates with total dissolved solids, are highest in the streams at the lower elevations of the LHA area. These watersheds are dominated by marine-deposited shale and sandstone which have high levels of common salts. Nitrate and phosphate concentrations, being largely responsible for eutrophication of aquatic environments, are in relatively low concentrations in most streams sampled within the landscape area. Data from USGS Open File report 97-233 showed average nitrate and phosphate concentrations average 0.81 mg/l (2,076 samples) and 0.09 mg/l (287 samples), respectively, in the Upper Colorado Basin. All of the stream sample averages in the LHA are lower than the Upper Colorado Basin average. Phosphate exceeded the Upper Colorado Basin average on the higher elevation streams (Specie Creek, Fall Creek, Beaver Creek, Big Bear Creek, and Naturita Creek at Redvale).

The Colorado Unified Watershed Assessment (Table 1.10), dated 12/1998 ranked the San Miguel Basin (14030003) as Category 1, defined as “Watersheds in Need of Restoration”. None of the stream or river segments within the landscape unit are on the state’s 303(d) list for impaired water quality or the Colorado Monitoring and Evaluation List for suspected impairment.

Ground water occurrence in the LHA area is primarily limited to bedrock aquifers associated with the Dakota and Burro Canyon formations and less commonly in more recent surface deposits of alluvium. On public lands within the LHA area, there are 8 known springs with water quality that reflects their geologic origin. The springs at the higher elevations, in the southeast portion of the LHA area exhibit total dissolved solids (TDS) concentrations less than 500 ppm, and the springs at the lower elevations where Mancos shale is more commonly encountered, average TDS concentrations over 1000 ppm.

Table 1.9 Water Quality Summary for Major Streams in the Norwood LHA Area

Stream	Dates[1]	Sample Number[2]	Flow Rate (CFS)	EC umhos/ cm	Temp. C	Dominant Ions	Nitrate mg/l	Phosphate mg/l
Specie Creek	1981-1991	9	1.95	494	11	calcium-bicarbonate	0.224	0.47
Saltado Creek	1977-1981	13	0.49	260	14	calcium sulfate	0.010	0.01
Maverick Draw	1977-1984	12	13.79	1597	17	calcium-bicarbonate	0.036	0.04
Leopard Creek	1981-1984	3	144.77	418	16	calcium-bicarbonate	0.153	0.05
Fall Creek	1977-1991	12	98.39	337	8	calcium-bicarbonate	0.262	0.30
Dry Creek nr. Mouth	1977-1984	7	22.07	2546	17	calcium-sulfate	0.206	0.08
Big Bucktail Creek	1977	1	0.10	700	22			
Beaver Creek at Beef Trail	1983-1991	9	8.51	290	12	calcium-bicarbonate	0.261	0.43
Big Bear Creek	1982-1991	10	9.65	360	7	calcium-bicarbonate	0.272	0.28
Naturita Creek @ McKee Draw	1979-2004	10	57.90	1082	16	calcium-bicarbonate/sulfate	0.291	0.07
Naturita Creek @ Redvale	1978-2004	5	36.60	1211	16	calcium-bicarbonate/sulfate	0.605	0.10
Naturita Creek near mouth	1979-2004	13	81.45	1464	17	calcium-sulfate	0.293	0.04
San Miguel River at Norwood Bridge	1984	2	3953.00	278	11	calcium-bicarbonate/sulfate	0.182	0.03

1- Years which bracket the sample dates.

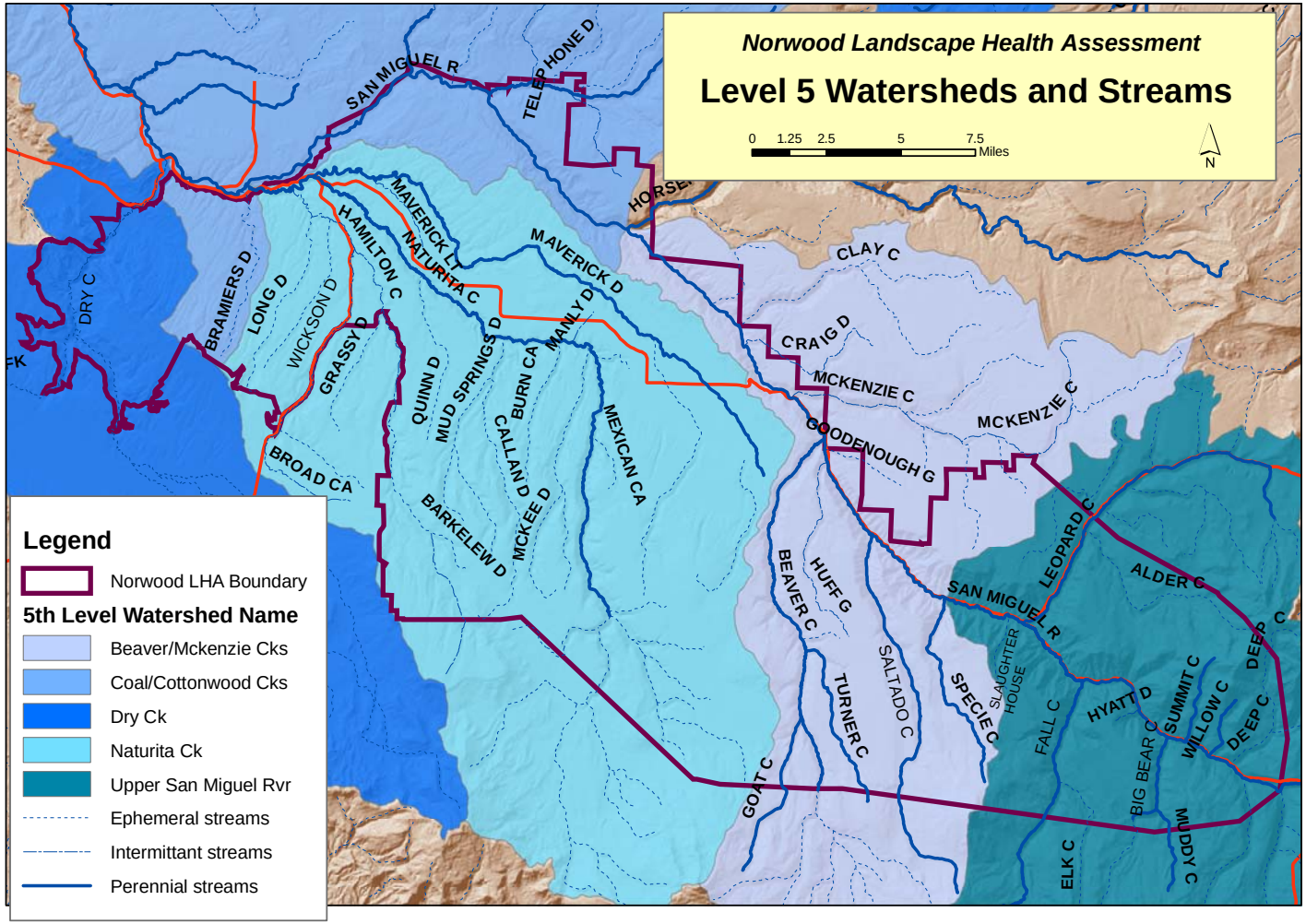
2- Number of samples used in the calculated, average water quality constituent values (e.g. flow, EC, temp, etc.). The seasonal sampling dates varied but most commonly were during spring snowmelt and late summer. Individual sample results are available from the Bureau of Land Management, Uncompahgre Field Office, Colorado. Many of the samples used for the water quality summary date back to the early 1980's or earlier but few major land use changes have occurred since then that would significantly influence water quality. Activities worth noting that may have influenced water quality are the Burn Canyon Wildfire, and several vegetation conversion treatments that resulted in improved vegetation cover.

Table 1.10 Colorado Unified Watershed Assessment Ranking

4th Field Watershed	Category Rank*	Category Ranking for BLM Portion of Watersheds	Rationale for ranking
14030003 San Miguel	1	BLM lands not ranked	- >50% federally managed - 319 project in Dry Creek Basin

* Unified Watershed Assessment ranking are defined as:
Category 1: watersheds in need of restoration

Figure 1.14 Norwood LHA area streams and 5th level watersheds.



METHODS

The land health assessment was conducted on public lands in the Norwood LHA Unit during the period spanning April through August of 2005. The following procedures were used:

1). The area was first broken apart into 67 different polygons. Polygons were based on ecological sites (NRCS-USDA 2002) derived from soil mapping units and allotment boundaries. Polygons ranged from 33 to 8,546 acres in size.

2). The interdisciplinary team made up of range, wildlife, ecology, hydrology, and T&E specialists ranged between 6-8 people. At the beginning of the field work period, the entire team worked together collecting data, in order to gain consistency. Afterwards data was collected primarily by interdisciplinary teams of two to three people.

3). Each polygon was visited in the field, and land health assessment forms were used to describe the plant community characteristics, and various soil and community health attributes. Polygons were evaluated at two to five sites spread across the polygon. The sites were predetermined on maps, and not subjectively chosen in the field. Data collection occurred in the field. Nearly every point was mapped by a GPS unit in the field. A photo of each site was also taken.

4). Riparian Proper Functioning Condition (PFC) data was collected at points along nearly all perennial and intermittent streams within each grazing allotment during the summer of 2004. Where data was not collected, PFC data from 1995-1997 was used. This data was used to address Standard 2.

5). In addition to the PFC data, water chemistry was analyzed, and macroinvertebrate samples were collected in 2004 at the PFC points where there was live water. Qualitative data on sediment and water quality was also collected at these points. On ephemeral or intermittent drainages, qualitative data on likely sediment production was also collected. Standard 5 was evaluated using this data in association with the PFC data and upland health assessment data. This data was evaluated against Colorado's stream water quality designations.

6). A comprehensive weed inventory of the Norwood LHA area was conducted in the summer of 2005. All likely sites for weed invasion were visited in the field, and weed infestations that were found were documented and data entered into GIS. Likely sites for invasion included known soil disturbances, drainages and travel corridors.

7). Data from the field forms and location data was entered into an ARCGIS personal geodatabase. The databases were linked to the polygons and to the stop points to provide a system that allows maps to be made based on any of the data attributes collected. Mean values of groundcover and plant growth form cover were calculated for each ecological site type (unique combinations of ecological site, slope and aspect). These mean values were then used as a standard of comparison to assess each individual site.

8). A final determination for Standards 1 and 3 for each polygon was made by the ID team. This was done by identifying problems with the range health indicators or by finding lower than average values for the ecological site type. Problems were defined as a score of 1 or 2 for the following health indicators: runoff drainages, pedestals, plant distribution, community diversity, exotic plants, noxious weeds, or litter retention; or for scores of less than average for soil cover, plant cover or vigor attributes. The ID team judged each polygon as to whether it was meeting the standard (no evident problems at any site in the polygon), not meeting the standard (problems at one half or the majority of sites in the polygon), or meeting with problem areas (problems at less than half of the stops in polygon), based on a preponderance of evidence. The "meeting with problem areas" category has been used in past land health assessments, and denotes polygons

which on balance meet a health standard, but have some indicators or locations within them that the ID team would like to see tracked and managed for improvement. Reasons for the rankings, and likely causes were documented. Riparian Functioning at Risk ratings were directly translated into "Meeting With Problems", as they had been in past land health assessments.

9). Polygon rating (Meeting, Not Meeting, Meeting With Problems) was then entered into the geodatabase, along with land health problems and causes. Causes for polygons not meeting or meeting with problems for any standard were discussed by an ID team. The team considered evidence which included observations made on the site of possible disturbances, grazing dates, actual use, records of past treatments, and proximity to roads and recreational or mining related disturbance.

10). Numerous maps were created showing the locations of different types of problems across the assessment area, based on the data collected at sample points.

11). Large scale health issues were assessed by using a remotely sensed vegetation map (from 1993 Landsat imagery) and the desired landscape map that has been developed through the fire planning process, in addition to wildlife population data.

12). Standard 4 was rated based on existing location data of special status species and Colorado BLM's listed species of concern together with habitat needs data and the data from the Health Evaluation.

RESULTS

Standard 1:
Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic process. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for optimal plant growth and vigor, and minimizes surface runoff.

*Indicators used to assess this standard include: rills and **pedestals**, active **gullies**, appropriate **groundcover** and plant canopy cover, **litter accumulation**, **litter movement**, appropriate soil organic material, plant species diversity and vigorous, desirable plants.*[*]

[*] *bold text identifies the indicators which were most important for this assessment*

Acreage Figures

Meeting Standard 1		**Not Meeting Standard 1**	**Unknown**	**Water or other N/A**
Meeting	Meeting with problems			
82,971	15,768	730	3,244	597

See figure 2.1 for map showing polygon ratings.

Specific Problems
Active Soil Erosion-Pedestals and Gullies

Soil erosion is a concern because it reflects loss of site productivity and potential that usually cannot be regained for centuries or more. Gullies along with other downcutting or widening drainage channels, and the formation of pedestals on the soil surface were the primary indicators used to evaluate active soil erosion. Although the great majority of sites visited did not have active soil erosion problems, gullying and pedestals occurred at significant levels in two areas in the central and northern part of the LHA unit (see Figure 2.2).

Active Soil Erosion–Runoff Drainages

Runoff drainages occur where water fails to infiltrate into the soil and instead runs off the site as overland flow. Water running over the soil surface is an important source of soil erosion, carrying off soil particles as it goes. An additional concern is that water which does not enter into the soil is unavailable for plant growth. This reduces productivity in an area that is already constrained by a dry climate. As with pedestals and gullies, runoff drainage problems were comparatively minor across the unit (Figure 2.3). However, one area had multiple sites with runoff drainage problems. While some of these areas were on steep slopes which typically decrease infiltration and increase the velocity and erosive force of runoff, other problem areas were on flatter parts of the landscape where water should infiltrate into the soil more readily.

Figure 2.1 Norwood LHA Standard 1 Polygon Ratings.

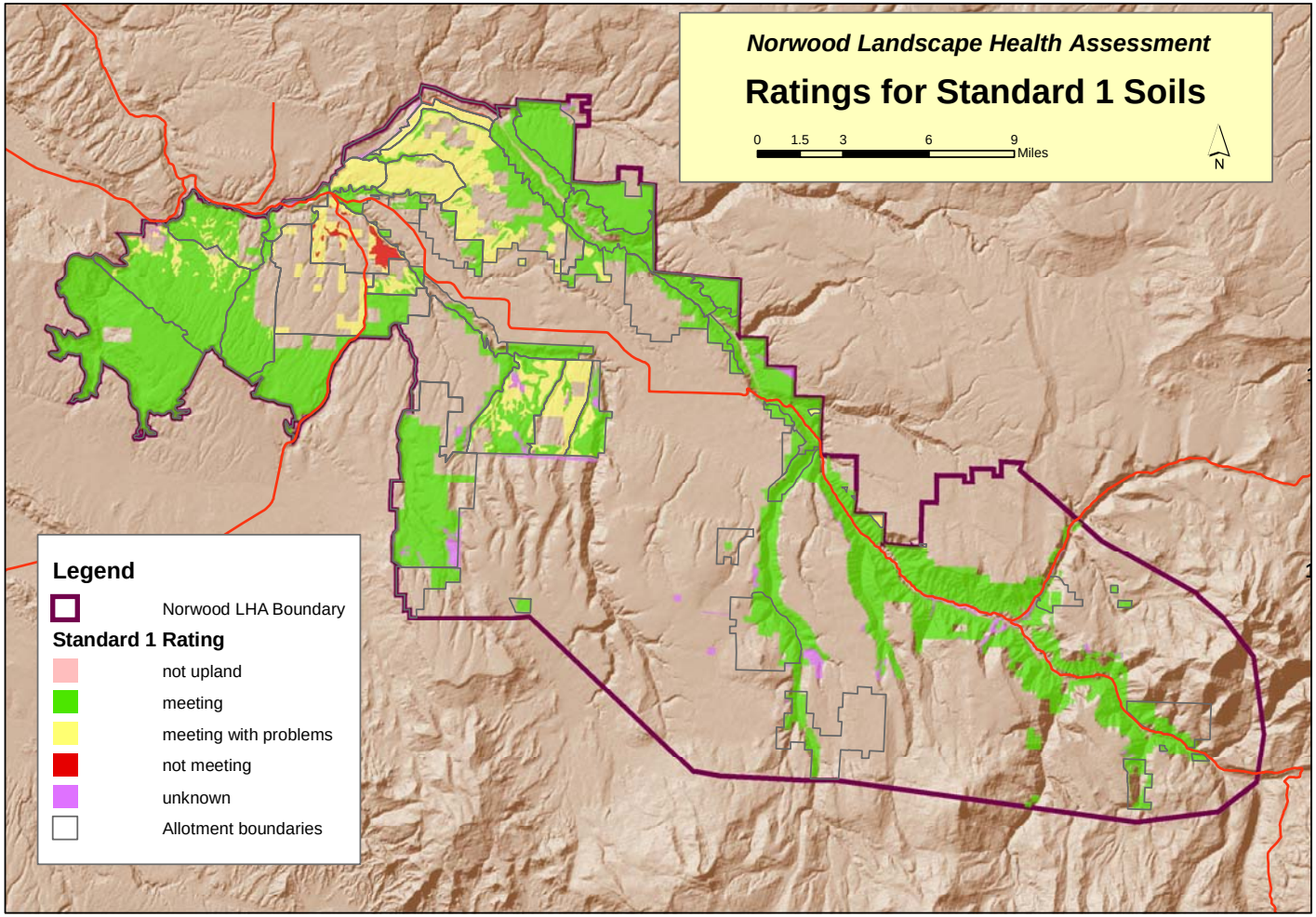


Figure 2.2 Norwood LHA Area soil erosion problems: map shows all sites with gully activity (Rosgen type F and G channels), and soil pedestals (sites with scores of 1 or 2 on the Rangeland Health Indicators data sheet).

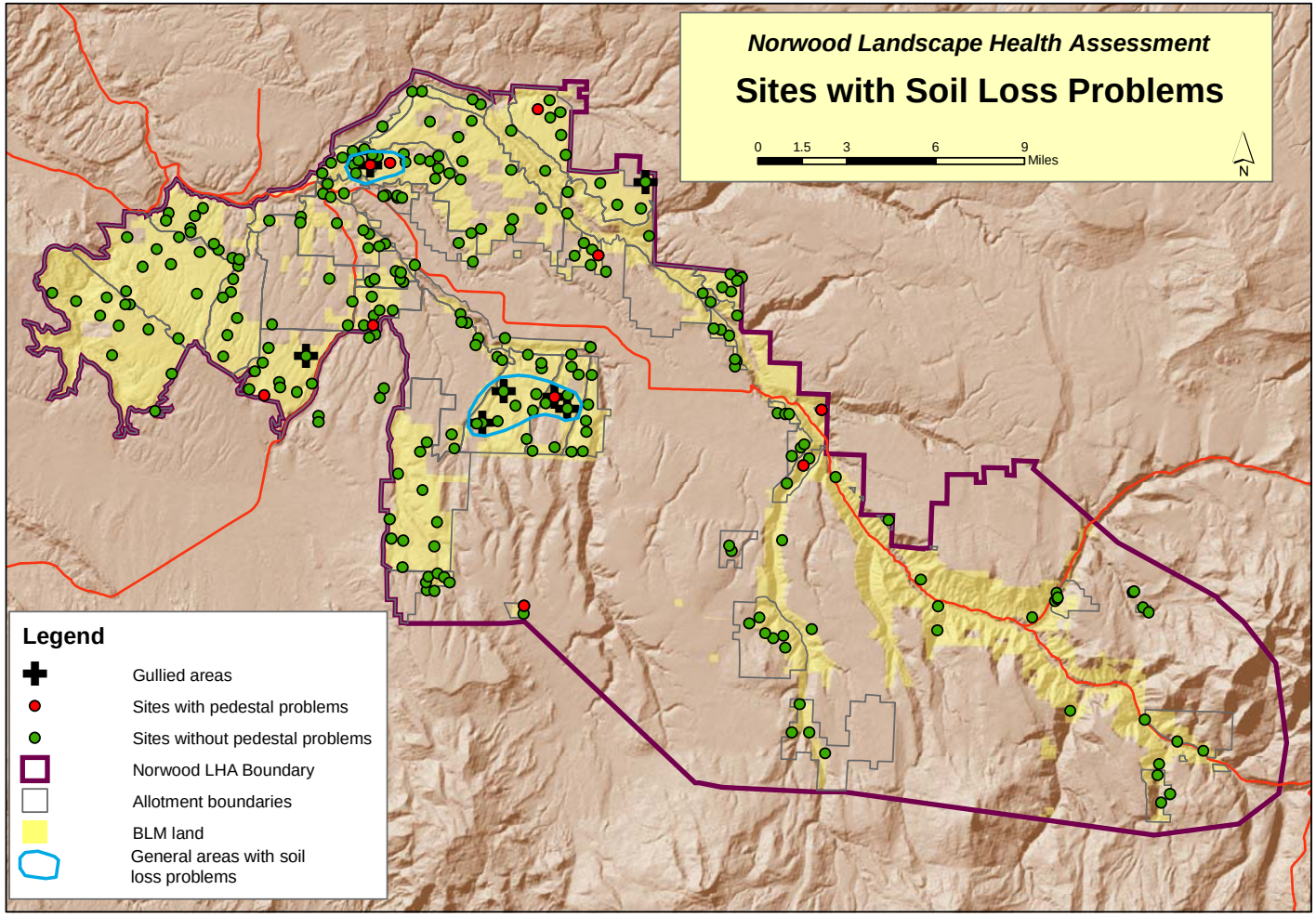
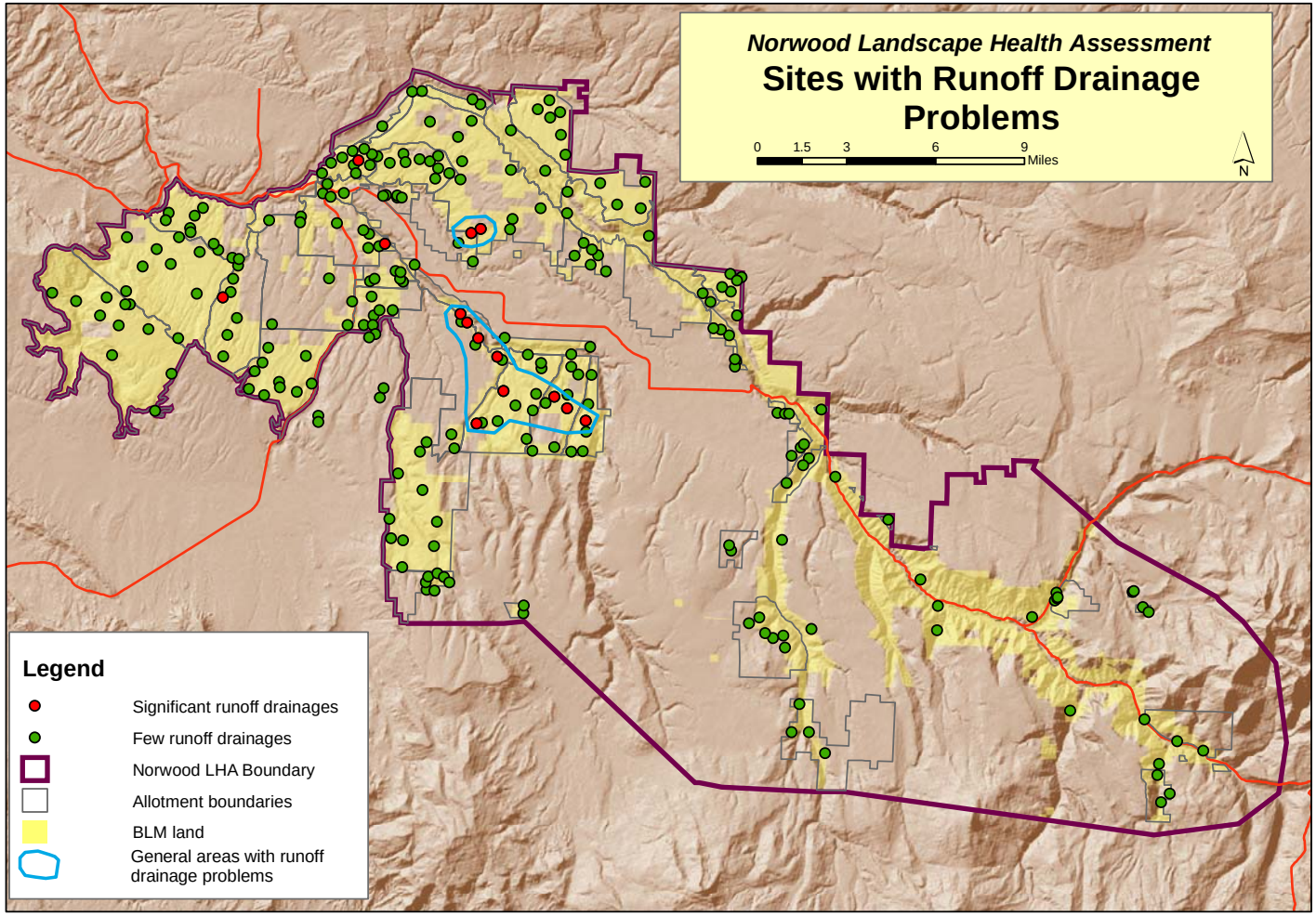


Figure 2.3 Norwood LHA Area runoff related problems. Sites with erosion associated with overland flow: runoff drainage scores of 1 or 2 on the Rangeland Health Indicator sheet are considered problem sites.



Elevated Bare Soil Levels

Bare soil is that part of the ground surface that is not protected by rock, plant basal area, cryptogamic crust, or litter. Bare soil is vulnerable to the erosive forces of water and wind. The percent cover of bare soil was an important indicator used to evaluate the soil's vulnerability to erosion. Bare soil is a widespread problem across the unit (Figure 2.4), as many sites sampled had substantially higher bare soil than the average values for the ecological sites. Locations with numerous problem sites were found throughout the LHA area and are identified by blue circles on Figure 2.4.

Low Plant Basal Cover

Plant basal cover is one of the best sources of soil protection since it protects the soil surface from wind and water erosion, and binds soil particles together with roots. The percent of ground covered by the crowns of perennial plants (basal area) was used as an important indicator of the level of soil protection. In addition to elevating the risk of soil erosion, low basal cover is a concern because the site is producing less vegetation, less vigorous vegetation, or a different type of vegetation than it is capable of producing. Low basal cover is a widespread problem across the unit (Figure 2.5), where large areas are characterized by sites having substantially lower than average plant basal cover.

Low Litter Cover

Litter cover is another plant-related source of soil protection. Although fine litter tends to be less permanent than plant basal cover, it serves to protect the soil surface and enhance water infiltration by slowing movement of overland flow of water. In addition, as litter decomposes it adds to the organic material in the soil, increasing soil productivity. Low litter cover was another widespread problem in the unit (Figure 2.6). Many areas throughout the unit had numerous sites with significantly lower than average litter than the site and vegetation community are capable of producing.

Figure 2.4 Norwood LHA Area sites vulnerable to soil erosion because of high levels of bare soil. On this map red dots denote sites with bare soil levels worse than 10% more than average for the ecological site.

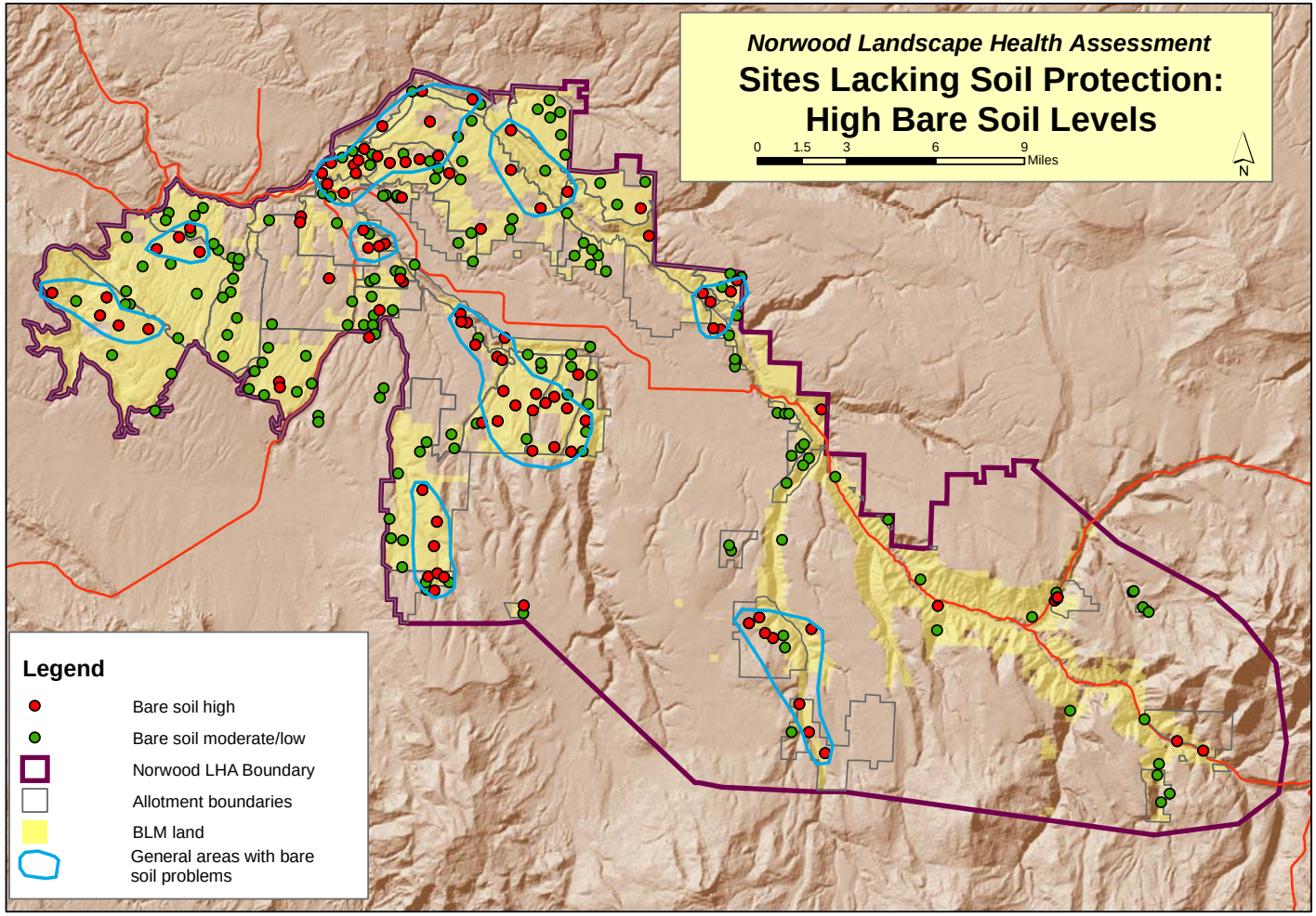


Figure 2.5 Norwood LHA Area sites with low plant basal cover. On this map red dots denote sites with basal area cover worse than 10% below average for the ecological site.

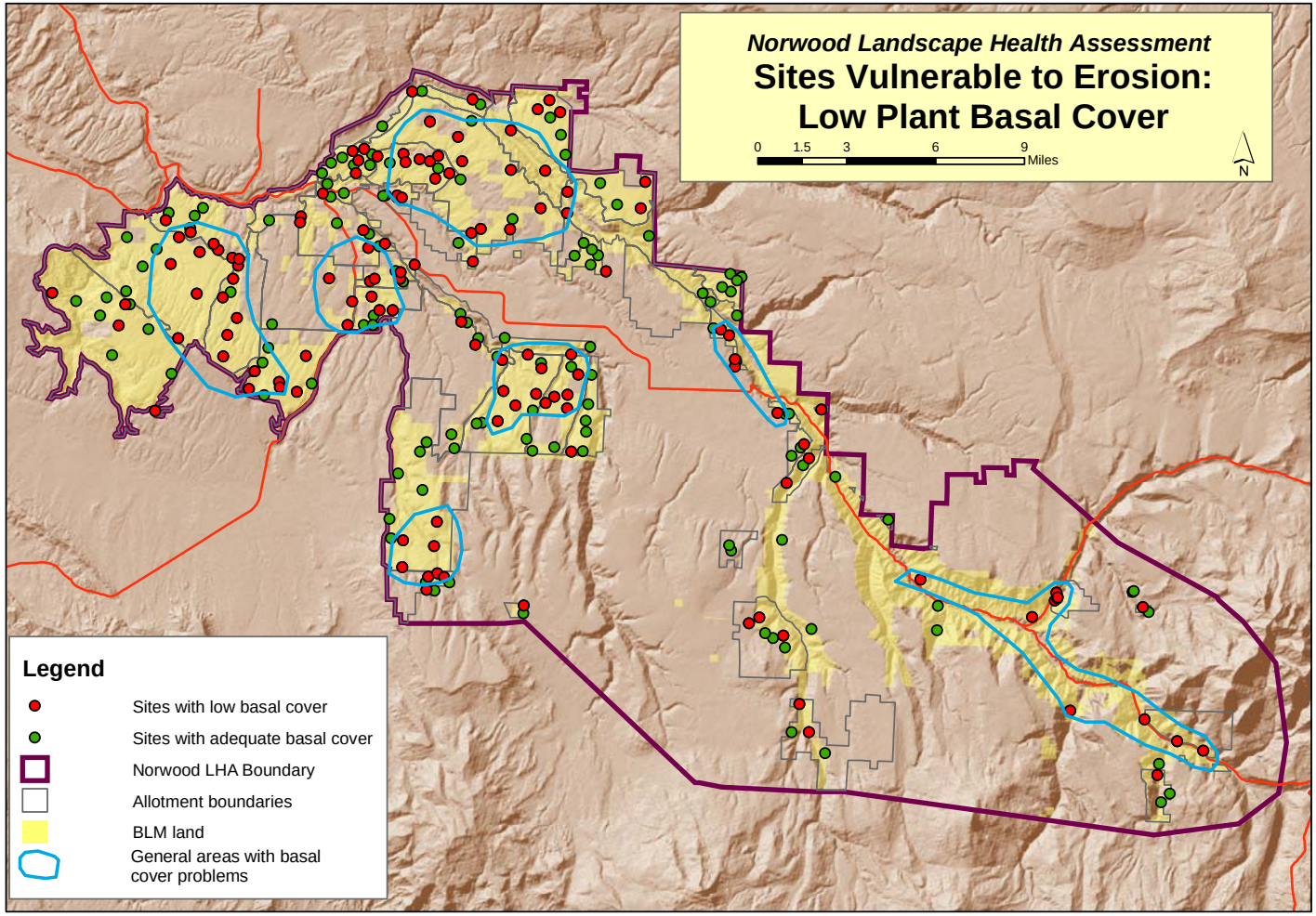
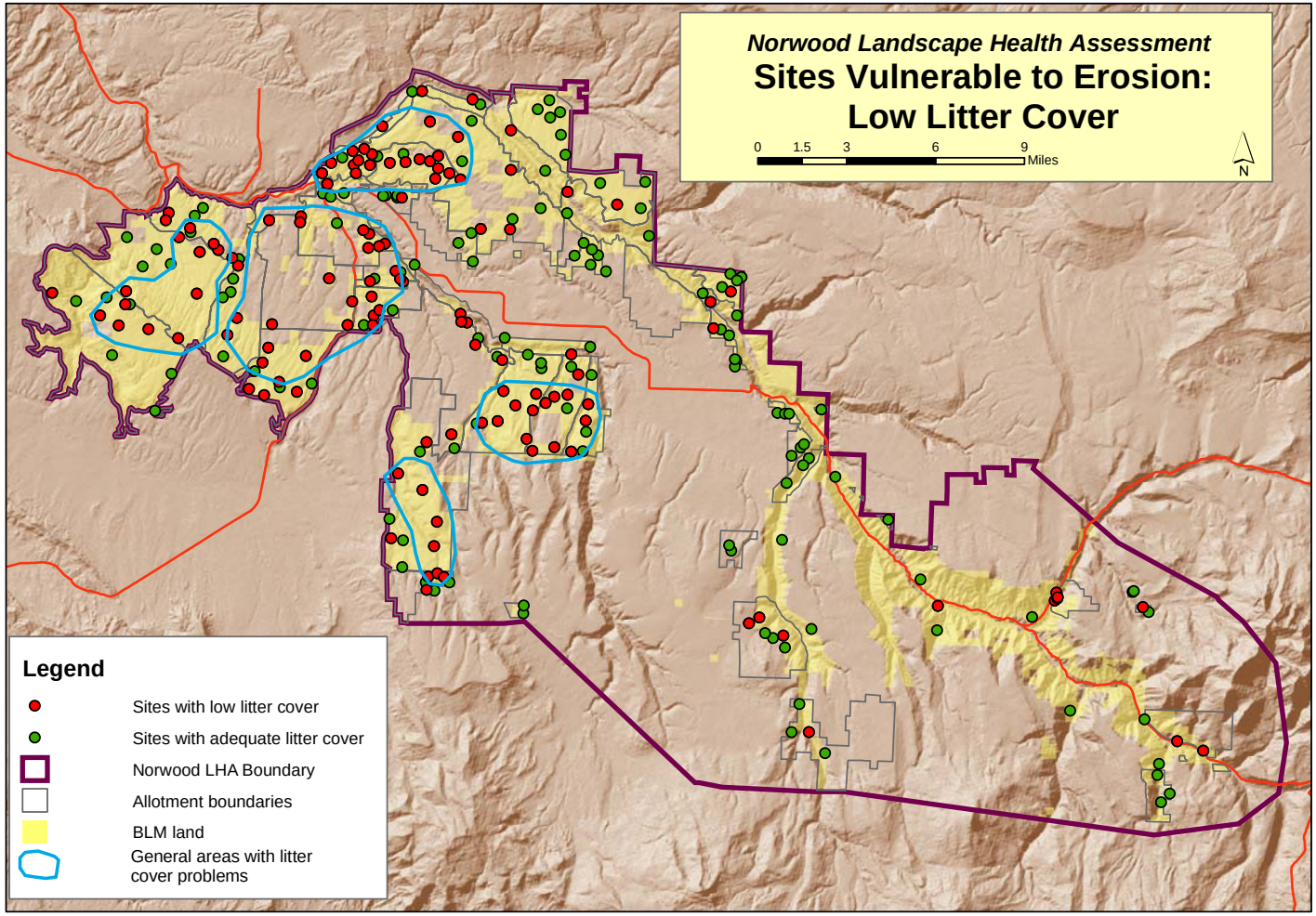


Figure 2.6 Norwood LHA Area sites with low litter cover. On this map, red dots denote sites with litter cover more than 10% worse than average for the ecological site.



Standard 2: *Riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance such as fire, severe grazing, or 100 year floods. Riparian vegetation captures sediment, and provides forage, habitat and biodiversity. Water quality is improved or maintained. Stable soils store and release water slowly.*

Indicators used to assess this standard include: native or desirable vegetation dominant, vigorous vegetation, diversity of vegetation age classes, vertical and compositional structure, vegetation that has root systems capable of withstanding high stream flows, species that indicate maintenance of riparian moisture, stream in balance with water and sediment supplied from watershed, indications of high water tables, point bars colonized by vegetation in range of age classes, active floodplain, floodplain vegetation available to capture sediment and dissipate flood energies, appropriate channel meander patterns, woody debris a part of stream morphology where appropriate.

Mileage Figures

Meeting Standard 2		**Not Meeting Standard 2**	**Unknown**
Meeting	Meeting with problems		
82.7 miles	8.1 miles	2.2 miles	0 miles

See figure 3.1 for stream segment ratings.

Specific Problems

The majority of riparian areas on public land in the landscape unit fully met Standard 2, having no evident problems with hydrology, vegetation, or excessive erosion and deposition from either the stream channel or from the watershed. Out of the total 93 miles of perennial or intermittent streams, 8.1 miles were rated as "functioning at risk", which we have translated into "meeting Standard 2 with problem areas". An additional 2.2 miles did not meet Standard 2. All problem streams are detailed below.

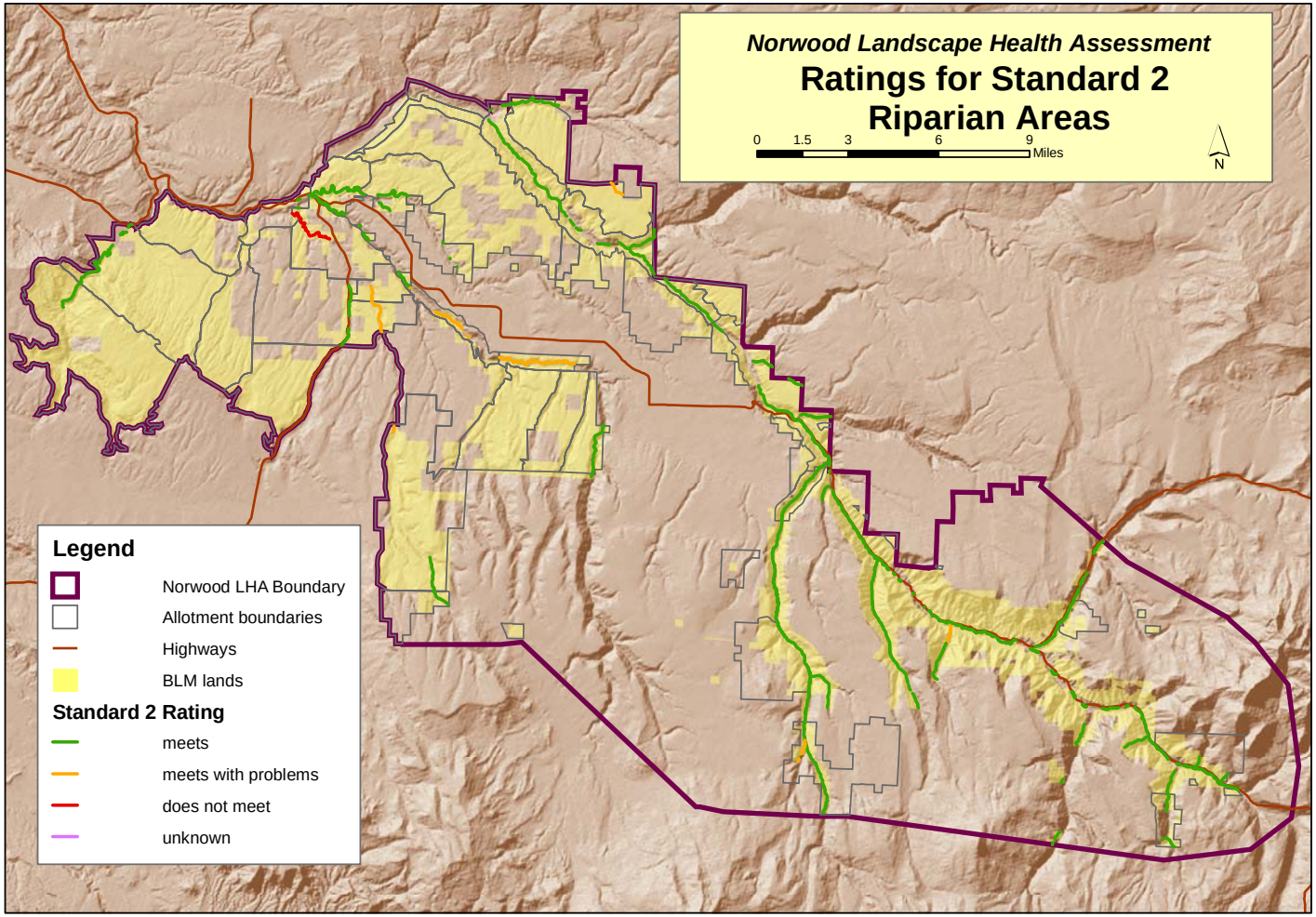
Dry Park Draw

A short reach (0.6 miles) of this intermittent stream passes through BLM. It was evaluated in 1994, and rated "functioning at risk". At that time, there was some downcutting of the channel. Riparian vegetation also had problems, including inadequate cover to protect streambanks during flooding, absence of species with erosion-preventing root masses, and poor age class diversity. Cattle grazing was cited as the most evident cause for this condition.

Goat Creek

About 0.6 miles of this perennial stream which feeds into Beaver Creek were rated as "Meeting Standard 2 with Problems" in 2004. Most of the problems were due to recent bulldozer removal of beaver dams, which had caused a narrowing of the riparian area, and significant bank instability and undercutting. In the damaged areas, inadequate riparian vegetation was present to protect the banks during flooding. Upstream of this disturbance, the stream and riparian area were in good condition.

Figure 3.1 Norwood LHA Standard 2 ratings. Only streams with perennial or intermittent flow are considered for this standard.



Hamilton Creek

Just over 4.2 miles of the lower reaches of this stream had problems. The problems were most pronounced at its mouth, where a 2.2 mile reach was rated in nonfunctional condition. The reach appeared to be intermittent, dominated by tamarisk, and the channel was filled with sand. Riparian vegetation was not adequate to protect the streambanks, nor was it vigorous, diverse, or present in a full range of age classes. Hydrologic and deposition/erosion problems were also evident, with a nonfunctional floodplain, a too-narrow riparian area, and imbalance between water and incoming sediment. The cause of these conditions was not evident, although the flow in this stream is manipulated by diversions in some of its tributaries, and influences from Lilylands Ditch. Additionally, Hamilton Creek drains parts of the Burn Canyon Fire which burned over 30,000 acres in 2002. Some of the vegetation problems are probably associated with the dominant, alien tamarisk. This had been treated recently by cutting and herbicide application. The aftermath of this treatment may have contributed to the overall problems with riparian vegetation and bank stability. However, native plants are expected to increase in the absence of the tamarisk.

Roughly 2.0 miles of Hamilton Creek was rated as Functioning at Risk. Vegetation in areas along this reach had problems with age class and species diversity, cover and bank-protecting attributes, and vigor. Some channel problems were also evident in places where there was excessive sediment deposition and vertical stability. These problems are probably connected with the Burn Canyon Fire.

Naturita Creek

About 4.2 miles of the middle reach of Naturita Creek are rated as Functioning at Risk. A poor width:depth ratio (channel too wide), upland watershed condition (burned), inadequate vegetation age class diversity and limited extent of the riparian area were the most evident problems. The Burn Canyon Fire is also within the Naturita Creek watershed, and appeared to be the primary cause for these problems.

Specie Creek

The lowest portion of Specie Creek on BLM (a total of 0.7 miles) was rated as Functioning at Risk, but in an upward trend. It had highly variable riparian vegetation, with some areas which were sparsely vegetated, and some areas with channel braiding. Problems were most evident near its mouth. Most of the problems appeared to be due to past road widening which had altered the channel. Historic placer mining may also have been a factor.

Standard 3: *Healthy productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species' and habitats potential. Plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations, and ecological processes.*

Indicators used to assess this standard include: native plant and animal communities distributed adequately to assure sustainability, age class diversity to sustain recruitment and mortality fluctuations, adequate habitat connectivity, photosynthetic activity throughout the growing season, resilience to human activities, appropriate plant litter accumulations, and landscapes composed of a variety of successional stages.

Acreage Figures

Meeting Standard 3		**Not Meeting Standard 3**	**Unknown**	**Water**
Meeting	Meeting with problems			
66,695	24,881	7,894	3,244	597

See figure 4.1 for map showing polygon ratings.

Specific Problems

Plant Diversity

Native plant diversity indicates that the soil and water resources are being efficiently and maximally used. A diverse community also has greater resilience to disturbance, since more survival and reproductive strategies and capabilities are present than in monocultures. Figure 4.2 shows that diversity problems are concentrated in the northwestern section of the Norwood Landscape Unit, with many sites supporting significantly less species than expected for those ecological sites.

Cool Season Grass Cover

Perennial grass is an important if not dominant plant type in most of the plant communities occurring in the unit, particularly in the non-forested communities. It is also one of the plant community components most reduced by historic and present day uses, especially grazing. Cool season perennial grasses are those which are actively growing in the spring and fall months, and are generally dormant during the heat of the summer. On the majority of public lands managed by the Uncompahgre Field Office, low cool season grass cover is a particular problem because most grazing on BLM has historically taken place during the fall and spring. This coincides with the cool season grasses' vulnerable, active growing period. When these species are reduced in a plant community, the community loses productivity because spring and fall resources (sunlight and moisture) are not being fully used. In addition, cool season grasses are important for the competition they provide against cheatgrass and many other annual invasive species, because they use the same growing period. The percent canopy cover of cool season perennial grass was used as an indicator of plant community health and wildlife habitat quality (Figure 4.3).

Figure 4.1 Norwood LHA Area Standard 3 ratings.

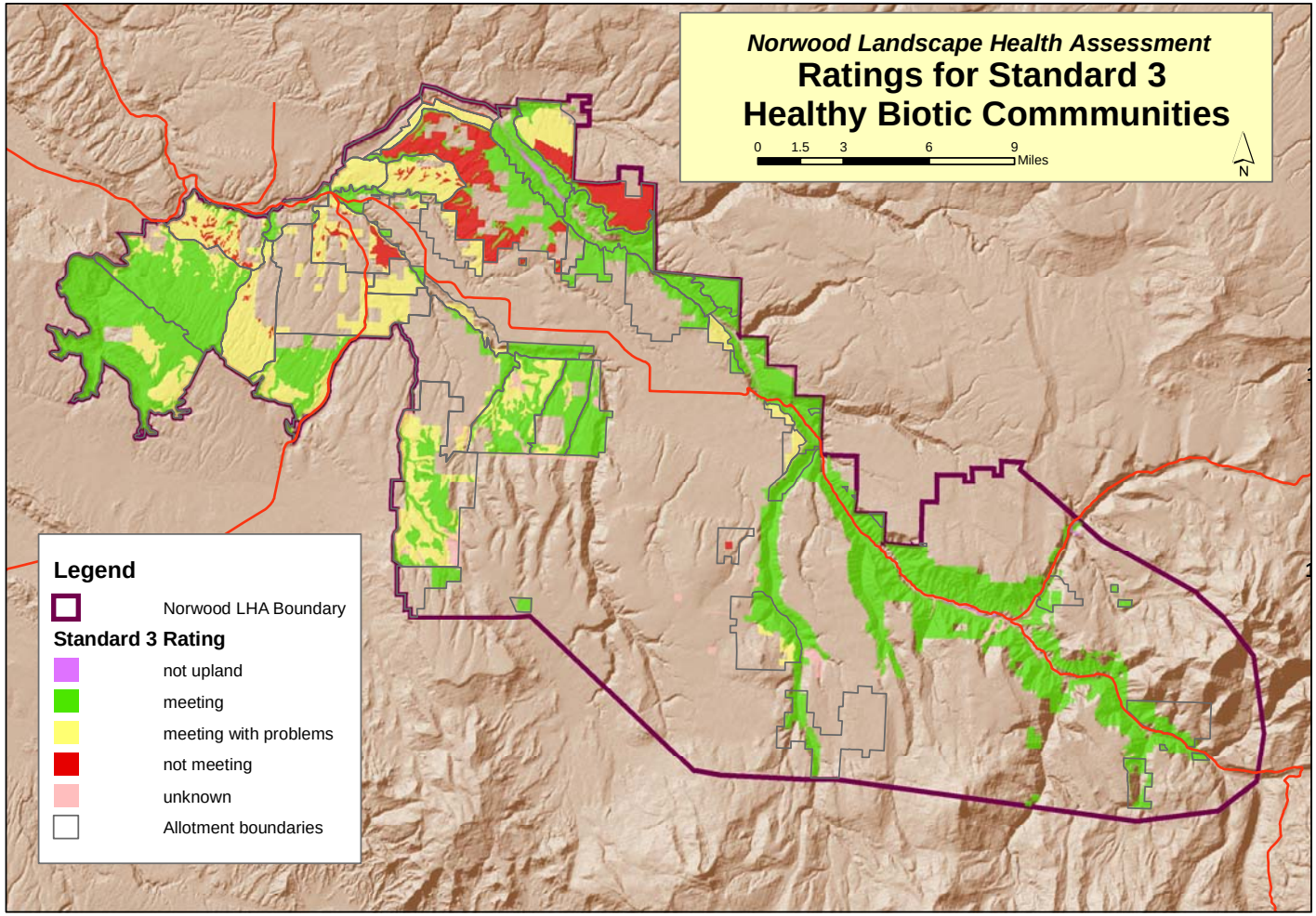


Figure 4.2 Norwood LHA Area plant diversity. This map shows sites with Rangeland Health Sheet scores of 1 or 2 as diversity problem sites, scores of 3, 4 or 5 as adequate to good diversity.

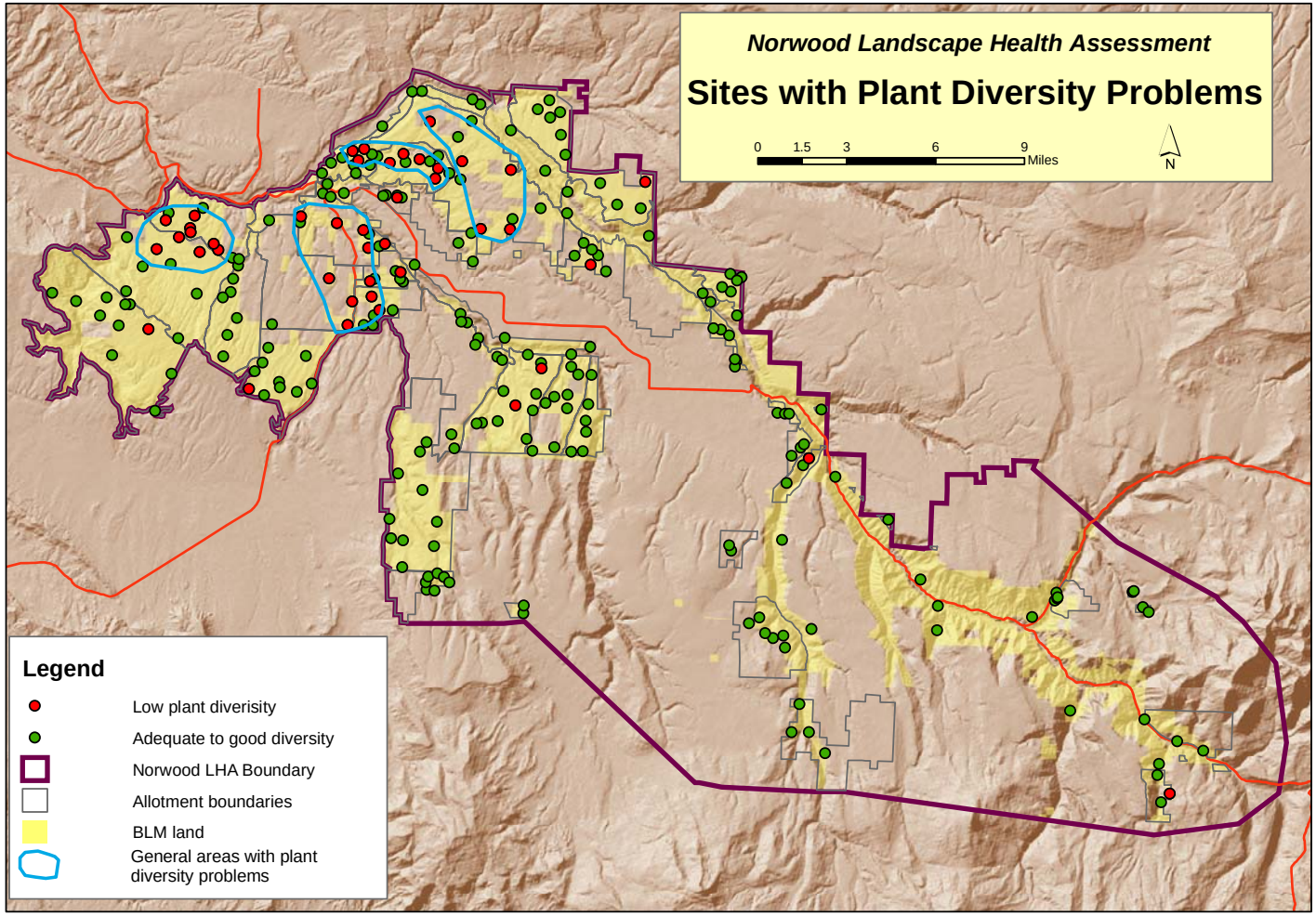
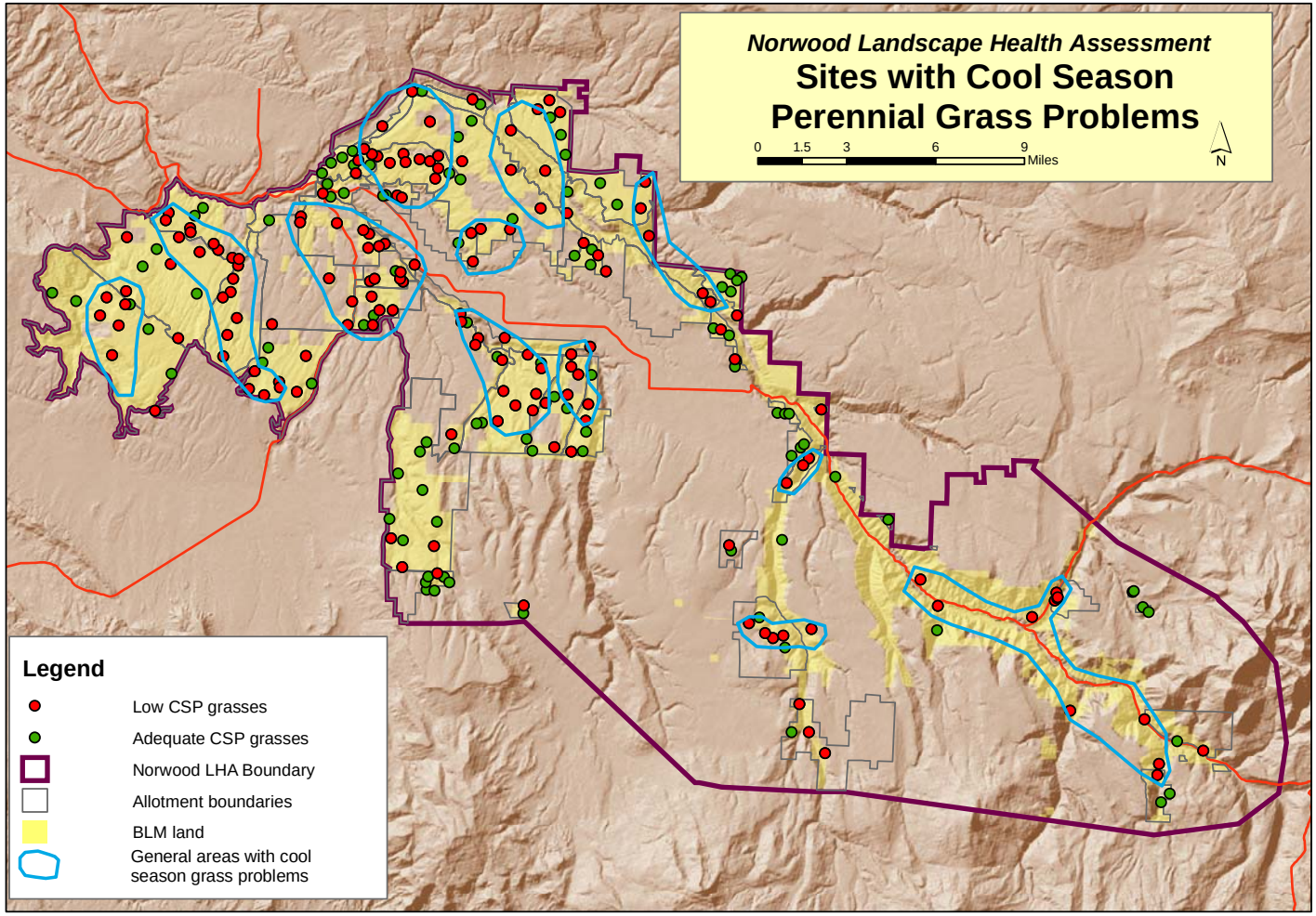


Figure 4.3 Norwood LHA Area perennial cool season grass cover. In this map red dots denote sites with perennial cool season grass canopy cover worse than 10% below the average value for the ecological site.



Problems with low cool season grass cover were widespread across the unit. Most of the sites visited in the northwest part of the unit had low levels of cool season grasses, with problems diminishing somewhat with increasing elevation. Since these results are based on average values, the large Burn Canyon fire and the many mechanical treatments across this landscape may have skewed results somewhat. Comparatively high grass cover in the burned and treated area would drive up the average value for ecological sites on which they occur. High averages would make untreated sites appear worse in comparison. However, it is reasonable to expect that many of the untreated sites have the capability of producing more cool season grass based on NRCS ecological site descriptions, comparison areas, and the productivity of the treated or burned sites.

Warm Season Grass Cover

Warm season grasses germinate and grow during periods of summer moisture. This capability enables them to use monsoonal moisture during warm periods when cool season grasses are mostly dormant. Warm season grasses are growing and vulnerable to grazing during the summer, a season in which only higher elevation BLM lands are grazed. Historically, vegetation treatments and seedings have reduced warm season grasses in many areas across BLM lands, however. Widespread problems with warm season grasses were observed throughout the LHA unit (Figure 4.4). Around half of the sites visited had substantially lower than average levels of warm season grasses. Treatments and the Burn Canyon Fire are unlikely to have affected the averages or skewed these ratings in any way.

Perennial Forb Cover

Perennial forbs are a source of diversity, nectar, seeds, palatable forage, varied photosynthetic periods and root morphologies. These characteristics increase a community's water and sunlight capturing capabilities, biomass production, and ability to support animals. Although typically not a dominant plant type, forbs fill many important niches in a plant community. Like the cool season perennial grasses, perennial forbs are one of the native plant types that appear to have been most impacted by historic grazing, especially at lower elevations. Native perennial forbs have also been reduced in many areas by past BLM treatments and seedings. Percent perennial forb canopy cover is used as an indicator of plant community health and wildlife habitat quality.

Low perennial forb cover was another widespread problem across the unit (Figure 4.5). Although the drought of the previous several years may have reduced the appearance and abundance of forbs, comparison with average values based on ecological sites shows that many of the problem sites have the capability of producing more perennial forbs, even in a drought year. Forbs did respond well and contribute significantly to overall plant cover in the Burn Canyon fire, so this may have skewed forb ratings downwards on those ecological sites across the rest of the Norwood landscape.

Pinyon-Juniper Invasion and Decline

Pinyon and juniper trees are native species which live for centuries and have been common in the area for millennia. However, historic photos and tree stand structure indicate that in some areas across the Uncompahgre Field Office, pinyon-juniper woodlands are becoming denser than they were in the past and are expanding into other plant communities. As this occurs, herbaceous and shrub species visibly decline in dominance and vigor, and the landscape loses patch diversity at the larger scale. Pinyon and juniper invasion (as evidenced by young age classes of trees dominating a site) is used as an indicator of plant community health and wildlife habitat quality. Tree invasion was found at several sites throughout the unit (Figure 4.6), and was

Figure 4.4 Norwood LHA Area perennial warm season grass cover. On this map red dots denote sites with canopy cover values worse than 10% below the average value for the ecological site. WSP is used for Warm Season Perennial.

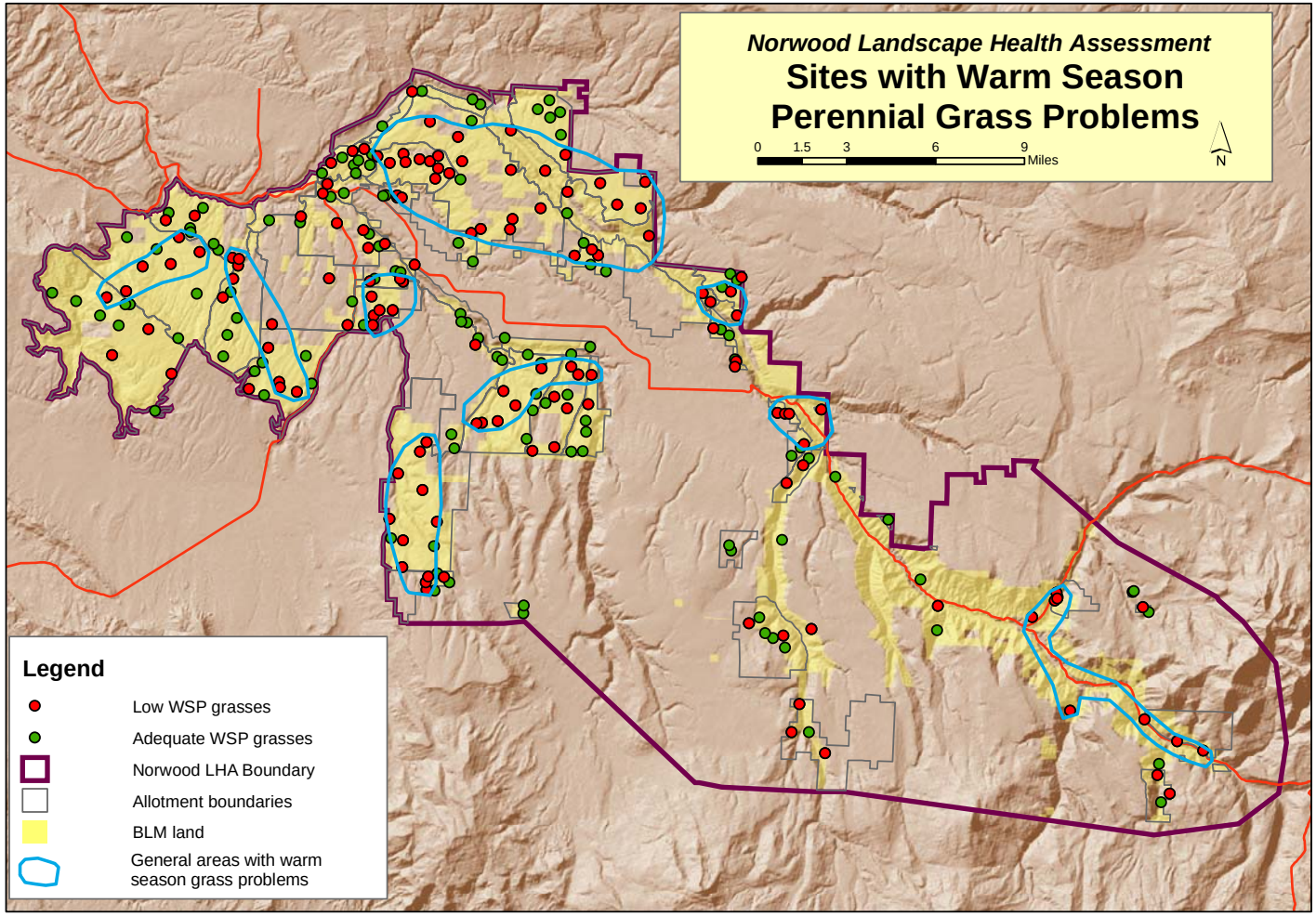


Figure 4.5 Norwood LHA Area perennial forb cover. On this map red dots denote sites with perennial forb canopy cover values worse than 10% below the average value for the ecological site.

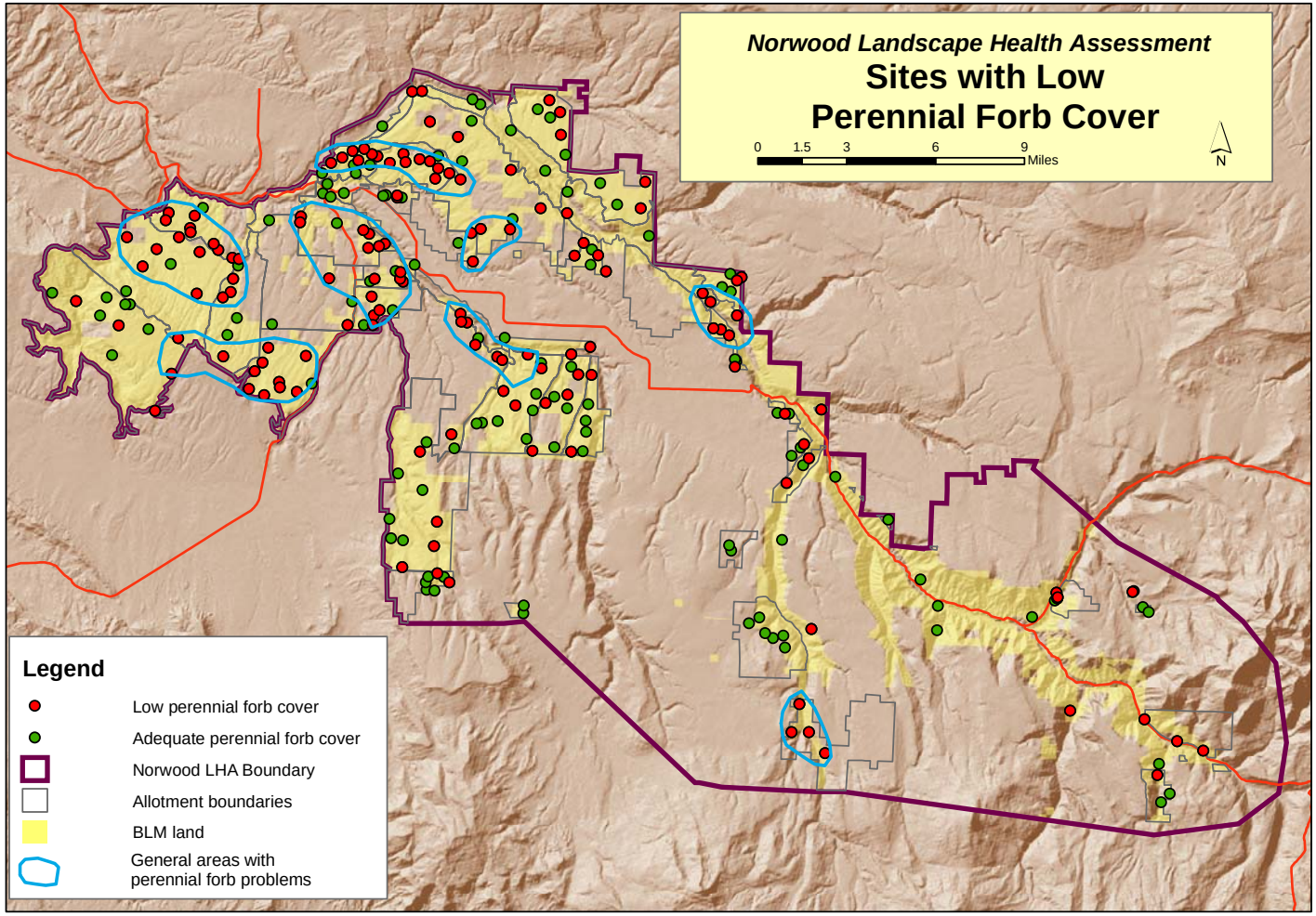
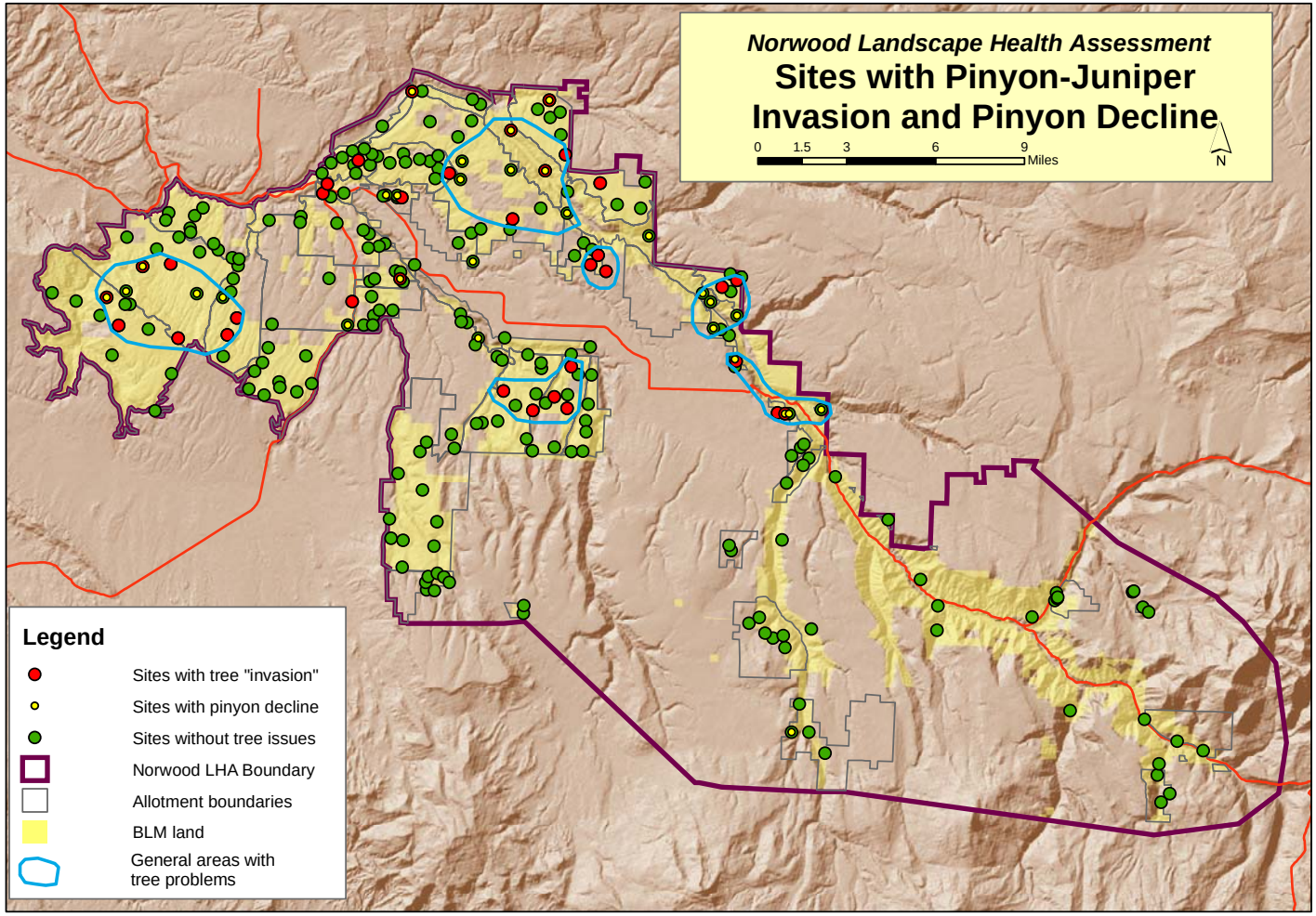


Figure 4.6 Norwood LHA Area pinyon-juniper invasion and pinyon decline. Red dots denote sites where young age classes of either pinyon or juniper are the dominant tree age classes on the site. Yellow dots denote sites where most pinyon are in a state of low vigor.



occurring both as tree establishment in non-woodland communities, and increases of pinyon within existing woodland stands.

Recent long-term drought has brought on an Ips beetle epidemic in much of southwestern Colorado. Many other pinyon pathogens have also combined with these to create "pinyon decline" which kills the pinyon trees. Because pinyon are such an important part of the plant communities in the Roubideau unit, pinyon decline was used as an indicator of health, and captured by evaluating pinyon tree vigor at each site. Pinyon decline was observed at many sites throughout pinyon-juniper woodlands in the unit.

Exotic Plant Cover

Exotic plants are those species which were not present in the region prior to European settlement of the area, and were brought in from other countries or regions. Therefore, they have not co-evolved with the plants and animals that are native to the area. In some cases, this provides the exotic plants with a competitive advantage allowing them to push out native species. In other cases, the exotics are weedy species associated with disturbance of the native plant community or soil. Prevalence of exotic plant species was used as an indicator of plant community health and wildlife habitat quality.

Exotics were a widespread problem across the LHA area (Figure 4.7). About 10% of the sites visited were dominated by exotic plants, and these were mainly located in the north and west parts of the Norwood unit, and associated with old vegetation treatments and seedings with nonnative species. Exotics were present within the communities, but not dominant at an additional 23% of the sites. Most of the sites with exotic plants are located in the western half of the unit. The primary exotic species encountered were cheatgrass (*Bromus tectorum*), burr buttercup (*Ceratocephela testiculata*), Jim Hill mustard (*Sysimbrium altissimum*), filaree (*Erodium cicutarium*), prickly lettuce (*Lactuca serriola*), common dandelion (*Taraxacum officinale*) and the seeded species: crested wheatgrass (*Agropyron cristatum*), orchardgrass (*Dactylis glomerata*), intermediate wheatgrass (*Thinopyrum intermedium*), Kentucky bluegrass (*Poa pratensis*), small burnett (*Sanguisorba minor*) and yellow sweet clover (*melilotus officianle*).

Cheatgrass is an exotic species of particular concern, as it has completely overtaken and transformed many plant communities in the Great Basin region. Land managers in the Colorado Plateau region are concerned that this area may be on the threshold of a similar level of cheatgrass invasion. Of the 257 sites visited in the Norwood LHA area, cheatgrass occurred at very high levels at 2% of the sites, and an additional 2% had significant cover of cheatgrass. Cheat grass was present at low canopy cover levels in 20% of the remaining sites, and was at trace amounts at another 25% (Figure 4.8). The remaining 51% of sites were free of cheatgrass. The cheatgrass problems were found in the western half of the unit.

Noxious Weed Infestations

Noxious weeds are those exotic species which are formally designated by the state of Colorado as noxious. They include: Russian knapweed (*Acroptylon repens*), spotted knapweed (*Centauria biebersteinii*), Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), field bindweed (*Convolvulus arvensis*), whitetop (*Cardaria draba*), oxeye daisy (*Leucanthemum vulgare*), and tamarisk (*Tamarix chinensis*). Weeds are widespread across the unit (Figure 4.9). Many of the infestations are associated with roads, especially maintained roads. Stock ponds, roads and drainages are also often infested with Russian knapweed, tamarisk, whitetop and Canada thistle. Russian knapweed, Canada and musk thistle are also present in some areas.

Figure 4.7 Norwood Area exotic plants. This map shows sites with Rangeland Health Sheet scores of 1 or 2 as exotics dominant, scores of 3 as exotics present, and scores of 4 or 5 as exotics minimal.

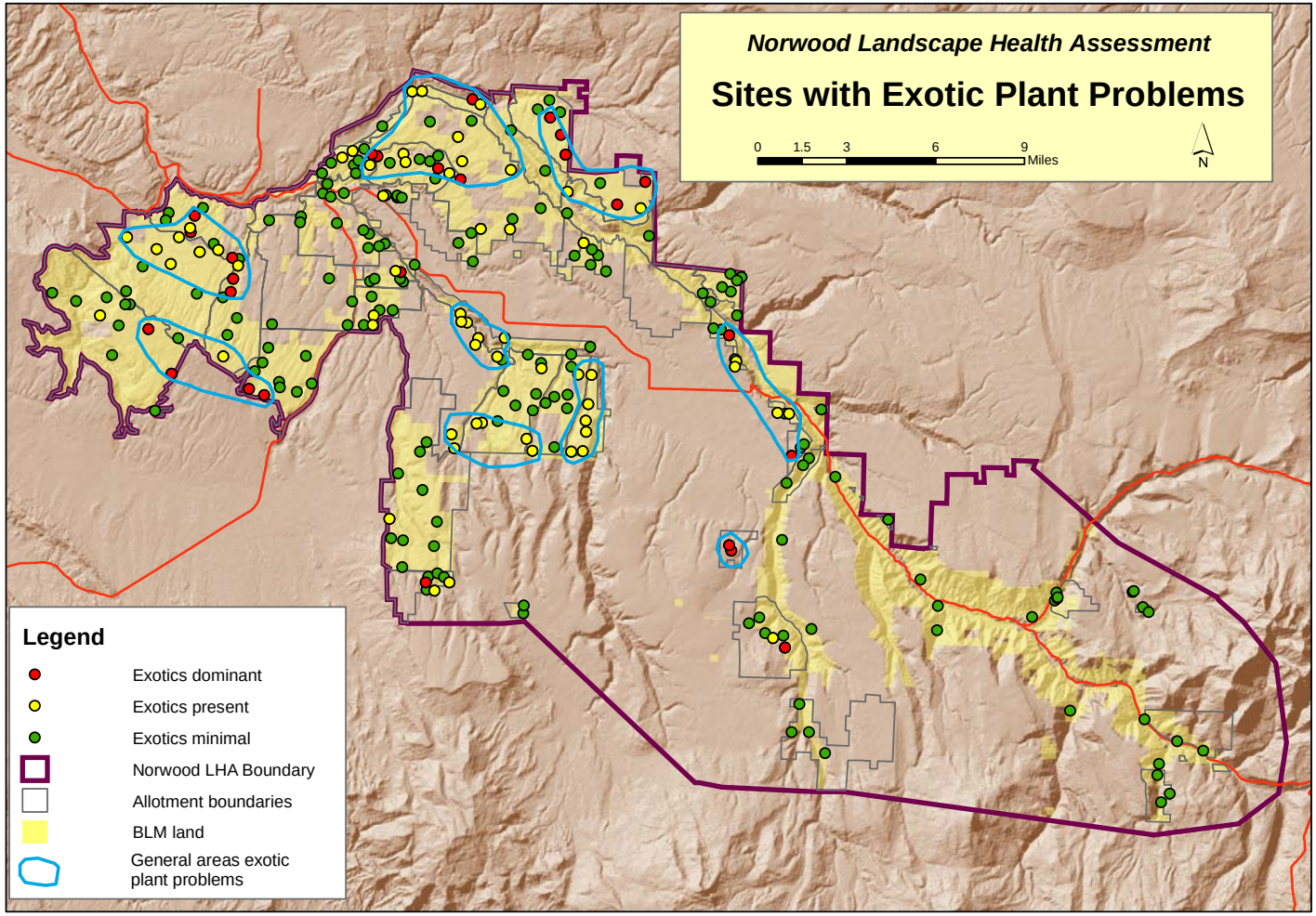


Figure 4.8 Norwood Area cheatgrass infestations. This map shows sites with cheatgrass, at varying levels of canopy cover.

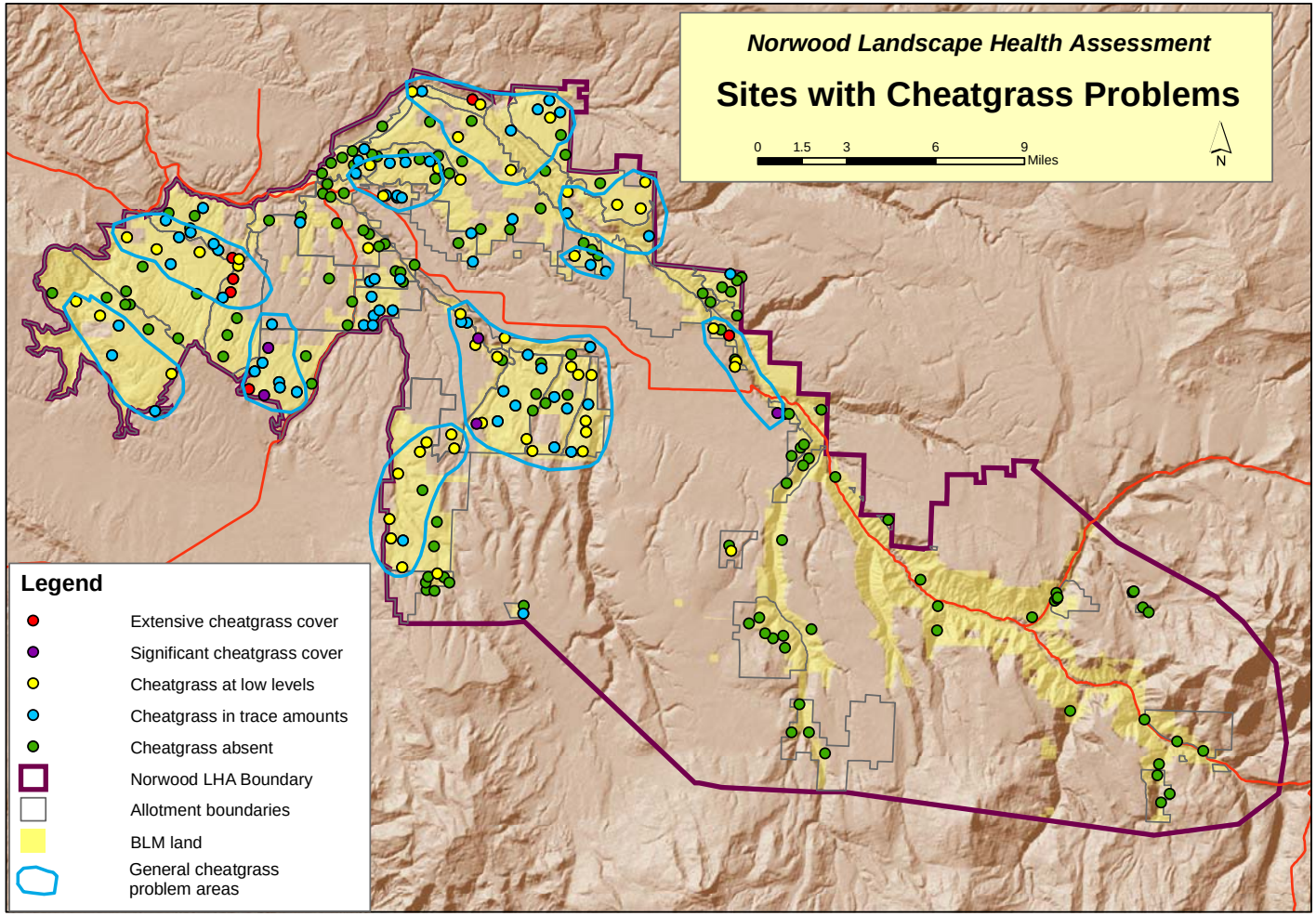
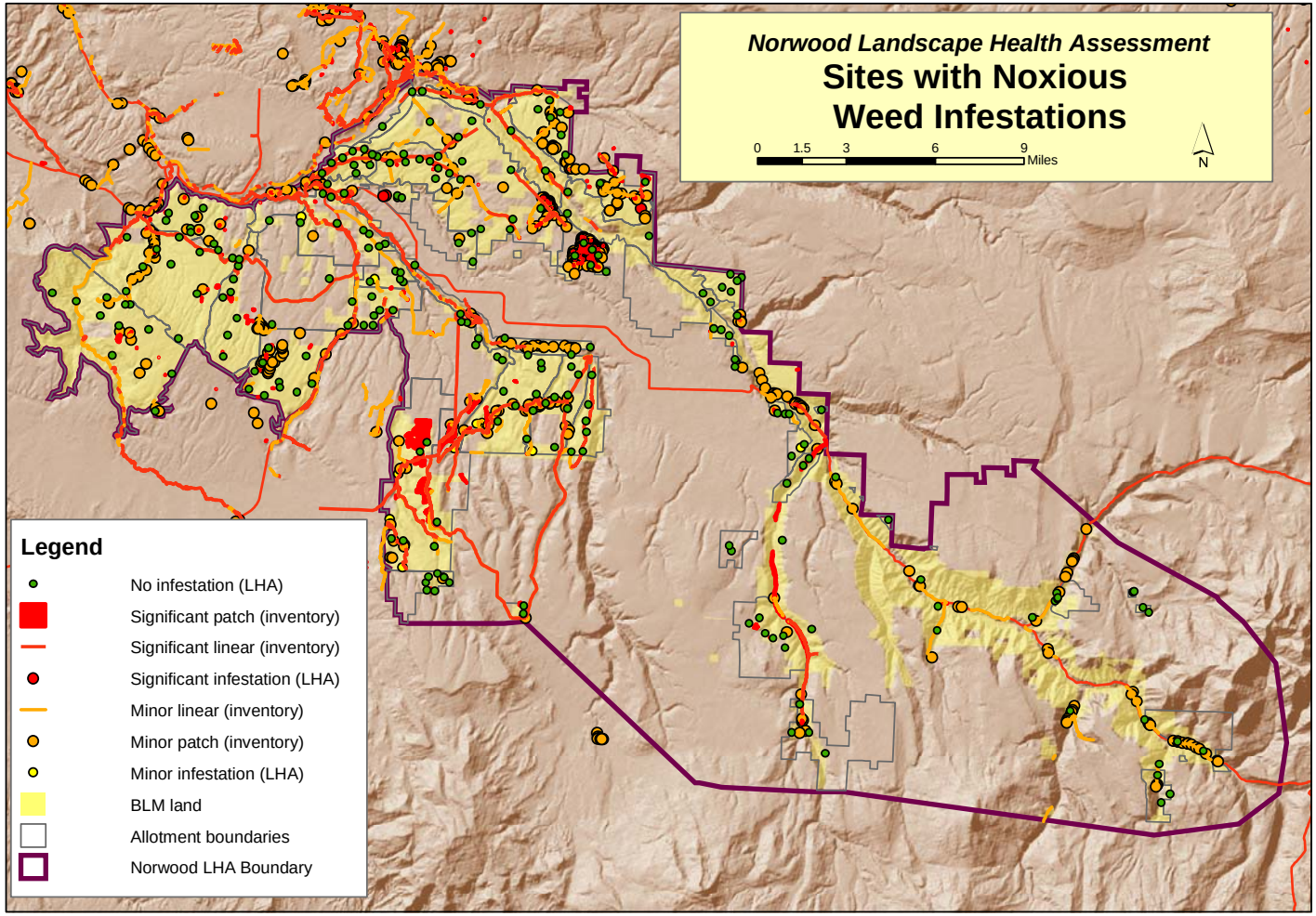


Figure 4.9 Norwood LHA Area noxious weed occurrences. This data comes from two sources-a comprehensive weed inventory which maps large patch infestations, linear weed infestations and small point infestations. The LHA data collection points also generated weed data.



treatments and burns. For most of the landscape apart from drainages, noxious weeds are not a dominant species, and usually not even present in the natural plant community. However, although few infestations are present in undisturbed lands, infestations tend to be distributed frequently enough across the landscape to pose a threat to undisturbed lands.

Shrub Utilization

Hedging is the alteration of a shrub's growth form into a compact, dense growth of twigs. Hedging on shrubs is caused by repeated browsing by wildlife or livestock, and can result in reduced productivity and vigor of the shrub, or even death. Hedging is indicative of the balance between browsers and habitat carrying capacity. It is used here as one indicator of plant and animal community health. Problems with shrub hedging are minimal across the unit, with only a handful of sites showing any hedging (Figure 4.9). This indicates there is not an imbalance between the vegetation and the browsing animals.

Shrub Vigor

Shrubs are an important component of most plant communities across the unit. They are often the dominant life form of the plant community and also provide structure, diversity and food, thus shaping many other aspects of the community. Shrub vigor, (or health and productivity) is used as an indicator of plant community health and wildlife habitat quality. Low vigor indicates the plants are stressed, more vulnerable to disease, unlikely to reproduce successfully, and produce less food for wildife. Only in isolated areas were there concentrations of sites showing low shrub vigor (Figure 4.10). Wyoming big sagebrush was the most widespread shrub species having problems with vigor

Native Plant Distribution

Two hundred thirty four different plant species were found to occur in the unit. Of those species which occurred in significant amounts on at least one site, Utah juniper, a widely occurring native tree, was the most widespread species. It was at 120 out of a total of 257 sites where data was collected. Colorado pinyon was the second most widespread species occurring in significant amounts on 99 sites, with the native annual forb known as western tansy mustard (*Descurainia pinnata*) the third most common on 64 sites, followed by Gambel's oak at 59 sites. Muttongrass, a native cool season perennial bunchgrass was the most common grass occurring as a significant part of the plant community on 57 sites. The most common warm season perennial grass was blue grama grass at 33 sites, while the most common perennial forb was rock goldenrod which was significant on 35 sites. Forty four species occurred at substantial levels on only one site, and another 47 occurred on less than 10 sites as a significant component of the plant community.

As expected, both elevation and soils appear to drive where most of the plant species are located. The Morrison and Cutler-derived shale soils on canyon side slopes support substantially different plant species than the sandy and loamy soils found on the mesa tops. Deeper soils typically support some different species than shallow and rocky soils, although many species also occur on both soil types. Elevation and aspect also affect plant distribution, with the more moist, higher elevations and aspects typically supporting a greater variety of species.

The most obvious problems observed with plant populations are associated with the ongoing drought. Most evident is the die off occurring among the Colorado pinyon which are being affected by drought and associated insect and pathogen problems throughout the LHA area. This is occurring in large patches, but living pinyons are still distributed, and in fact still dominant throughout the area.

Figure 4.10 Norwood LHA Area shrub utilization and hedging levels. Sites with shrubs falling in hedge classes 3 or 6 depicted as seriously hedged, sites with shrubs in hedge class 2 or 5 are moderately hedged, and sites with shrubs in hedge class 1 or 4 are not hedged.

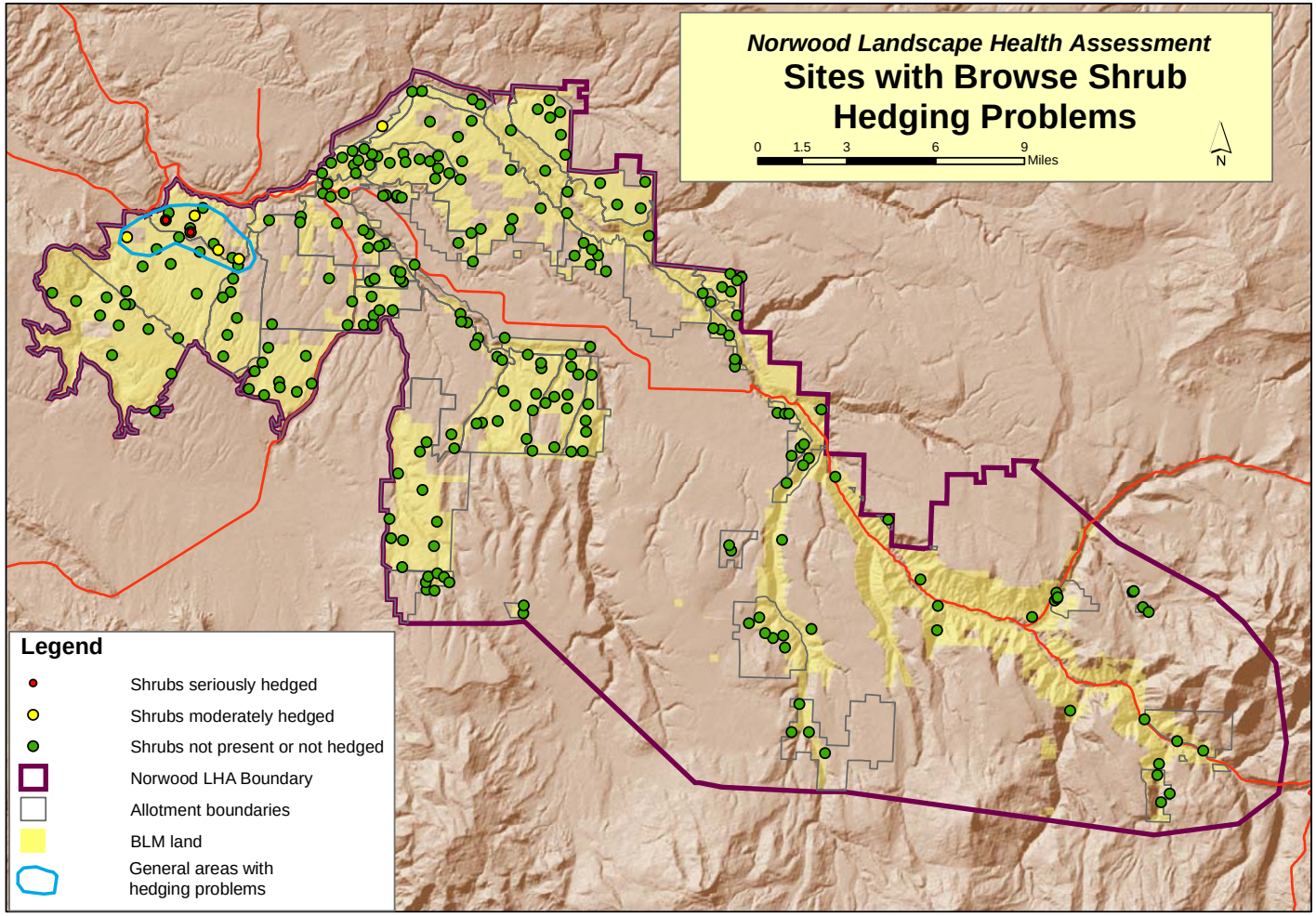
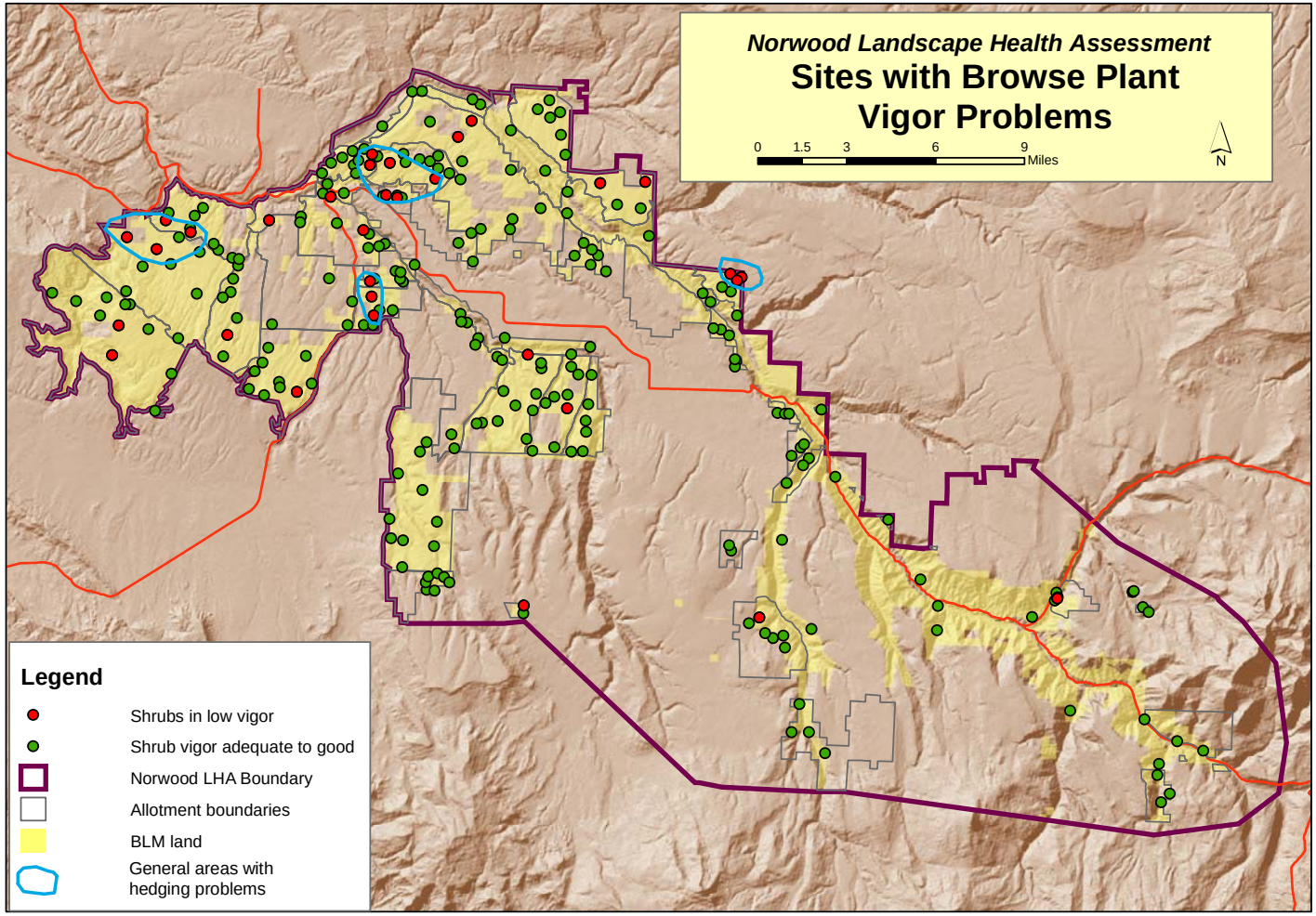


Figure 4.11 Norwood LHA Area browse plant vigor. Red dots denote sites with at least one major browse shrub species that is in predominantly low vigor across the site.



At the level of data collection, it appears that the major plant species appropriate to soil and elevation are found broadly scattered across their available habitat. This evidence suggests that major plant distribution problems are not occurring which would interfere with region-level population viability or resilience among the more common species.

Healthy Wildlife Community

The wildlife community health assessment in the LHA area, including habitat, was made using existing CDOW, CNHP and BLM data, qualitative knowledge and data collected during the LHA rapid assessment process. The rapid assessment process by itself does not provide adequate information to fully assess this standard. A much more complex and time consuming effort would be necessary to collect sufficient information for an accurate assessment of health of the wildlife community. Information is not available, nor is it possible to obtain these data quickly enough to determine the status of many wildlife species and their habitats for this report. Additional information is needed for many of the wildlife species and their habitats; specifically small mammals, herptiles, birds, and predators.

Based on the available information, the main problems or changes that relate to Standard 3 which are occurring in the Norwood unit at a landscape scale include: 1) major changes to habitat structure, condition, and arrangement of components across the landscape, 2) the long-term mule deer population trend is down slightly, 3) winter range quantity and quality is declining in some of the key winter concentration areas where treatments have not been done or wildfire has not occurred, 4) the elk population trend is up slightly and appears to have a tendency to increase rapidly without constant heavy hunter harvest, 5) several species of neo-tropical birds in the Western Colorado region are declining. The natural dynamics of this system in some areas appear to have been slowed down due to lack of natural disturbances, thus vegetation is getting older with less diversity. However, recent large fires have occurred, scattered across the landscape and have reset plant succession and renewed habitat conditions and values for many wildlife species. Also, the increase of human activities and development has caused changes to the dynamics of this area.

Specific problems or changes:

1. Wildlife habitat changes are occurring across the Landscape. Cumulatively, the problems listed above in the Healthy Plant Community section are indicators of changes occurring to habitat structure, condition, and arrangement of components in the Norwood LHA unit, and across the larger landscape. As these habitat changes occur, so will the species present, their abundance and distribution, and perhaps their role in the community. As habitat abundance and quality declines for some species, it will improve for others.

Habitat changes that are occurring in the unit, and much of the adjacent landscape that affect the wildlife habitat quantity and quality are: the average patch size is getting larger, the amount of "edge" is decreasing, the size and quality of browse stands are declining, human development is expanding causing fragmentation of key habitats for several species, and the abundance and amount of area supporting exotic and noxious vegetative species is increasing. In general, this area, as well as much of the adjacent landscape, is declining in overall quality for many species. It is becoming more favorable for species that require larger patch sizes of later seral stage vegetation, and with less diversity. However, in recent years several wildfires and habitat improvement and fuel reduction projects have occurred across this landscape and have

greatly helped to resolve this issue for much of the LHA area.

2. The long-term mule deer population trend is declining in the LHA area and the region (Uncompahgre Plateau, GMUs 61 & 62 & Groundhog/Disappointment, GMU 70)), which is consistent with declines in mule deer populations in adjacent areas and throughout the west. Although erratic annual fluctuations in mule deer numbers are typical, the 15-20 year trend is downward. The CDOW's desired mule deer population level for this area is 38,500 for GMU's 61 & 62, and 34,000 for GMU 70. During the early 1980's populations in these areas were estimated to be near 50,000 in each, and the 2005 estimate was just over 35,000 for each area (Figures. 1.11a, & 1.11b).

Habitat changes due to fire suppression, historic grazing, development, and fragmentation; human impacts due to commercial activities and rapidly increasing recreational use; predation from coyotes, cougars and black bears; and competition from the increased elk populations are among the suspected and possible factors interacting to contribute to this decline. Recent disturbance from planned projects and wildfire is expected to vastly improve habitat conditions in the near future.

In this unit mule deer depend heavily upon sagebrush for winter forage. For mule deer to utilize sagebrush without ill effects they need an abundance of herbaceous vegetation. Mule deer do not do well when their diets consist of >30-35% sagebrush. Our assessment data shows areas of low shrub vigor and annual growth on some of the shrubs, which are largely sagebrush. Current levels of use did not appear to be very high. Also, assessment data shows widespread low presence of cool season grasses and perennial forbs, which help to explain the low present day utilization on sagebrush, and perhaps is a factor in the decline of mule deer numbers.

3. Winter range quantity and quality is declining in much of the LHA area even with the recent disturbance, due mostly to: 1) the lack of natural disturbances scattered throughout the unit to reset succession, hence creating a more desirable mosaic of feeding and cover areas, and improving the herbaceous species composition and vigor of browse plants, 2) existing browse stands are advancing in seral stage, and in some areas browse plants are being replaced by pinyon and juniper and, 3) over use by mule deer and elk, caused by their number being concentrated on the remaining amount of shrinking winter range, thus quickening the decline of winter range condition. See the Desired Landscape Objectives map for a comparison of existing mule deer winter range conditions to the desired landscape objectives for winter range.

The highest potential value of the LHA area to mule deer and elk is winter range; a large portion of the unit is severe winter range. There is abundant summer range at higher elevations of the surrounding areas. Presently, too much of the shrub area, especially the sagebrush stand, is too old and decadent, and lacking a good herbaceous understory of cool season grasses and forbs. Also, not enough sites of early to mid seral stages, supporting sagebrush and/or mountain shrubs are interspersed throughout the area.

4. The elk population is increasing slightly on the LHA area, and is consistent with increasing elk populations throughout Colorado, and most of the west. Unchecked, the elk population growth would likely have greater effects on the mule deer population status. The CDOW's desired elk numbers for DAU E-20 is 8,500-9,000. From 1980 to 2000 elk numbers on the Uncompahgre Plateau increased steadily from 4,000 to 12,000. Then with heavy hunting pressure it was decreased to near 9,000 in 2003 (Figure 1.11a). Habitat changes resulting in larger areas of more mature vegetation, especially on their summer range is believed to be a

significant factor in this increase. Without continued high levels of harvest to this population, it would increase rapidly. This potential for the elk population to increase is a good indicator that the wildlife community is changing to meet the conditions created by changing vegetation.

The CDOW's desired elk numbers for DAU–24 is 17,000-19,000 (Figure. 1.11b). The elk population trend in this area is more stable and it appears the current level of hunter pressure is adequate to keeping this elk population stable through the years.

5. Several Neo-Tropical Migrant Bird species show population trend declines, or have inadequate data for making trend determinations in the Western Colorado region (Kingery, H.E. ed. 1998). The Breeding Bird Survey provides the most complete and accurate data available for NTMB species throughout their range, and in the LHA area. In Montrose County, there are six full or partial BBS transect survey routes. These routes are 24.5-mile roadside transects with stops occurring every mile. The observer documents, by sight and sound, the species present for a 5-minute interval.

Partners In Flight (PIF) have organized and presented information concerning bird population status and other information by Physiographic Region. The Norwood LHA area is within the Colorado Plateau region. PIF has determined there are eight important habitat types for birds in the Colorado Plateau Region, and they have determined priority bird species for each. These habitat types, along with priority bird species are:

1. Cliff/Rock: peregrine falcon, white-throated swift,
2. Lowland Riparian: Lewis's woodpecker, western kingbird,
3. Mountain Shrubland: common poorwill, Virginia's warbler,
4. Pinyon-Juniper: black-chinned hummingbird, gray flycatcher, Cassin's kingbird, gray vireo, pinyon jay, juniper titmouse, black-throated gray warbler, Scott's oriole,
5. Ponderosa Pine: band-tailed pigeon, Mexican spotted owl, western bluebird, Grace's warbler,
6. Sagebrush Shrubland: Gunnison sage grouse, Brewer's sparrow, sage sparrow,
7. Semidesert Shrubland: burrowing owl, loggerhead shrike, horned lark,
8. Wetland: northern harrier, short-eared owl

PIF reports that the Colorado Plateau hosts at least 190 species of breeding birds in the eight habitats. This area has few species that are wholly or nearly absent from other regions of the state; Gambel's Quail, Black-throated Sparrow, Sage Sparrow, and Scott's Oriole fit into this group. More species are at their highest numbers in this region; Chukar, Western Screech-Owl, Canyon Wren, Brewer's Sparrow, and several pinyon-juniper woodland species are in this class.

Also, PIF states that livestock grazing is the most extensive use of land in western Colorado, and the extent and timing of grazing are constant conservation issues. The manipulation of habitats (e.g., sagebrush and pinyon-juniper "treatment") for improved grazing and the degradation of habitats (especially riparian) by grazing have significant effects on wildlife. Livestock water development and operation offers hazards and opportunities for wildlife.

The manipulation of water, including irrigation and dam building, and the resultant land uses (orchards, farms, industrial, residential) have created major threats to wildlife habitats, especially the lowland riparian where water storage and allocation has greatly reduced cottonwood regeneration and has encouraged exotic plant invasion (e.g., salt cedar, Russian knapweed). Irrigation, however, has also expanded waterbird habitat in the arable valleys.

The control of natural fires has created successional patterns that may be quite different from historical patterns and which may have profound effects on wildlife populations and distribution. Pinyon-juniper has expanded in some areas. Fire exclusion and climatic fluctuations have resulted in stands overstocked with small trees. Wildfires tend to be less frequent and more catastrophic. The result has probably been harmful to non-forest raptors and seed-eaters, and has been beneficial mostly to non-game upland bird species.

A query of the Breeding Bird Survey Database (www.mbr-pwrc.usgs.gov/bbs/) indicates fourteen NTMB species (Table 4.1) in Western Colorado show population trend declines in both the 10 and 26 year population trend. All of these species have high "importance of area" (IA) rankings; indicating a high proportion of their habitat in this region provides essential breeding habitats. Five of these species, vesper sparrow, Swainson's hawk, Say's phoebe, rock wren, and loggerhead shrike have very low abundance ratings, indicating they are the species' of highest concern in this unit and landscape. The nine remaining species, horned lark, common nighthawk, killdeer, northern flicker, western wood-pewee, chipping sparrow, sage thrasher, Brewer's sparrow and mourning dove have moderate to good abundance ratings, making them species of second highest concern. Species for which inadequate data are available (Table 4.2) to make status determinations with a high degree of certainty are considered third priority species. Many other NTMB species are present in this area, but their status appears to be stable at this time. The LHA area is part of the larger overall landscape that provides habitat for all these species, which is important for their long-term sustainability.

Table 4.1 Neotropical migratory bird (NTMB) species showing population trend declines during the 26 and 10 year Breeding Bird Survey (BBS) datasets in western Colorado

NTMB SPECIES	HABITAT	26 year Population Trend Ranking (PT26)	10 year Population Trend Ranking (PT10)	Abundance Ranking (AB)	Importance of Area Ranking (IA)
Priority #1 species: PT26 & PT10 ranking = 4 or 5, AB ranking = 3-5, and IA ranking = 3- 5.					
Vesper Sparrow **	Annuals/Grassland	4	5	3	4
Swainson's Hawk *	Annuals/Grassland	4	4	3	3
Say's Phoebe **	Annuals/Grassland	4	4	3	5
Rock Wren **	Barren Land	4	5	3	3
Loggerhead Shrike *	Riparian	5	4	3	3
Priority # 2 Species: PT26 & PT10 ranking = 4 or 5, AB ranking = 1 or 2, and IA ranking = 3-5.					
NTMB SPECIES	HABITAT	26 year Population Trend Ranking (PT26)	10 year Population Trend Ranking (PT10)	Abundance Ranking (AB)	Importance of Area Ranking (IA)
Common Nighthawk	Annuals/Grassland	4	5	2	5
Killdeer *	Annuals/Grassland	4	4	1	3
Northern Flicker *	Generalist	5	5	1	3

Priority # 2 Species continued					
NTMB SPECIES	HABITAT	26 year Population Trend Ranking (PT26)	10 year Population Trend Ranking (PT10)	Abundance Ranking (AB)	Importance of Area Ranking (IA)
Western Wood-Pewee *	Generalist	4	4	2	3
Chipping Sparrow **	Ponderosa Pine-Doug Fir	5	5	1	4
Sage Thrasher **	Sagebrush	4	5	2	4
Horned Lark **	Annuals/Grassland	5	5	1	5
Brewer's Sparrow **	Sagebrush	4	4	2	5

Breeding Bird Survey rankings: 1= low concern, 5 = high concern.
* =Low, **=moderate, ***=highest potential for affects (+ or -) in Roubideau LHA area based on Breeding Bird Atlas (Kingery 1998) information.

Table 4.2 Neotropical migratory bird (NTMB) species with inadequate data for making trend determinations (Priority #3 species.)

SPECIES	HABITAT	Abundance Ranking (AB)	Importance of Area Ranking (IA)	26 year Pop. Trend Ranking (PT26)	26 year Uncertainty Ranking (PTU26)	10 year Pop. Trend Ranking (PT10)	10 year Uncertainty Ranking (PTU10)
Northern Harrier *	Annuals & Grassland	4	3	3	4	3	4
Savannah Sparrow *	Annuals & Grassland	3	3	3	4	3	4
Common Poorwill *	Mountain Shrub	3	5	3	4	3	4
Gray Flycatcher ***	Pinyon-Juniper	3	4	3	4	3	4
Gray Vireo ***	Pinyon-Juniper	3	4	3	4	3	4
Long-eared Owl *	Riparian	3	3	3	5	3	5
Bank Swallow *	Riparian	3	3	3	4	3	5
Swainson's Thrush*	Swainson's Thrush*	3	3	3	4	3	4

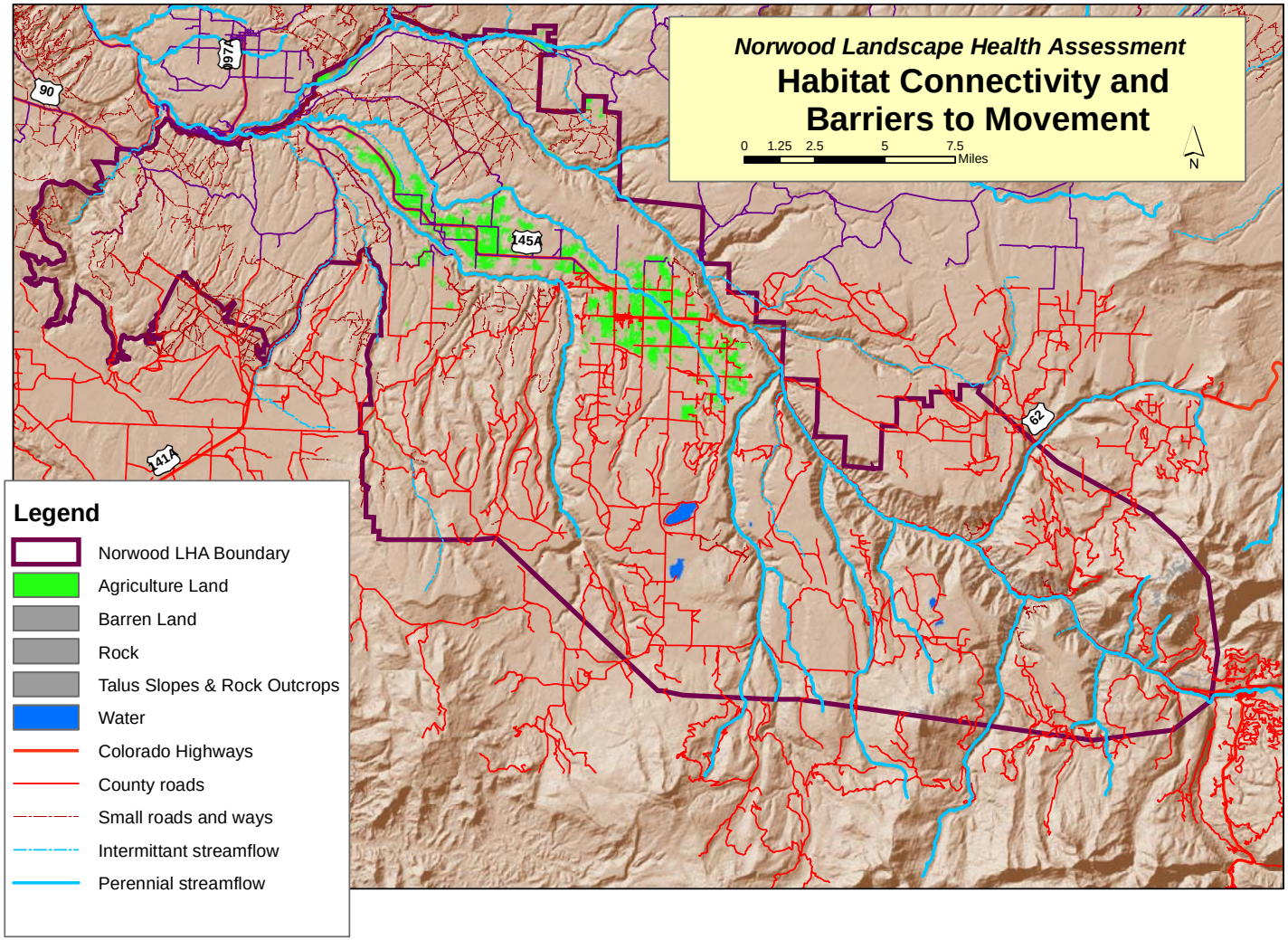
Breeding Bird Survey rankings: 1= low concern, 5 = high concern.
* =Low, **=moderate, ***=highest potential for affects (+ or -) in Norwood LHA area based on Breeding Bird Survey Data.

Connectivity

Not much information is available, nor are we aware of formal procedures that are outlined for assessing connectivity of habitat in dry woodland or semi-desert shrubland vegetation types, particularly in very rough terrain. Because the canyon and mesa country is highly fragmented by topography, we assume that land uses like agriculture and urban uses together with manmade constructs like roads and dams interact with natural barriers or corridors to alter wildlife movement. A map of likely barriers and dispersal routes is included (Figure 4.12). Possible barriers and dispersal routes are outlined below.

Steep rock outcrops and rocky slopes: Steep rocky areas are typically found in small patches on the sides of the steeply cut drainages throughout this unit. Usually these are not continuous bands that completely cut off movement from mesa top to drainage bottom, but they tend to funnel movement of larger animals into the few passable areas and make movement more

Figure 4.12 Norwood Area landscape and habitat connectivity. Map shows potential barriers and corridors to plant and animal movement (roads, barren areas, rock, rivers or streams, and irrigated agriculture)



difficult. Given their isolated occurrence, it is unlikely that these rocky areas significantly reduce large ungulate and carnivore use of any significant mesa top areas.

Rivers, streams, and dams: The San Miguel River is a small river that lies at the heart of the Norwood LHA area. It may present some barrier to movement, especially of smaller animals which are not able to swim across it. The streams within the unit do not present significant barriers to movement because they are narrow, and often dry in places during some parts of the year.

In addition to being a barrier for some animals, rivers, streams and canals act as dispersal and movement corridors for both plant and animal species. Weed species often move along streams because water transports their seeds, and because they find a similar habitat to irrigated cropland or landscaping (which are often sources of weeds) in the riparian zone. Oxeye daisy has recently spread along the lower part of the San Miguel River, and is spread throughout the river corridor, and some of its tributaries, within this unit. Tamarisk has become firmly established throughout some of the lower elevation streams across the unit, although a comprehensive program to eradicate it from the watershed is underway (The Nature Conservancy, http://www.coopext.colostate.edu/TRA/abstracts/2203Tamarisk/Dimmitt.html). Russian knapweed forms numerous infestations throughout the LHA unit, and seems to become established along drainage corridors and where livestock ponds have been built. It is a particular problem along Naturita Creek, Maverick Draw and Little Maverick Draw.

Agriculture and intensive human land uses: Agriculture and residential use of land can act as a barrier to movement by species that don't use the nonnative vegetation, tolerate the presence of humans and domesticated animals like dogs, need hiding cover, or cannot travel long distances in unsuitable habitat. Agriculture and residential development can also act as corridors for other species. For example, species that thrive in disturbed areas, those that are transported by domestic species, others that benefit from the irrigation systems and more abundant moisture, or those that use crop species are able to move through agricultural lands and populate the areas adjacent to agricultural lands. Species like the European starling, raccoon, domestic cats, burdock, Russian olive, and Siberian elm are probably spreading and utilizing parts of the unit as a result of agricultural and human land uses in and adjacent to the unit. Deer and elk feed on the irrigated lands, and their behavior and movement patterns are altered by the presence of these fields.

Irrigated agriculture and residential development are the dominant land uses in the north-central part of the unit, along parts of the upper reach of the San Miguel River, and on the high mesas in the southeastern part. The increased human presence and altered plant communities in these developed areas is certainly affecting the native plant and animal communities on adjacent BLM lands.

Roads and trails: Roads can be a barrier to movement because they are a strip of bare or altered ground, and because they are a focus of human activity and disturbance. In the case of heavily traveled roads, they can be a major cause of mortality for animals trying to cross. The most heavily traveled road in the unit is Highway 62 along Leopard creek and southeast into Telluride. Highways 145 and 141 also receive substantial use and many animals are killed along these routes. Because of proximity to towns, extensive mineral exploration, and open travel designations, a dense road network has developed in this unit. Most of these roads are lightly traveled, dirt roads. These probably do not act as a barrier in this ecosystem. Instead, they probably facilitate spread of some species, such as elk in the pinyon-juniper woodland, and weed

species, which spread along the disturbed ground, particularly where the roads are maintained and graded or graveled.

Livestock, wildlife, people, vehicles, and pets: Livestock, deer and elk provide a mechanism for dispersal of seeds, insects, and disease. They are likely a principal source of weeds in native communities because they can transport seeds in their fur or digestive tracts, and because they often move between heavily disturbed or agricultural private lands, up into native rangelands. They can also reduce the competitive capabilities of native plant species through grazing, and are a source of soil disturbance. To a lesser extent, people, their vehicles and their pets transport weed seeds in the same way. Livestock (cattle and sheep) graze on many of the lands in the unit. All of the herds spend some time on irrigated ground during the year.

The Vegetation Mosaic

Vegetation diversity in the Norwood LHA Area arises from geology, soils and elevational diversity, as well as disturbance like fire and drought and the vegetation successional processes that follow (the successional processes are the relatively predictable vegetation stages that a plant community passes through after disturbance.) The arrangement of the various vegetation types and seral stages across the area is called the vegetation mosaic. The vegetation mosaic is a dynamic characteristic that changes over time. The mosaic is important because it helps determine what types and amounts of wildlife and plant species can survive in an area. Some aspects of the mosaic are more fixed than others. For example, trees will not grow below a certain elevation. Others are more fluid, such as grass dominated vegetation which can occur at nearly any location in the area, either as an early successional stage following disturbance, or as a stable community that occupies a site for the long term. Many of the vegetation types in the area can transition from one to another over time, or with disturbance.

It is commonly thought that disruptions in the amounts and types of disturbances in the landscape have changed the vegetation mosaic from what existed prior to European settlement. In order to manage for healthy vegetation mosaic and coordinate activities that affect the mosaic, large scale plans have been developed that set objectives for the how the mosaic should look. The Uncompaghre Field Office Fire Management Plan (FMP) (2002) states objectives for vegetation mosaics for vegetation management subunits and polygons within them. These mosaic objectives describe desired proportions for each seral stage and patch sizes within the mosaic for different types of management polygons on various parts of the landscape. In this plan, the objectives were based on the best information available at the time, but were designed to be flexible if assumptions proved wrong. Recent studies on fire history and the range of natural variability in pinyon woodlands (Eisenhart 2004), and input from fire ecologists (USDI Bureau of Land Management 2003) may cause the existing objectives to change, and reduce the amount of early and early mid seral stages prescribed. These adjustments will probably be made to the UFO Fire Management Plan plan's recommendations at its next update.

The assessment area is broken into four vegetation management subunits (Figure 4.14): Upper San Miguel, Mailbox Park, Naturita South, and Burn Canyon. These units are further subdivided into polygons, each representing different landscape mosaic objectives (Figure 4.13). The existing vegetation mosaic is shown in Figure 4.14. Table V1 in the Appendix compares the existing seral stage proportions with the desired amounts specified by the Fire Management Plan objectives. Patch sizes for each of the vegetation management subunits in the Norwood LHA area are also compared with objectives. .

Figure 4.13 Norwood LHA Area Vegetation management subunits and polygons within them that prescribe various desired vegetation mosaics (From BLM, 2002: UFO Fire Management Plan).

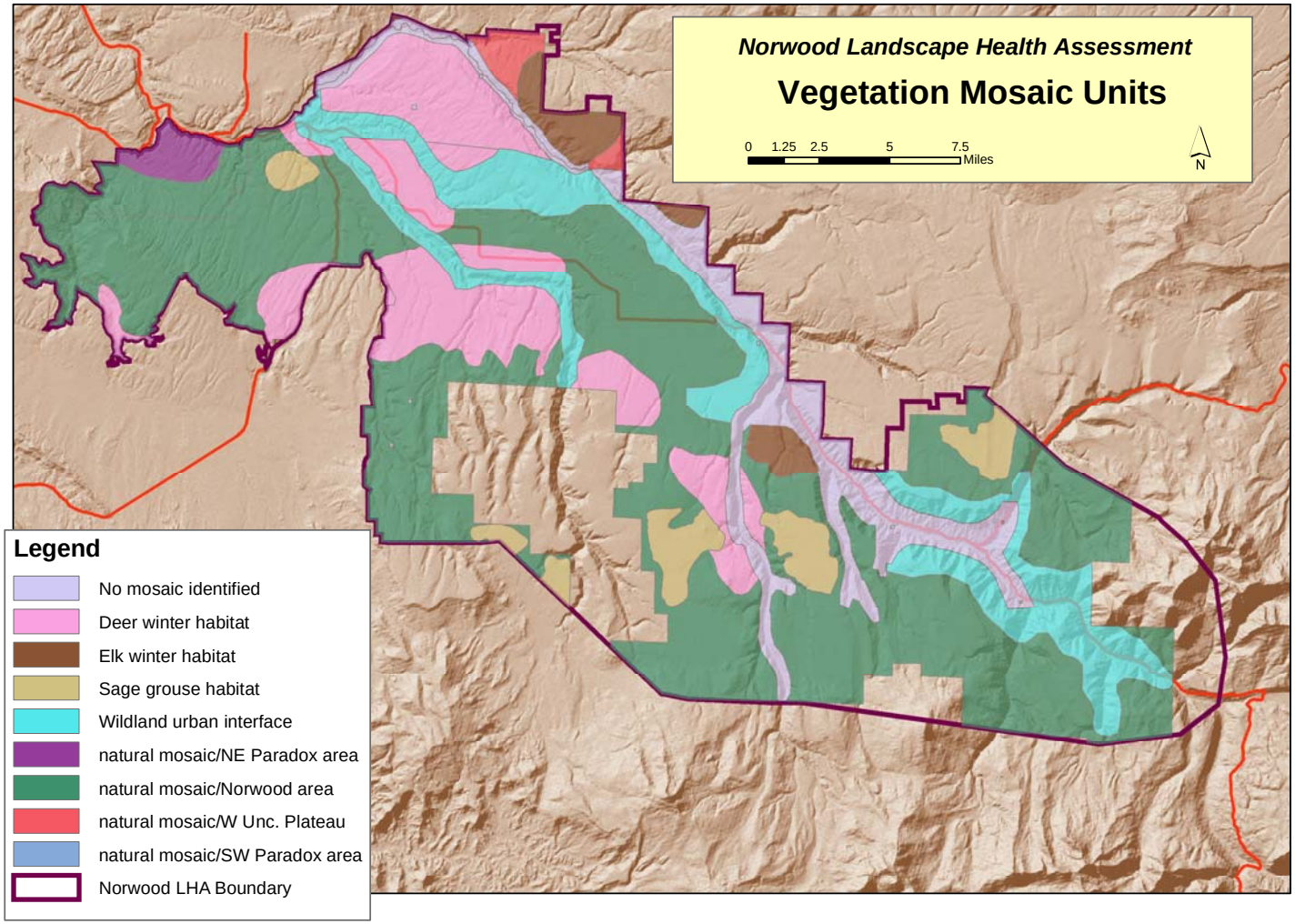
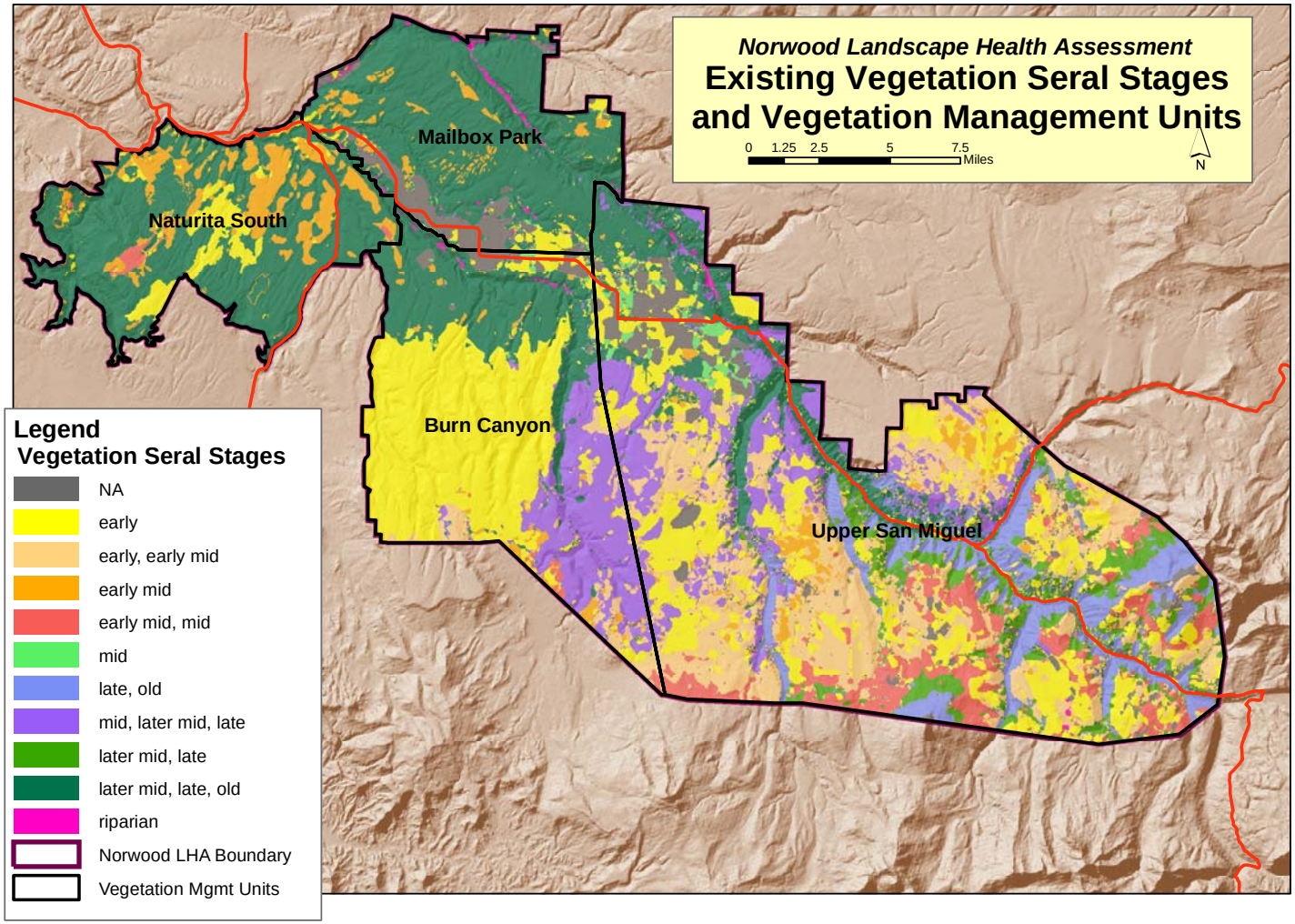


Figure 4.13 Norwood LHA Area existing vegetation seral stages.



Upper San Miguel Canyon Unit

The majority of the unit has no mosaic objective specified, because the primary goal of management is to protect the riparian corridor along the canyon bottom.

Wildland-urban interface makes up the next largest portion of this unit. The objective behind this unit is to create a vegetation mosaic which slows the spread of fire and gives firefighters multiple opportunities to control a fire. Around 780 more acres of early seral stage are needed in this unit, mostly in small (<5 acre) patches. The greatest imbalance in this unit is the shortage of early mid seral stage. Over 5,700 more acres are needed in this stage, and should be distributed so as to form the matrix for the mosaic. The early and early mid stages should be taken from existing late mid and late stages, which are overly abundant. They form the existing matrix, which needs to be carved up into patches to meet the vegetation mosaic objective.

Unit D7 makes up the largest remaining part of the Upper San Miguel Canyon Unit. This unit's objective is to recreate a natural vegetation mosaic that would have been typical for the greater Norwood area if all natural disturbance processes were intact. This unit has a deficit of about 460 acres of early mid seral stage. Most of this acreage should come from the existing late mid and late stages, so as to carve up the matrix that these later stages presently form. Patches of early mid should mostly be in the 5-50 acre range, with a few larger and several smaller patches.

Naturita South Unit

Most of this unit is comprised of the C11 unit, which has the objective of recreating a natural vegetation mosaic that would have been typical for the greater Norwood area if all natural disturbance processes were intact. This area is currently skewed toward the later seral stages. About 4,272 additional acres of early seral stage and 4,030 additional acres of early mid stage are needed to meet this objective. This additional acreage should come from the late stage, which presently forms the matrix. This existing matrix should be reduced to patches, and additional early and early mid stages should also be in the form of patches. Most patches should range between 5-50 acres, with a few larger and many smaller patches.

Polygon C2, with the objective of optimizing winter habitat quality for mule deer, also makes up a significant part of this unit. This unit is also heavily skewed toward the later seral stages. Over 750 acres of early seral and 670 acres of early mid stage are needed to meet mosaic objectives. The early and early mid stages should be in the form of patches that are less than 25 acres in size. These patches should be carved from the existing matrix of late seral vegetation in such a way that the matrix is not reduced into patches.

Polygon C13 makes up most of the remainder of this unit. The objective behind this polygon is to recreate a natural mosaic for the northeast Paradox area. Presently, this area has about 420 more acres of early mid stage than the mosaic objective calls for, about 750 too few acres in the late mid stage, and 400 too many acres of late stage. The Late stage should remain as the matrix. The existing large patches of early mid stage should be broken into mostly smaller patches, <5 and <25 acres in size.

Mailbox Park Unit

The largest portion of this unit falls into polygon C2, with the objective of optimizing winter habitat quality for mule deer. This area is very low in the younger vegetation age classes, falling about 2,430 acres short of the objective for early seral stage, and another 1,360 acres short of early mid stage vegetation. Around 2,430 acres of late mid stage are also needed. All additional acres should be taken from the existing late stage, but in such a way so that it remains as the matrix. The patches created should be less than 25 acres in size, with many smaller patches (<5 acres) as well.

Wildland-Urban Interface (B1 Polygon) also makes up a large part of this unit. Again, the objective behind this unit is to create a vegetation mosaic which slows the spread of fire and gives firefighters multiple opportunities to control it. About 850 additional acres of early seral stage, and 2,230 acres of early mid stage are needed, and should be taken from the 3,700 excess acres of late seral stage vegetation. Early mid seral stage vegetation should make up the new matrix, with early, late mid and late stages forming primarily small (<5 acre) patches, with a few larger patches.

The C3 Polygon also makes up substantial acreage in this unit. The objective of this polygon is to optimize elk wintering habitat quality. Presently, 1,010 additional acres of early seral vegetation and 690 acres of late mid stage vegetation are needed. This acreage should be taken from the late seral stage which currently is in excess of the objective by about 1,880 acres. Patch sizes of the early seral stage should primarily range from 50-200 acres, which is substantially larger than they are now. The late-mid stage in combination with the late stage should form the matrix, much as it currently does.

Much of the remaining part of this unit falls into the D6 Polygon, which has an objective of recreating a natural mosaic similar to what would have occurred on the west slope of the Uncompahgre Plateau under an intact natural disturbance regime. Existing vegetation is heavily skewed toward the older age classes, with about 1,820 excess acres of late stage vegetation. There are approximately 710 too few acres in each of the early and early mid seral stages, and 480 too few acres of late mid stage. The existing late stage matrix should be broken up into a mosaic of patches. Most of the acreage changed should be in the form of 50-200 acre patches, but many smaller patches (<50 acres) should also be created.

Burn Canyon Unit

The largest component of this unit is the C11 Polygon which has the objective of recreating a natural vegetation mosaic that would have been typical for the greater Norwood area if all natural disturbance processes were intact. Because of the recent Burn Canyon Fire, nearly all of this area falls into the early stage. This has caused it to fail to meet the mosaic objective. Seeded sagebrush has established well in many parts of the burn, which should accelerate the development of early mid seral stage in many areas. However, the unit will lack adequate levels of late mid and late stage vegetation for many years. Currently it falls about 1,600 acres short in both categories. It may be as much as 50 years before some parts of the burn start to develop late mid stage vegetation, and one hundred years or more until late stage vegetation begins. In the interim, all remaining patches of older stage vegetation should be retained.

The second large component of this unit is the C2 Polygon for optimization of deer winter range habitat. Presently, about 1,280 additional patches of early mid stage are needed. Some of this is now being developed as seeded sagebrush increases in dominance on areas affected by the Burn Canyon Fire. Currently, the unit is skewed toward late stage vegetation, which has about 2,400 acres in excess of the objective. While this should remain as the matrix, small and mid-size patches (<25 acres) of early-mid and late mid vegetation should be carved from it.

The Wildland-Urban Interface (B1) Polygon makes up the remaining large part of this unit. Again, this unit is skewed toward late stage vegetation. Approximately 300 more acres of early stage and 1,360 acres of early mid vegetation are needed. Early patches should be in many small (<5 acre) and a few larger (<50 acre) patches, while early mid stage vegetation should take the form of the matrix. About 350 additional acres of late mid vegetation are also needed. The overly abundant late seral vegetation (about 1,950 acres in excess of the objective) should be treated so as to break up the matrix it forms, and make the earlier stages from it.

Standard 4:

Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.

Indicators used to assess this standard include: stable and increasing populations of endemic and protected species, suitable habitat is available, minimal levels of undesirable or noxious plants, native plant and animal communities distributed adequately to assure sustainability, age class diversity to sustain recruitment and mortality fluctuations, adequate habitat connectivity, photosynthetic activity throughout growing season, community exhibits resilience to human activities, appropriate plant litter accumulations, and landscapes are composed of a variety of successional stages.

Acreage Figures

Meeting Standard 4		**Not Meeting Standard 4**	**Unknown**
Meeting	Meeting with problems		
103,310	0	0	0

Specific Problems:

All areas were considered to meet Standard 4 for Threatened, Endangered, and Sensitive species.

Analysis of indicators:

The analysis of T&E, BLM sensitive and rare species has been conducted largely with existing information from the BLM files, CDOW data, CNHP data, and PIF reports, as well as the knowledge of the BLM staff, some of whom have been in this area for over twenty years. The rapid assessment process is not designed to provide the kind of data required for evaluating rare species. Where this analysis uncovers a significant data gap, recommendations will be made to help resolve it.

The black-footed ferret (*Mustela nigripes*) is not thought to have populations in the LHA area at this time. However, BLM has not mapped the distribution of prairie dogs upon which this species is dependent. Current data on the distribution and health of the area's prairie dog colonies is not available to help establish a baseline for prairie dog distribution and health. This would facilitate an assessment of habitat availability for species dependent on prairie dogs, such as the burrowing owl and black-footed ferret.

As is the case elsewhere within its range, the populations of wintering bald eagles in the area appear to have increased in the last ten years. We do not believe that current management of public lands is having any impacts habitat quality for this species within the LHA area. The Mexican spotted owl (*Strix occidentalis lucida*) is a federally threatened species with potential habitat in the canyons of this LHA area. Previous inventories of the major canyons by CDOW did not document any occurrences of this species within the LHA area. However, the primary threat Mexican spotted owls face is the loss of mature trees to stand-replacement fires, especially in steep canyons and in riparian zones. Prescribed burns outside of the breeding season can reduce the fuel load and lessen the potential for catastrophic fires. Management activities should follow recommendations in the recovery plan. Although there are no documented peregrine falcon (*Falco perigrinus anatum*) nests in the LHA area, much of the area is used as hunting

habitat by ones nesting in the Paradox Valley area to the west. Ferruginous hawks (*Buteo regalis*) utilize the area only during migration, and habitats in this unit are unlikely to be essential to this species.

The Gunnison sage grouse is present in several locations in the LHA south of the San Miguel River (Figure 1.12). Their potential habitat in the LHA area is fairly large, but presently is appears fragmented, and much of the necessary connectivity within the larger area may have been lost. Leks are located near Gurley Reservoir, on Beaver Mesa and near Miramonte Lake, and are the center of activity for the remaining birds. Radio tagged Beaver Mesa birds have been tracked to the Iron Springs area north of the San Miguel River. The Miramonte group is known to move to, and use Hamilton Mesa, and may move into Dry Creek Basin to the west. However, additional data is necessary to confirm these patterns. There appears to be additional potential habitat within the LHA, which probably could support enough birds to substantially improve the status of this population if it were occupied.

Although previous inventories for yellow-billed cuckoos were conducted in Montrose and Delta Counties, no habitat condition inventories have been completed for riparian systems such as those in the San Miguel River or its larger tributaries.

Due to the distances from the LHA area to the habitats occupied by the endangered fish (Colorado pikeminnow, razorback sucker and bony chub) it is doubtful that most management actions would have any detectable impact on endangered fish habitat. The roundtail chub (*Gila robusta*) is a BLM sensitive species known to exist in Sam Miguel, and Dolores Rivers that could have the potential to be threatened by competition with non-native fish species also present in the system.

There are a number of rare plants occurring in the LHA area, however, there is no evidence to suggest that current management of public lands is having any impact on the health of this species. The milkvetch, lupine, and penstemon tend to grow in areas which are typically inaccessible and not likely to be affected by livestock grazing or recreation.

Standard 5: *The water quality of all water bodies, including groundwater where applicable, located on or influenced by BLM lands will achieve or exceed the Water Quality Standards established by the state of Colorado. Water Quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and antidegradation requirements set forth under State law as found in (5 CCR 1002-8), as required by Section 303(c) of the Clean Water Act.*

Indicators used to assess this standard include: appropriate populations of macroinvertbrates, vertebrates, and algae, pollutants and sedimentation attributable to human activity is within amounts specified by the Water Quality Standards established by the State of Colorado.

Mileage Figures: Stream Miles Evaluated Against Standard 5

Stream Type	**Meeting Standard 5**		**Miles Not Meeting**	**Unknown**
	Miles Meeting	**Miles Meeting but Problem Areas**		
Perennial	67.2	7.3	1.7	0
Intermittent	11.5	3.5	1.9	0
Ephemeral	13.3	11.5	11.9	0
Total	92.0	22.3	15.5	0

See Figure 6.1 for map showing polygon ratings.

Aquatic macroinvertebrate population density and composition are commonly evaluated to assess stream health and water quality. Macroinvertebrates are good surrogate indicators of stream health, as there are usually many species that are relatively immobile, many invertebrates are sensitive to pollutants and because of their year round presence in the stream environment and they are capable of reacting to intermittent discharges.

Several instream factors control the composition and abundance of stream invertebrates, including: river flow rate and water velocity, channel substrate size and concentration of suspended solids, winter processes such as river icing, the composition and density of aquatic and riparian vegetation, and the chemistry of the river's water.

Table 6.1 shows stream sites within the LHA area that were sampled for aquatic macroinvertebrates. Unfortunately, dry and warm climatic conditions occurred most significantly during water years 2000 and 2002, which could have significantly altered both the abundance and species composition of the aquatic macroinvertebrates, as a result of reduced water flows, increased water temperature, and higher levels of total dissolved solids. These effects could manifest themselves in the macroinvertebrate populations in the year(s) post drought conditions. The number and abundance of macroinvertebrates indicative of clean water conditions occurs in the two upper most sites on the San Miguel River (San Miguel above Placerville and San Miguel below Beaver Creek). These two sites rated better than the ecoregion average for preferred macroinvertebrate indicators of water quality.

Table 6.1. Stream Macroinvertebrates

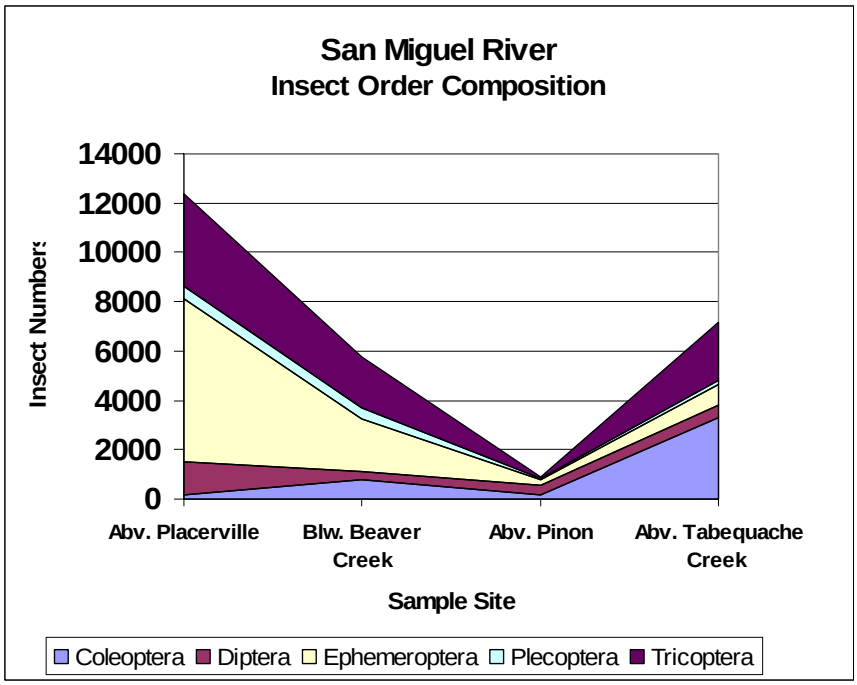
Stream	*Date*	*Total Abundance*[1]	*EPT Abundance*[2]	*Dominant Family*[3]	*Disturbance Intolerant Abundance*[4]	*Disturbance Tolerant Abundance*[5]
San Miguel above Placerville	10/11/2000	11,149	9528	Baetidae	840	0
	4/16/2001	12,355	5621	Chironomidae	1,593	43
San Miguel river below Beaver Creek	10/11/2000	5,907	4621	Baetidae	2,091	22
	4/16/2001	16,343	8339	Chironomidae	1,977	59
San Miguel River above Pinon	10/11/2000	935	290	Chironomidae	87	198
	4/17/2001	1,680	493	Chironomidae	94	77
Maverick Draw	5/28/2004	3522	397	Simuliidae	0	0
Naturita Creek near mouth	6/4/2004	14,188	1,312	Simuliidae	0	0
	8/19/2004	140	17	Chironomidae	5	0
Naturita Creek near Redvale	5/28/2004	3,590	134	Chironomidae	0	0
	8/19/2004	1,270	17	Chironomidae	0	2
Naturita Creek near Mckee Draw	6/4/2004	61,021	21,798	Simuliidae	0	1
Southern Rockies Ecoregion Average (mean of 577 samples at 408 Sites)		4,117	2,332		1,091	274

1- The number of aquatic macroinvertebrates per unit area is an indicator of habitat availability and is influenced by flow regime and changes in water quality.
2- The number of aquatic macroinvertebrates among the insect Orders: Ephemeroptera, Plecoptera, and Tricoptera. These insect orders are commonly considered sensitive to water quality degradation.
3- The family of macroinvertebrates with the highest occurring number of individuals.
4- Macroinvertebrates with a Hilsenhoff Biotic Index of between 0-2, which indicates clean water taxa, intolerant of pollution.
5- Macroinvertebrates with a Hilsenhoff Biotic Index of between 9-10, considered pollution tolerant taxa.

Figure 6.2 shows the longitudinal variation in aquatic macroinvertebrates in the San Miguel River. The results show that the river sample taken at the San Miguel River above Pinon has the overall lowest health rating out of four San Miguel sites (lowest abundance of preferred macroinvertebrates, and the highest number of disturbance tolerant macroinvertebrates). These values at the Pinon site, more than likely reflect the channel disturbance from being dewatered by the upstream CC Ditch Diversion.

The Upper San Miguel River, primarily from the confluence with the South Fork to below Norwood Bridge, experiences winter ice processes that are a potential disturbance to aquatic biota and bank side vegetation. Preliminary data indicates that winter river icing and resultant ice flows are exacerbated by both warm water discharges and diurnal flow fluctuations associated with operations of the Ames Hydropower Plant, located at the confluence of the Howard's Fork and Lake Fork. The Ames Power Plant is presently involved with a Federal Energy Regulatory Commission (FERC) relicensing effort. The potential river icing influence of the power plant is a major issue being evaluated and addressed in the relicensing process, with which the Bureau of Land Management has been involved. The Ames Power Plant existing FERC license expires in 2010.

Figure 6.2 San Miguel River, Longitudinal Variation of Aquatic Macroinvertebrate Populations



Accelerated yield of sediment from upland soil and stream channel erosion is the most widespread water quality issue in the LHA area. Much of the sediment derived from the LHA uplands is detached and transported during intense rainfall events in the late summer months. These rainfall events are usually short duration, typically lasting from less than one to no more than three hours. The resultant runoff in the LHA area's streams is also short duration, making quantitative water quality assessments difficult. Thus, to assess a stream's potential for suspended sediment loading in the LHA area, surrogate indicators (soil surface conditions) in place of water quality analyses were used. The specific surrogate indicators used for this assessment, include the amount of bare soil surface, live plant basal coverage, and amount of plant litter on the soil surface. Low amounts of plant litter and plant basal cover, and high amounts of bare soil surface (soil surface with no plant, rock, or litter cover) are indicative of soils susceptible to high rates of erosion. Most of the drainages in the LHA have one or more of the soil surface indicators showing problems. On watersheds that have two soil surface indicators showing problems, the drainages that intersect problem areas are rated as meeting standard 5 with problems (Figure 6.1). Stream channels where all or portions of the drainage area showed problems with all three indicators, do not meet Public Land Health Standard 5.

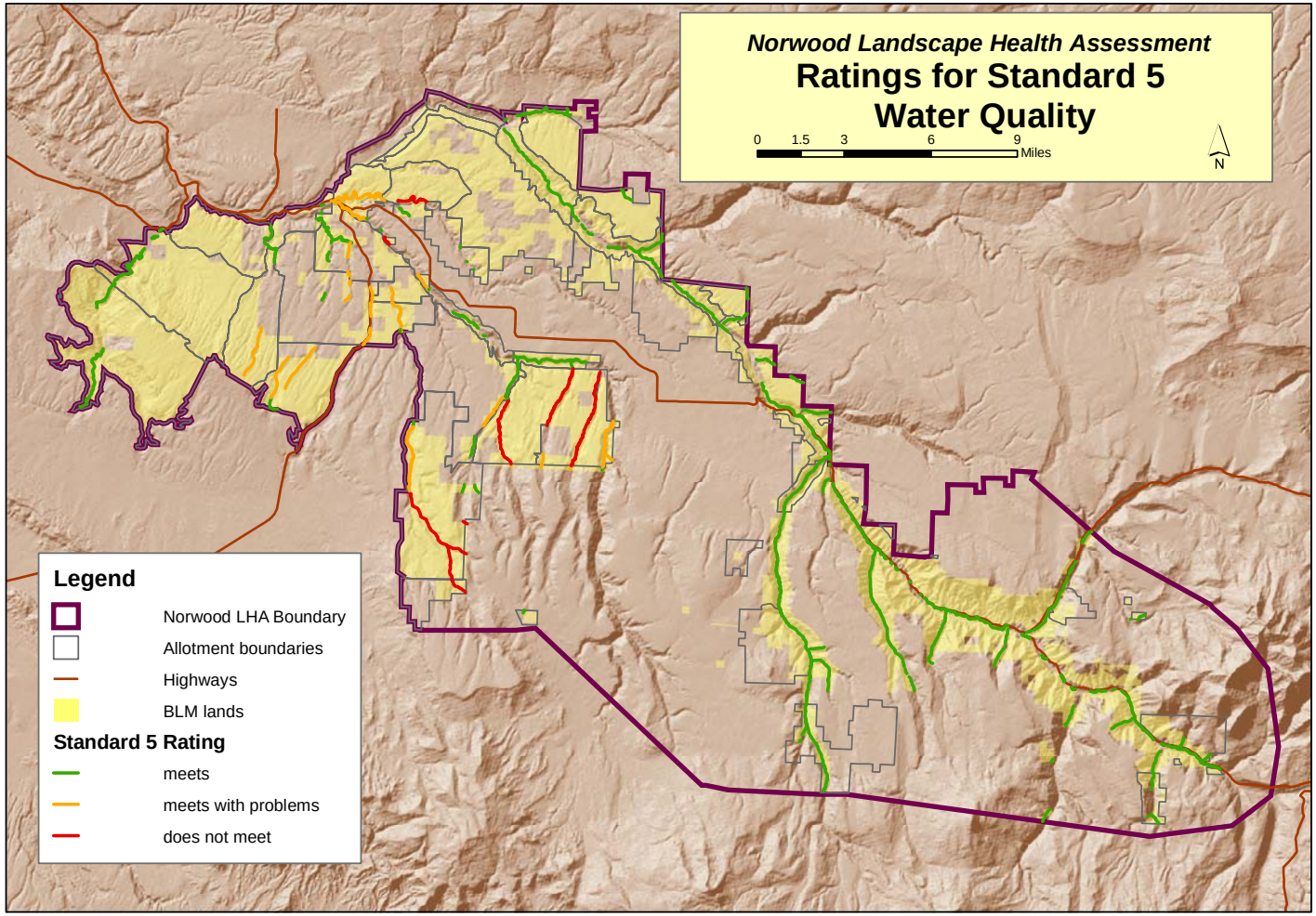
Another source of accelerated sediment yield occurs along the San Miguel River approximately 1.5 miles downstream of the town of Placerville. At this location, historic gravel mining operations in the valley fill, including the mainstem river channel resulted in the total loss of channel confinement. Over the last 30 years since gravel mining operations ceased, the channel has changed from wide, braided conditions to more single-thread. However, in a few locations the channel has intercepted cut bank terraces, remnants of gravel mining operations. In these areas, during spring snowmelt, high flows have resulted in very rapid channel migration. A

series of large rock vanes (jetties) were installed in 2003 which successfully stabilized a portion of the river reach and provided protection to Colorado State Highway 145. In the river reach immediately downstream of the above-mentioned treated reach, channel migration continues at a rapid rate (25-30 feet during the 2005 snowmelt season), and is close to intercepting the fill slope for highway 145.

Lastly, roads and trails in need of maintenance can be large sources of sediment into receiving surface waters. This LHA did not evaluate the condition of all roads and trails in the evaluated area but did take note of problem areas when encountered. An example would be the Dry Creek Trail in T 45 N, R 16 W, sections 7, 8, and 17. This trail traverses the west side of Dry Creek Canyon, with the trail head on Monogram Mesa. The photo below shows a typical steep section of the trail and the massive erosion that has occurred in recent years. Trail reconstruction is needed to produce outwardly sloping conditions, with adequate cross drainage installed.

Trail Erosion in Dry Creek Canyon

Figure 6.1 Norwood LHA area Standard 5 Polygon Ratings.



Causal Discussion and Determinations
For discussion and analysis of probable causes for problems observed with each of the standards see the separate document entitled "Causal Determinations for Norwood LHA"

Recommendations

Standard 1 Soils

In areas with elevated bare soil levels, leave more plant litter on the soil surface. Limit grazing seasonal utilization during the dormant season to 50% use on palatable species.

In areas with low plant basal cover, minimize grazing impacts to plants during periods when the grasses are actively growing. Prevent grazing on regrowth by limiting time of use to 2 weeks or less in a given pasture or grazing area. Minimize instances where livestock graze the same areas in both spring and fall seasons. Provide for occasional, year-long rest.

Use the range project inventory information in combination with the map of high erosion risk areas to identify projects contributing to increased erosion. Identify and implement corrective measures for project maintenance, management, or deconstruction.

Ensure that existing mosaic objectives are met by allowing natural disturbances to take place, simulating natural disturbances, and restoring past vegetation treatments to increase herbaceous cover and minimize vegetation stages that provide little soil protection (aggressively implement the Uncompahgre Fire Management Plan).

Reseed burns and consider mulching/rollerchopping/hydroaxing burned areas that are prone to erosion where existing vegetation is unlikely to stabilize the site within the first 1-2 years post fire.

Complete the road and trail map, and use it in a GIS to identify road-caused soil loss. This analysis should be used to direct road maintenance and rehab areas so that road and travel related erosion is reduced. Monitor use to better understand soil impacts from OHVs. Change travel designation from open to limited to existing roads and trails. Where necessary, further limit travel to designated routes and close and rehab abandoned roads and trails to prevent further erosion.

Standard 2 Riparian

Continue to work on the control of tamarisk, knapweed and other invasive exotics that infest riparian communities in the LHA area. Develop and implement weed management plans such as the Horsefly Weed Management Plan. Retreat tamarisk resprouts that have grown since initial treatment by The Nature Conservancy. Incorporate weed management responsibilities into grazing permits on allotments where BLM has done initial treatment, and for new range projects.

Prevent additional damage to existing native riparian species by limiting grazing use on willows

and cottonwoods to 30% where grazing is found to exceed that level. Reducing stress on native woody species should make them more competitive with tamarisk and other invasive plants.

Complete an updated map of water rights and instream flows within the Norwood area to better understand controls on stream flows, to identify segments still needing protection, and to help ensure existing water rights are being correctly managed.

Put into place a comprehensive series of riparian cross-section studies to monitor riparian condition changes over the long term.

Standard 3 Native Plant and Animal Communities

Improve warm and cool season perennial grass and forb cover by adjusting livestock grazing where it is a contributing factor to low cover. Prevent grazing on regrowth during the growing season by limiting time of use to 2 weeks or less in a given pasture or grazing area. Minimize instances where livestock graze the same areas in both spring and fall seasons. Provide for occasional, year-long rest.

Promote and support the native seed development program to generate a source of adapted, truly native species for rehabilitating damaged areas in the LHA unit.

Finalize the Norwood LHA area road and trail map, and implement more intensive monitoring of OHV use and potential for loss of native plant and animal species, and increase in invasive plants, with the objective of improving road and trail management. Change travel designation from open to limited to existing roads and trails. Where necessary, further limit travel to designated routes and close and rehab abandoned roads and trails to prevent further damage to vegetation.

Reseed fires and similar disturbances with native, adapted species where weed invasion is likely, or the native community is depleted. Use the best adapted seed possible as determined by treatment monitoring studies, and use the products of the UP native plant material development effort as they become available.

Improve warm and cool season grass and forb cover, shrub vigor and the vegetation mosaic by reintroducing fire and other natural disturbances, or simulating their effects:

1) Develop vegetation management strategies for each vegetation management unit. Use mosaic analysis (Chapter 4, this document) to guide vegetation treatment design, both in terms of quantity and pattern.
2) Review findings by Eisenhart (2004) and retool mosaic descriptions in the UFO Fire Management Plan (USDI BLM 2002) for natural landscape conditions based on this new data.
3) Where new mosaic objectives are developed, reevaluate existing mosaic versus desired mosaics to develop acreage figure recommendations for treatment.
4) Continue to implement the planned projects to achieve the mosaic objectives. Evaluate impacts from drought and pinyon and sagebrush decline to determine if each project is still needed.

Work with UP, CNHP and academic partners to better understand small mammals, herptiles, birds, and predators, their habitat needs and the existing condition of their habitats.

Promote Neotropical Migratory Bird (NTMB) species by:

1) Continuing control work on noxious weeds and tamarisk to improve habitat for NTMB species
2) Following the Best Management Practices developed for woodland and sage dependent species when implementing vegetation treatments.
3) Maintaining support for the Rocky Mountain Bird Observatory to continue with Breeding Bird Survey transects on BLM land
4) Reduce or eliminate activities that degrade the structure and quality of the overstory or understory of riparian systems.
5) Monitor livestock grazing to ensure tree and shrub regeneration in riparian areas. Design recreational facilities such as roads, trails, and campgrounds to allow the long-term persistence of wooded riparian areas. Include plant species that attract large numbers of insect pollinators as prey in rehabilitation schemes in lowland riparian areas.
6) Maintain stands of large-diameter Gambel oaks, which produce acorns for deer, bears, Wild Turkeys, and Band-tailed Pigeons and which provide shade and access to elk sedge understory production for cattle and elk, benefit Virginia's Warblers as well.
7) Defer grazing in a rotation that has some pastures with flowering forbs at all times through the growing season. This should benefit the security of the forage resource for both livestock and hummingbirds.

Improve weed management by

1) Supporting Montrose County in its UMETCO-funded weed management project on BLM.
2) Following a strategic approach to first contain spread then reduce existing infestations by developing a weed management plan, or implementing existing plans (e.g. the UP Horsefly Weed Management Strategy, 2006.).
3) Utilizing existing partnership with Montrose, and San Miguel Counties to help implement these strategies.
4) Incorporating weed control responsibilities into grazing permits where BLM has initiated weed control. Eliminate spotted knapweed from unit while it is still in small populations.

In seriously degraded plant communities implement vegetation restoration activities to reduce competition from weeds or woody species, and seed with native species.

Consider amending the San Juan/San Miguel Resource Management Plan to evaluate special designations for CNHP, TNC or SREP Potential Conservation Areas, biodiversity conservation areas or wildlife movement corridors.

Put into place a comprehensive series of monitoring transects (several per grazing allotment) to track plant community changes over time, and to monitor effects of management on Standard 3.

Standard 4 Special Status Species:

Undertake a mapping effort for prairie dog colonies in the area, and establish a monitoring program to track changes in prairie dog distribution and colony health.

Continue to assess the potential for increasing the amount of suitable habitat within the unit for reintroduction and expansion of Gunnison sage grouse populations.

Work with DOW, CNHP, and other constituents to improve information on special status, and rare animal and plant species in the area. To improve or protect habitat for these species, recommend management actions, or develop Best Management Practices, these partners will need to develop improved surveys and monitoring activities.

Implement BLM surveys and monitoring to fill data gaps. Establish surveys and monitoring for Mexican spotted owl, and peregrine falcon, at a minimum. Conduct habitat inventories for yellow-billed cuckoo within the major riparian areas in the LHA area.

Consider amending the San Juan/San Miguel Resource Management Plan to include special designations and management decisions for the CNHP, TNC, or SREP Potential Conservation Areas, biodiversity conservation areas, and wildlife movement corridors.

Enhance the management of those streams that are functioning at risk in order to improve habitat conditions for sensitive fish species (see recommendations for Standard 2.)

Standard 5 Water Quality:

Assess the condition of in-channel structures for possible contribution of sediment to local drainages, and repair/reclaim as necessary.

Implement management strategies to maintain or increase basal vegetation cover across the LHA area, and decrease amount of bare soil surface on the uplands in the watersheds rated as "Meeting with Problems".

Perform road maintenance and/or closures on roads and trails identified with drainage or erosion problems.

Assess identified incised channel systems as to their stage of development and causal factors, and implement corrective actions, if appropriate.

Reseed burns and consider mulching/rollerchopping/hydroaxing burned areas that are prone to accelerated sediment production where existing vegetation is unlikely to stabilize the site within the first 1-2 years post fire, or if the invasion of cheatgrass is a threat.

Continue to assess the condition of stream and riverine environments to identify potential impacts to water quality, including the annual thermal regime (e.g. river icing associated with the Ames Powerplant operations). Additionally, pursue instream flow recommendations to the state

of Colorado on streams needing flow protection to sustain flow-related resource values (e.g. complete and implement the San Miguel River Instream Flow Assessment).

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Table V1. Existing vegetation mosaic versus desired vegetation mosaic for major Fire Management Plan. The estimated % seral stages are more accurately portrayed along a spectrum from young to old in the top row, and classified for analysis in the bottom row in the green blocks. These are approximations of what exists due to inaccuracies in the vegetation mapping

Subunit, Polygon type, Acreage	**% of Sub-unit**	**Desired % of each Vegetation Seral Stage** e=early (herbaceous) em=early mid (shrub/grass) m-mid (shrub/young tree) lm=late-mid (tree-shrub; tall shrub) l=late (tree) * designates matrix stages					**Estimated % of each Vegetation Seral Stage** e=early (herbaceous) em=early mid (shrub/grass) m=mid (shrub/young tree) lm=late-mid (shrub/mature tree; tall shrub) l=late (mature/old tree) top numbers are an accurate portrayal of estimated percentages along the seral stage spectrum, while bottom bolded numbers have been interpreted to fit into a single seral stage
		e	**em**	**m**	**lm**	**l**	**e----------em----------m---------lm----------l**
Upper San Miguel **B2: San Miguel Canyon** **17,609 acres**	53%	No mosaic specified					No mosaic specified
Upper San Miguel **B1:Wildland-Urban Interface** **11,245 acres** **Patch Sizes:**	34%	20	55*	15	10		6 7 0.2 4 0.2 10 16 18 33 **13 4.2 0.2 -- 77 --**
	Early seral patches range from <2-203 acres, and average 3 acres (most under 10 acres). Early mid patches are <2-101 acres and average around 8 acres (most under 14 acres). Mid seral patches range from <2-4 acres. Late mid and late stages combine to form the matrix. The prescription calls for a matrix of early-mid stage with early seral acreage distributed among many small (<5 acres) and fewer medium (5-50 acre) and a few large (>50 acre) patches. Later stages should be mainly in small patches with very few medium size patches.						
Upper San Miguel **D7: Natural Mosaic, Norwood** **1,968 acres** **Patch Sizes:**	6%	30	30	20		20	4 26 0.5 6 13 16 12 20 **30 6.5 0 29 32**
	Early seral patches range from <2-151 acres, and average 5 acres (most under 18 acres). Early mid patches are <2-61 acres and average around 9 acres (most under 18 acres). Mid seral stage is absent. Later mid seral patches range from <2-163 acres, averaging 6 acres (most under 20 acres); and late seral patches range from <2-152 acres, averaging 7 acres with most under 18 acres. The prescription calls for no specific matrix, but a fairly even mixture of patches across all stages. Patches are distributed among many small (<5 acres, making up 30% of acreage) and fewer medium (5-50 acre, making up 50% of acreage) and a few large (>50 acre) patches making up 20% of the acreage.						
Naturita South **C11: Natural Mosaic, Norwood** **23,734 acres** **Patch Sizes:**	76%	30	30	20		20	12---------10-----3----------74------- **12 13 0 0 74**
	Early seral patches range from <2-973 acres, and average 21 acres (most under 10 acres). Early mid patches are <2-416 acres and average around 11 acres (most under 50 acres). Mid and late mid are absent and late forms the matrix. The prescription calls for no specific matrix, but a fairly even mixture of patches across all stages. Patches should be distributed among many small (<5 acres, making up 30% of acreage) and fewer medium (5-50 acre, making up 50% of acreage) and a few large (>50 acre) patches making up 20% of the acreage.						

Subunit, Polygon type, Acreage	**% of Sub-unit**	**Desired % of each Vegetation Seral Stage** See top of table for definitions					**Estimated % of each Vegetation Seral Stage** See top of table for definitions				
		e	**em**	**m**	**lm**	**l**	**e----------em----------m---------lm----------l**				
Naturita South	10%	25	25	25*		25*	2----------4----0.5----------93---				
C2: Mule Deer Winter Areas							**2**	**4.5**	**0**	**0**	**93**
3,289 acres	Early seral patches range from <2 to 18 acres, and average 3 acres (most under 4 acres). Early mid patches are <2 to 40 acres and average around 4 acres (most under 5 acres). Mid and later mid seral stages are absent. Late stage forms the matrix. The prescription calls for a matrix of late mid and late stages, but about half of the area should be made up of mostly small and medium (<25 acre) patches dispersed throughout the matrix.										
Patch Sizes:											
Naturita South	8%	10	20	30*		40*	4----------37----0.1----------56---				
C13: Natural Mosaic Northeast Paradox							**4**	**37.1**	**0**	**0**	**56**
2521 acres	Early seral patches range from <2 to 17 acres, and average 3 acres (most under 5 acres). Early mid patches are <2 to 513 acres and average around 30 acres (most under 10 acres). Mid and late mid are absent. Late seral forms the matrix. The prescription calls for a matrix of later mid and late seral vegetation. Within this matrix, most of the acreage of early and early mid stage vegetation should be in small (<5 acres) and medium (<25 acre) patches.										
Patch Sizes:											
Mailbox Park	43%	25	25	25*		25*	0.1--------11----------0.1---------89---				
C2: Mule Deer Winter Areas							**0.1**	**11**	**0**	**0.1**	**89**
9,733 acres	Early seral patches are minimal and all under 2 acres. Early mid patches are <2 to over 181 acres and average around 22 acres (most under 40 acres). Mid and late mid are essentially absent, while late seral stage forms the matrix. The prescription calls for a matrix of late mid and late stages, but about half of the area should be made up of mostly small and medium (<25 acre) patches dispersed throughout the matrix.										
Patch Sizes											
Mailbox Park	21%	20	55*	15		10	2----------8----------0.3---------88---				
B1: Wildland-Urban Interface							**2**	**8**	**0**	**0.3**	**88**
4,749 acres	Early seral patches range from <2 to 53 acres, and average 5 acres (most under 15 acres). Early mid patches are <2 to over 86 acres and average around 8 acres (most under 18 acres). Mid seral stage is absent, and late mid seral is nearly so. Late stage forms the matrix. The prescription calls for a matrix of early-mid stage with early seral acreage distributed among many small (<5 acres) and fewer medium (5-50 acre) and a few large (>50 acre) patches. Later stages should be mainly in small patches with very few medium size patches.										
Patch Sizes											

Subunit, Polygon type, Acreage	**% of Sub-unit**	**Desired % of each Vegetation Seral Stage** See top of table for definitions					**Estimated % of each Vegetation Seral Stage** See top of table for definitions				
		e	**em**	**m**	**lm**	**l**	**e----------em----------m---------lm----------l**				
Mailbox Park	16%	30	10	20*		40*	1----------4----------0.1--------0.1---------94---				
C3: Elk Wintering Area							**1**	**4**	**0.1**	**0.1**	**94**
3,487 acres	Early seral patches range from <2 to 12 acres, and average 5 acres. Early mid patches are <2 to 118 acres and average around 17 acres (most under 28 acres). Mid and late mid patches are almost absent. The late stage forms the matrix. The prescription calls for a matrix of late mid and late stages combined, with slightly less than half of the landscape made up of mainly medium sized (50-200 acre) patches of early and early mid stages.										
Patch Sizes											
Mailbox Park	11%	30	30	20		20	1----------1----------0.2---------0.4--------94---				
D6: Natural Mosaic West Uncompahgre Plateau							**1**	**1**	**0.2**	**0.4**	**94**
2,461 acres	Early seral patches range from <2 to 13 acres, and average 2 acres. Early mid patches are <2 to 7 acres and average around 2 acres. Mid and late mid seral patches are nearly absent. The late seral stage forms the matrix. The prescription calls for a mix of seral stages with no single stage forming the matrix. For each of the seral stages, most acreage should fall into the medium size class (50-200 acres). There should also be many small patches (<50 acres).										
Patch Sizes											
Burn Canyon	49%	30	30	20		20	99----------0.2--------1---				
C11: Natural Mosaic, Norwood							**99**	**0**	**0**	**0.2**	**1**
8,150 acres	Early stage forms the matrix as a result of the Burn Canyon Fire (2002). Early mid and mid seral patches are virtually absent. Late mid patches are few, ranging from <2 to 10 acres, and averaging 3 acres. Late seral patches range from <2 acres to 61 acres, averaging 12 acres. The prescription calls for no specific matrix, but a fairly even mixture of patches across all stages. Patches should be distributed among many small (<5 acres, making up 30% of acreage) and fewer medium (5-50 acre, making up 50% of acreage) and a few large (>50 acre) patches making up 20% of the acreage.										
Patch Sizes											
Burn Canyon	34%	25	25	25*		25*	29----------2-----0.1---0.1----------0.5--------68---				
C2: Mule Deer Winter Areas							**29**	**2.1**	**0.1**	**0.5**	**68**
5,602 acres	Early seral stage is made up of patches ranging from <2-632 acres, and averaging 52 acres (most <100 acres). Early mid stage is composed of patches ranging from <2-46 acres (most under 8 acres). There are very few patches of mid and late mid stage. Late seral stage forms the matrix. The prescription calls for a matrix of late mid and late stages, but about half of the area should be made up of mostly small and medium (<25 acre) patches within the matrix.										
Patch Sizes											
Burn Canyon	15%	20	55*	15	10		8----------1-----0.2---0.2----------1----------87---				
B1: Wildland-Urban Interface							**8**	**1.2**	**0.2**	**1**	**87**
2,527 acres	Early seral stage is made up of patches ranging from <2-166 acres, and averaging 22 acres (most <20 acres). Early mid stage is composed of patches ranging from <2-15 acres (most under 3 acres). There are very few patches of mid stage. Late mid stage is made up of patches from <2-6 acres. Late seral stage forms the matrix. The prescription calls for a matrix of early-mid stage with early seral acreage distributed among many small (<5 acres) and fewer medium (5-50 acre) and a few large (>50 acre) patches. Later stages should be mainly in small patches with very few medium size patches.										
Patch Sizes											