
Rangeland Suitability For Livestock Grazing At the Forest Plan Level and Standards for NEPA Display – November, 2002

Requirements to perform analysis of rangeland suitability are found in NFMA at 16 U.S.C. 1604(g)(2)(A) and were found at 36 CFR 219.20. There is no corresponding manual or handbook direction. FSM 1905 contains a definition of "Lands Suitable for Grazing or Browsing" as "Lands with vegetation that can be used by grazing animals, both domestic and wild herbivores, without damage to the soil and water resource values."

Rangeland Capability

The definition of rangeland capability was found in 36 CFR 219.3 and is found in FSM 1905 as follows:

Capability: The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current resource conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease.

Capability is the initial step in the determination of suitability. It is portrayed as a separate step both for reasons of clarity and because the actual product of "capability" often has utility in planning beyond its role in the determination of suitability.

For Forest Planning purposes, rangeland capability does not vary by alternative and is only determined once during the Land Management planning process.

Required Data for Determination of Rangeland Capability

- Land Ownership (from the Land Status layer of GIS)
- Soil Map Unit - from IRI or other soil inventory
- Geology - optional -- from IRI or other inventory
- Optional - Potential plant community production - from RMRIS database or from Common Vegetation Unit, Common Land Unit, or IRI
- Water polygons - from CFFs or from Common Water Unit (CWU) of IRI

- Rivers/Streams - from CFFS or CWU of IRI
- Roads - from CFFs or Infra Travel Routes
- Slopes - from Digital Elevation Models (DEM)
- Optional – Distance to water from CFFS, Common Water Unit and/or Range Structural Improvement layer.

Process for Determination of Rangeland Capability

Use GIS to identify areas that meet the following criteria (it is not expected that all National Forest System units will have all of the following data sets available in the near future. Use the best available data in making the determination and document what data sets are not available and what steps were taken to provide comparable data). If local changes are made to the values to be applied, document the rationale behind the changes:

1. Begin with all lands within the project area that are National Forest System (NFS) lands.
2. Subtract soil types that are dominated by a large percentage of rock outcrop and rubbleland, loose granitic or highly erosive soils, very wet and boggy soils, and sites with high mass movement risk. Optional - to identify erosive areas, a geologic layer to identify active landslides, slumps, etc. may be used.
3. Subtract soil types that are not inherently capable of producing more than 200 pounds of forage/acre within their Potential Natural Community (such as badland outcrops, nutrient-poor soils, shallow soils, or alkali salt flats). If a figure other than the “200 pounds per acre” is used, document the rationale.
4. Subtract areas that consist of lakes, reservoirs, or ponds, e.g. the area covered by water at the high water mark.
5. Buffer major rivers (Colorado or North Platte, for example) by the actual width (averaged for individual reaches if need be) and subtract.
6. Buffer perennial streams by the actual width of the water surface at the mean high water mark, or use an average width of 3 feet on either side of center line and subtract. The 6-foot width for perennial streams represents an average width for a stream's water surface and can be used as a Unit-wide average for purposes of modeling.
7. Buffer National Forest system roads by 8 feet on either side of center line and subtract. The 16-foot width for roads represents an average width for a road's surface and can be used as a Unit-

wide average for purposes of modeling. The road surface is not considered to be capable unless the road surface has been obliterated and revegetated in which case, the road surface will remain within the capable land base.

8. Subtract slopes meeting the following criteria:
 - a. Subtract slopes greater than 60% (not capable for either sheep or cattle). Keep track of capable acres for cattle and sheep separately (may also need to track separately for other kinds and classes of livestock such as bison, if the need presents). The 60% figure can be modified for each specific Forest or Geographic area to fit with local situations (with documented rationale).
 - b. From the above (a) capability calculations, subtract slopes greater than 40% (slopes of 41-60% are capable for sheep but not normally for cattle). The 40% figure can be modified for each specific Forest or Geographic area to fit with local situations (with documented rationale).
9. Optional: subtract areas that lack available water, or lack the potential to develop water, within approximately 3 miles of the center of the polygon for Grasslands or one mile in mountainous rangelands. This figure can be modified for each specific Forest or Geographic area to fit with local situations (with documented rationale).
10. The remaining area is **Capable Rangeland**. -- The capable rangeland may be displayed as two separate map displays and acreage tables: one map/acreage table set displays capable polygons/acreage for cattle; and, a second set displays capable polygons/acreage for sheep if appropriate. Other displays may be used for other kinds of animals as needed.

Rangeland Suitability

The definition of suitability was found at 36 CFR 219.3 and is found in FSM 1905 as follows:

Suitability: The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses forgone. A unit of land may be suitable for a variety of individual or combined management practices.

Rangeland suitability may vary by alternative being considered in the Land Management Planning process. For this reason,

suitability will need to be determined by alternative or grouping of similar alternatives.

Required Data for Determination of Rangeland Suitability

- Capability Evaluation as detailed above. Areas determined to be other than capable, are by default, also not considered to be suitable.
- Percent tree or unpalatable shrub canopy cover - from RMRIS database or from Common Vegetation Unit or IRI
- Management Area Prescription/Allocation proposed for each alternative.
- Areas closed to livestock grazing as proposed for each alternative.
- Fenced Recreation Areas and/or Sites where livestock is to be excluded, as proposed for each alternative.
- Fenced cultural resource or other special management areas where livestock is excluded or is proposed to be excluded from livestock grazing, by alternative.
- Administrative Sites where livestock grazing is, or is proposed to be, excluded during the life of the plan (except administrative pack and saddle pastures which would be considered to be suitable)
- Special Use Sites where livestock grazing is determined to be incompatible with the purpose of the special use (summer homes, electronic sites, etc.). This determination may vary by alternative.
- Permanent enclosures fenced so as to exclude livestock use during the life of the plan.
- Road rights of way/easements (not including the actual road bed as that is covered in the capability analysis) where such right of way is or is proposed to be fenced to exclude livestock grazing. Include actual or estimated area fenced (from CFFs).
- Railroads rights of way/easements where such right of way is or is proposed to be fenced to exclude livestock grazing. Include actual area fenced or estimated (from CFFs).
- Research Natural Areas where decisions have been made or are proposed in the alternative, to exclude livestock.
- Research facilities, municipal watersheds, or other special purpose areas where decisions have been made, or are proposed in the alternative, to exclude livestock.
- Threatened or Endangered Species habitat permanently excluded from livestock grazing, or proposed in the alternative for exclusion through the life of the plan. Include Threatened or Endangered Species habitat where determinations have been

made that livestock grazing is incompatible with the viability of the habitat or species.

- Minerals production areas (mills, mines, settling ponds, etc.) where livestock grazing is incompatible with the minerals activity for safety or other reasons.
- Conduct economic efficiency analysis by alternative to determine cost efficiency (36 CFR 219.3, definition of suitability and 36 CFR 219.20(b)). Determine if areas that are not economically efficient (i.e. discounted costs exceed discounted benefits) under circumstances expected to prevail during the life of the plan should be classified as other than suitable. Present net value calculated over decade one is a reasonable approximation of expected plan life. NFMA does not require present net value to be positive for rangelands to be suitable. RPA values, as updated by the WO range staff must be used for benefit estimation. There are no specific criteria for determining suitability based on economic efficiency. This analysis is completed so that the decision maker is better informed and understands the economic trade-offs prior to making the decision.
- Conduct financial efficiency analysis by alternative to reveal the costs and revenues to agency and Federal taxpayers. Present net value calculated over decade one is a reasonable approximation of expected plan life. There is no requirement for present net value to be positive, especially since law and executive order establish grazing fees. Current grazing fees must be used for revenue estimation. Financial efficiency provides an analytical complement to economic efficiency. This analysis is completed so that the decision maker is better informed and understands the financial trade-offs prior to making the decision.

Process for Determination of Rangeland Suitability.

To determine rangeland suitability (36 CFR 219.3, definition of suitability), perform the following as a separate GIS analysis for each alternative or group of similar alternatives.

1. Subtract areas determined to be other than capable as determined in the capability evaluation above.
2. Subtract areas that currently have an overstory of tree canopy cover and/or unpalatable shrub canopy cover greater than 70% (note: local exceptions to the 70% figure may be determined to be appropriate for specific situations, such as Aspen communities, provided that the rationale is documented).

- a. Transitory range will normally be considered as a special short term instance where suitability occurs because of the removal of the overstory vegetation (as by fire or harvest). However, since the long term site potential is normally a moderate to dense canopy with little understory production, and since these areas are normally dedicated to timber (and other resource) production, these areas are generally considered to be suitable for grazing only for the lifespan of the time that it takes for the canopy to once again close back to 60% or greater, and only if the costs or viability of adequately mitigating effects relative to livestock grazing on forest vegetation regeneration are acceptable.
 - b. Use harvest maps and records to determine if specific areas currently meet the suitable criteria and if they are expected to remain within that criteria for the life of the plan. If so, they are determined to be suitable. If the transitory site will become other than suitable during the life of the plan, either portray it as being other than suitable, or show it as being suitable only for the estimated time that it will continue to meet suitability definitions.
 - c. Optional: Certain vegetative types (such as some Aspen communities) may be suitable for a given type of livestock in certain geographic areas and not in other areas. If appropriate, these vegetative communities may be subtracted out of the suitable acres as needed. Document the rationale for the decision.
3. Subtract areas that have a proposed management area prescription allocation that does not allow for livestock grazing (e.g., certain Research Natural Areas, experimental forests, municipal watersheds). Subtract only management area prescriptions that have proposed standards & guidelines that do not allow for livestock grazing management, or where decisions have previously been reached that livestock grazing is incompatible with the planned land management prescription and the proposed alternative would continue that incompatibility finding.
 4. Subtract fenced recreation areas, developed recreation sites, administrative sites (except administrative pack and saddle stock pastures), minerals production sites, fenced cultural resource sites, permanent enclosures, and appropriate special use sites, where livestock use has been determined to be incompatible with the primary land use and/or where the alternative proposes to exclude livestock use.

5. Buffer primary roads (from CFFs or Infra Travel Routes). Primary roads are defined by the actual fenced area, or where a fence is known or proposed to exist but the exact location is unknown, buffer by 100 feet on either side of the center line and subtract.
6. Buffer secondary/county roads by the actual fenced area, or where a fence is known or proposed to exist, but the exact location is unknown, by 33 feet on either side of the center line and subtract to account for the area that is fenced along secondary/county roads. Only use when the road (or road segment) is fully excluded from livestock grazing on NFS lands. The road surface itself is not considered to be capable. The fenced area alongside the road is capable of growing harvestable forage, but is unsuitable for livestock grazing if decisions have or will be made that livestock grazing is incompatible with other objectives associated with the ROW/easement. Road surfaces are taken out at the capability analysis level and fenced areas along roads are taken out at the suitability analysis level.
7. Buffer railroads by 100 feet on either side of center line or by the actual fenced area where a fence is known or proposed to exist, and subtract.
8. Subtract areas that are closed to grazing. The reason for past or proposed closure or current lack of livestock grazing activity should be explained (e.g., lack of access, conflicts with wildlife, conflicts with recreation, etc.).
9. Subtract areas where decisions have been made that specific TES habitats, including habitat for Forest Service sensitive species, need to be excluded from livestock grazing due to an established incompatibility.
10. Have IDT specialists on the planning team identify any additional areas where conflicts occur between livestock grazing and other resources to the extent that the conflicts cannot be resolved or satisfactorily mitigated, and where the other resource values are proposed in the alternative to take precedence over livestock use. If the planning recommendation is that livestock use in these areas is incompatible, or the conflicts are incapable of being resolved in a satisfactory manner, these lands will be designated as other than suitable for the specific alternative for this planning cycle. Clearly document the reason for the other than suitable determination.
11. Subtract areas where the IDT has determined that livestock

grazing is not economically feasible when considering the costs of complying with applicable laws, regulations and Forest Plan standards. This should not be interpreted as making decisions for a free market but rather should evaluate the costs of mitigations and constraints and management activities that would be needed to ensure compliance.

12. The remaining area is **Suitable Rangeland** as determined at the Forest Planning level in compliance with Forest Planning Regulations. The suitable rangeland may be displayed as multiple map displays and acreage tables with one map/acreage table display for each alternative.

Forest Plan Suitability Determination

The overlay of the capable acres with the suitable acres yields the Capable and Suitable Acres. For Forest Planning purposes, the combined “capability” and “suitability” analysis constitutes a Suitability Determination. Remember that this analysis is done separately for cattle and for sheep (and possibly for other kinds of animals as needed) and for each alternative (or grouping of similar alternatives) being considered.

The capability and suitability analysis and resultant Suitability Determination is not a decision to graze livestock on any specific area of land, nor is it a decision about or estimate of livestock grazing capacity. The capability/suitability analysis and suitability determination may or may not provide supporting information for a decision to graze livestock on a specific area.

Any landscape area will contain areas that are capable and/or suitable as well as areas that are modeled as being other than capable and/or suitable. Since the Forest Plan level suitability determination is based on a modeling process, and is dealing with a variety of complex landscapes, it is inevitable that this intermingling will occur on a land base of any significant size. Therefore, these suitability determinations are not intended to imply that livestock will be precluded from being found on lands that may be modeled as other than capable or suitable.

At the Forest Plan level the Suitability Determination provides basic information regarding the potential of the land to produce resources and supply goods and services in a sustainable manner, as well as the appropriateness of using that land in a given manner. This information assists the interdisciplinary team and the line officer in evaluating alternatives and arriving at Forest Plan level decisions. It also helps in an analysis of alternative uses foregone.

Both capability and suitability may also have value when applied at the site specific level. At this level, both capability and suitability analyses may be reviewed, updated, or made more site specific, if doing so will provide information useful to the decisions being made. However, this use of the analyses is outside the scope of Forest Planning regulations and purposes and is strictly an application of a useful tool as an aid in management decision making. For instance, rangelands identified as capable and suitable for domestic livestock grazing in the land and resource management plan may include smaller inclusions that are not appropriate for domestic livestock grazing when analyzed at the site-specific level (i.e., some wetlands or some campgrounds). A more site specific analysis at the allotment (or multi-allotment) scale may provide information useful in planning management of the given allotment(s).

Changes to Suitability Determinations would involve making changes at the Forest Plan level, as suitability is a Forest Planning level determination.

Specific method used in this analysis:

This shapefile of rangeland capability was generated in response to the requirements of the Rangeland Suitability for Livestock Grazing at the Forest Plan Level and Standards for NEPA Display. It combines allotment data, slope data, soils data, roads data, and streams and lakes data.

Roads data: This shapefile was created by clipping the roads dataset to allotment boundaries. Roads were selected from Cartographic Feature File (CFF_CODE) values: 89, 96, 101, 103, 105, 106, 515, 518, and 753. These remaining roads were buffered to a distance of 8 feet.

Soils data: Soils with High (3) mass movement potential (Landslide Hazard) of 3 (High) were removed from the dataset. These soil types were defined from the Map Unit ID (MUID) data field. MUID types removed were: 754Y, 757Y, and 922A.

Soils with a Potential Erosion Hazard of 3 (High) were removed from the dataset. A join was performed with the file, mstr1_ersion_landslide_haz.dbf, and the dbf file in the soils_calc shapefile. The join item was MUID. The item used for potential erosion hazard was ERSN_HAZ.

Soil types dominated by a large percentage of rock outcrop and rubble land were removed. These included soils with LTA_CODE values of: M103, M306, M313, and M403.

Streams data: This shapefile was created by clipping streams dataset to allotment boundaries. Perennial streams were selected from Cartographic Feature File (CFF_CODE) values: 402, 404, and 415. These remaining streams were buffered to a distance of 3 feet.

Slope data: This shapefile was generated from a 25 meter DEM of slope. The slopes were reclassified to slopes less than or equal to 40 % and slopes greater than 40 %. The final shapefile is a polygon shapefile of those polygons which correspond to areas of slopes less than or equal to 40 %.

Polygons areas generated from roads and streams buffers and polygons of water bodies were removed from the Rangeland Capability dataset.

The final capability dataset was clipped to the range allotment boundaries.