



USDA Forest Service
Malheur, Umatilla, and Wallowa-Whitman National Forests

Identification of Timber Suitability Using The 1982 Planning Rule 07/26/2010, Bruce Countryman

Identification of lands not suited for timber production is required by the 1976 National Forest Management Act (NFMA) and the 1982 planning rule. This paper summarizes the process that was used during the Blue Mountains forest plan revision effort to identify those lands that were tentatively not suitable for timber production using the 1982 planning rule. Information including: existing vegetation, potential vegetation, existing and proposed land management allocation, and soils was used to make the suitability identification.

The process followed 1982 rule section 219.14 requirements. The first **step (A)** 219.14 (a) identifies areas that are not forest land, withdrawn from production, lands where irreversible resource damage might occur, or areas lacking assurance that adequate restocking would occur after final harvest. **Step B** 219.14 (b) stratifies the land into categories of land with similar management costs and returns to identify the management intensity that results in the largest excess of discounted benefits versus the discounted costs. Note: no acres are identified as unsuitable in this step. Steps A and B are completed before the development of alternatives. **Step C** 219.14 (c) will identify different areas as unsuitable during the development of alternatives in the EIS phase of revision based on combinations of resource management prescriptions to meet management objectives for the various multiple uses including outdoor recreation, timber, watershed, range, wildlife and fish, and wilderness.

Legal Requirements

1976 National Forest Management Act (Section 6k).

"(k) In developing land management plans pursuant to this Act, the Secretary shall identify lands within the management area which are not suited for timber production, considering physical, economic, and other pertinent factors to the extent feasible, as determined by the Secretary, and shall assure that, except for salvage sales or sales necessitated to protect other multiple-use values, no timber harvesting shall occur on such lands for a period of 10 years. Lands once identified as unsuitable for timber production shall continue to be treated for reforestation purposes, particularly with regard to the protection of other multiple-use values. The Secretary shall review his decision to classify these lands as not suited for timber production at least every 10 years and shall return these lands to timber production whenever he determines that conditions have changed so that they have become suitable for timber production.

1982 Planning Rule

Sec. 219.14 Timber resource land suitability.

During the forest planning process, lands which are not suited for timber production shall be identified in accordance with the criteria in paragraphs (a) through (d) of this section.

(a) During the analysis of the management situation, data on all National Forest System lands within the planning area shall be reviewed, and those lands within any one of the categories described in paragraphs (a) (1) through (4) of this section shall be identified as not suited for timber production--

(1) The land is not forest land as defined in Sec. 219.3.

(2) Technology is not available to ensure timber production from the land without irreversible resource damage to soils productivity, or watershed conditions.

(3) There is not reasonable assurance that such lands can be adequately restocked as provided in Sec. 219.27(c)(3).

(4) The land has been withdrawn from timber production by an Act of Congress, the Secretary of Agriculture or the Chief of the Forest Service.

(b) Forest lands other than those that have been identified as not suited for timber production in paragraph (a) of this section shall be further reviewed and assessed prior to formulation of alternatives to determine the costs and benefits for a range of management intensities for timber production. For the purpose of analysis, the planning area shall be stratified into categories of land with similar management costs and returns. The stratification should consider appropriate factors that influence the costs and returns such as physical and biological conditions of the site and transportation requirements. This analysis shall identify the management intensity for timber production for each category of land which results in the largest excess of discounted benefits less discounted costs and shall compare the direct costs of growing and harvesting trees, including capital expenditures required for timber production, to the anticipated receipts to the government, in accordance with Sec. 219.12 and paragraphs (b)(1) through (b)(3) of this section.

(1) Direct benefits are expressed as expected gross receipts to the government. Such receipts shall be based upon expected stumpage prices and payments-in-kind from timber harvest considering future supply and demand situation for timber and upon timber production goals of the regional guide.

(2) Direct costs include the anticipated investments, maintenance, operating, management, and planning costs attributable to timber production activities, including mitigation measures necessitated by the impacts of timber production.

(3) In addition to long-term yield, the financial analysis must consider costs and returns of managing the existing timber inventory.

(c) During formulation and evaluation of each alternative as required in Sec. 219.12 (f) and (g), combinations of resource management prescriptions shall be defined to meet management objectives for the various multiple uses including outdoor recreation, timber, watershed, range, wildlife and fish, and wilderness. The formulation and evaluation of each alternative shall consider the costs and benefits of alternative management intensities for timber production as identified pursuant to paragraph (b) of this section in accordance with Sec. 219.12(f). Lands shall be tentatively identified as not appropriate for timber production to meet objectives of the alternative being considered if--

(1) Based upon a consideration of multiple-use objectives for the alternative, the land is proposed for resource uses that preclude timber production, such as wilderness;

(2) Other management objectives for the alternative limit timber production activities to the point where management requirements set forth in Sec. 219.27 cannot be met; or

(3) The lands are not cost-efficient, over the planning horizon, in meeting forest objectives, which include timber production.

(d) Lands identified as not suited for timber production in paragraph (a) of this section and lands tentatively identified as not appropriate for timber production in paragraph (c) of this section shall be designated as not suited for timber production in the preferred alternative. Designation in the plan of lands not suited for timber production shall be reviewed at least every 10 years. Such lands may be reviewed and redesignated as suited for timber production due to changed conditions at any time, according to the criteria in paragraphs (a) and

(c) of this section, and according to the procedures for amendment or revision of the forest plan in Sec. 219.10 (f) and (g).

Outline of the Blue Mountains Suitability Process and Criteria

Step A: (sec 219.14 a) **Criteria for identifying lands generally not suitable for timber production during the analysis of the management situation (AMS)** See pages 10-14 of appendix for details.

1. The land is not forest land. (areas incapable of attaining 10 percent conifer canopy closure)
2. Lands where irreversible resource damage will occur from timber production. Note: the 1990 plans had very few acres in this category, and assumed that damage could be avoided through site specific prescriptions or logging systems such as helicopter.
3. Reforestation after regeneration harvest cannot be assured within five years. These areas include the cold-dry plant association group with a whitebark pine cover type, nine bark associations, and juniper woodlands. The GIS soil layer (LTA) and existing vegetation polygons layers were also used to identify these sites.
4. The land has been withdrawn from timber production by an Act of Congress, the Secretary of Agriculture or the Chief of the Forest Service. (includes wilderness)

Step B (219.14 b) **Stratification of lands prior to developing alternatives** (for all lands not identified in step A), assessment of costs versus returns, and efficiency of prescriptions.

This stratification will include combinations of the following categories of lands with similar management costs and returns:

- Development status (access for management)
- Vegetation type (VDDT potential vegetation type)
- Size class.

Step C (219.14 c) **Suitability identification during NEPA and the development of alternatives**

The following categories of land were identified in our **proposed action** as unsuitable (not appropriate for timber production is the wording from the 1982 rule) for timber production but available for harvest as long as they were not identified as unsuited in step A:

- Riparian management areas
- Specially designated areas
- Administrative sites
- Roadless areas
- Old forest

The unsuitable designation in step C includes consideration for minimum management requirements in 219.27 and multiple use objectives. **Other alternatives may have different acreage identified as unsuitable.** This will also create the potential for different long-term sustainable yield levels being identified in each alternative.

See the attached appendix for management areas in the current forest plans that are considered unsuitable for timber production. The management area calls are combined with Part A identification for a final suitability call.

Analysis Summary

The following table summarizes the results of the 219.14 part-A screening for lands tentatively suitable for timber production. See pages 10-14 of the appendix for details of screening criteria.

Step A. Table for the AMS phase of analysis (219.14 (a))

Category	Malheur (acres)	Umatilla (acres)	Wallowa-Whitman (acres)
1. National Forest System lands total acres	1,700,000	1,400,000	2,400,000
a. Non-forest land	215,000	199,000	310,000
b. Potential for irreversible damage	0	0	0
c. No assurance of adequate restocking	139,000	37,000	345,000
d. Forest land withdrawn from production	101,000	347,000	760,000
2. Total unsuitable land	455,000 (A+b+c+d)	583,000	1,415,000
3. Tentatively suitable forest land	1,245,000 (line 1 – line 2)	817,000	985,000

Step B. Stratification of the tentatively suitable for timber production land.

Tasks for this step include:

1. Stratification of the planning area into categories of land with similar management costs and returns
2. Determine the costs and benefits for a range of management intensities for timber production
3. Identify the management intensity for each category of land with the greatest excess of discounted costs less discounted costs
4. Display/consider the costs of managing the existing timber inventory

Stratification of the Land (lands tentatively suitable for timber production)

The land was stratified into the following categories to identify management costs and returns:

- **VDDT modeling groups** for potential vegetation, including: cold forest (CD, SW), moist forest (CM), and dry forest (DD, DP, DG, XP).
- **VDDT structural class** for diameter classes (less than 10 inches, 10-20, and 20 plus)
- **Cost to access treatment units.** Use developed (roaded) or undeveloped (unroaded) areas. These groups could also be broken down by logging systems such as cable, ground-based, and helicopter.

The following tables summarize the stratification of lands tentatively suitable for timber production for each forest.

Forest	road status	Veg type	Size group (in)	Acres
WAW	developed	cold	0: less than 10	65,082
WAW	developed	cold	1: 10-20	46,670
WAW	developed	cold	2: 20plus	20,157
WAW	developed	dry	0: less than 10	137,331
WAW	developed	dry	1: 10-20	260,743
WAW	developed	dry	2: 20plus	65,156

Forest	road status	Veg type	Size group (in)	Acres
WAW	developed	moist	0: less than 10	78,782
WAW	developed	moist	1: 10-20	118,445
WAW	developed	moist	2: 20plus	47,327
WAW	undeveloped	cold	0: less than 10	15,934
WAW	undeveloped	cold	1: 10-20	17,389
WAW	undeveloped	cold	2: 20plus	13,267
WAW	undeveloped	dry	0: less than 10	7,204
WAW	undeveloped	dry	1: 10-20	11,605
WAW	undeveloped	dry	2: 20plus	8,957
WAW	undeveloped	moist	0: less than 10	7,564
WAW	undeveloped	moist	1: 10-20	21,202
WAW	undeveloped	moist	2: 20plus	16,829

forest	Status	Veg group	Size group	Acres
UMA	developed	cold	0: less than 10	41,133
UMA	developed	cold	1: 10-20	6,962
UMA	developed	cold	2: 20plus	16,617
UMA	developed	dry	0: less than 10	144,696
UMA	developed	dry	1: 10-20	222,501
UMA	developed	dry	2: 20plus	34,420
UMA	developed	moist	0: less than 10	46,544
UMA	developed	moist	1: 10-20	67,130
UMA	developed	moist	2: 20plus	89,920
UMA	undeveloped	cold	0: less than 10	6,548
UMA	undeveloped	cold	1: 10-20	162
UMA	undeveloped	cold	2: 20plus	1,592
UMA	undeveloped	dry	0: less than 10	14,166
UMA	undeveloped	dry	1: 10-20	26,088
UMA	undeveloped	dry	2: 20plus	14,575
UMA	undeveloped	moist	0: less than 10	4,144
UMA	undeveloped	moist	1: 10-20	21,744
UMA	undeveloped	moist	2: 20plus	46,019

Forest	Status	Veg group	Size group	Acres
Malheur	developed	cold	0: less than 10	29,744
Malheur	developed	cold	1: 10-20	57,639
Malheur	developed	cold	2: 20plus	16,648
Malheur	developed	dry	0: less than 10	128,536
Malheur	developed	dry	1: 10-20	627,957
Malheur	developed	dry	2: 20plus	206,275
Malheur	developed	moist	0: less than 10	3,811
Malheur	developed	moist	1: 10-20	33,478

Forest	Status	Veg group	Size group	Acres
Malheur	developed	moist	2: 20plus	29,755
Malheur	undeveloped	cold	0: less than 10	6,684
Malheur	undeveloped	cold	1: 10-20	7,482
Malheur	undeveloped	cold	2: 20plus	3,676
Malheur	undeveloped	dry	0: less than 10	6,038
Malheur	undeveloped	dry	1: 10-20	41,999
Malheur	undeveloped	dry	2: 20plus	34,667
Malheur	undeveloped	moist	0: less than 10	864
Malheur	undeveloped	moist	1: 10-20	6,302
Malheur	undeveloped	moist	2: 20plus	9,675

Costs and Benefits for Timber Production

The following table summarizes the costs and benefits for items associated with timber production. Log values were derived from current market prices. Changes in market conditions will influence the values of products. Cost data are tri-forest estimates and individual project costs may vary substantially.

Cost/Value Data	National Forest		
	MAL	UMA	W-W
Pond Values			
Delivered Price \$/MBF	\$367.00	\$367.00	\$367.00
Haul Costs			
Felling, Bucking, Haul & Other Costs (\$/MBF)	-\$192.00	-\$192.00	-\$192.00
Logging Costs			
Tractor \$/MBF	-\$100.00	-\$100.00	-\$100.00
Cable \$/MBF	-\$180.00	-\$180.00	-\$180.00
Heli \$/MBF	-\$300.00	-\$300.00	-\$300.00
Harvest Costs			
EvenAge - Site Prep/Plant/Survey (\$/Acre)	-\$566.00	-\$498.00	-\$524.00
Unevenage - Site Prep/Plant (\$/Acre)	-\$269.00	-\$206.00	-\$251.00
Sale Prep/Admin Costs (\$/MBF)	-\$37.00	-\$51.00	-\$29.00
TSI Costs			
EvenAged Release (\$/Acre)	-\$150.00	-\$350.00	-\$60.00
UnevenAged Release (\$/Acre)	-\$36.00	-\$92.00	-\$45.00
EvenAged PCT (\$/Acre)	-\$250.50	-\$285.00	-\$216.00
UnevenAged PCT (\$/Acre)	-\$49.00	-\$171.00	-\$216.00
Management Costs			
NEPA Project Planning Costs (\$/Acre)	-\$70.00	-\$98.00	-\$98.00

Management intensity for each category of land with the greatest excess of discounted costs less discounted costs

The combination of management prescriptions and categories of land with the greatest benefit versus costs include areas that already have established road systems, use natural regeneration, are located in moist forest types, and utilize the shortest rotations (least cost of holding the investment).

Costs of managing the existing inventory

Significant costs associated with managing the existing inventory include maintaining the existing road system and protecting the timber resource from wildfire. Road maintenance costs for all three forests combined average 2.9 million dollars per year. Fire suppression costs can vary greatly by year depending on the extent of fire activity. The average cost per year to maintain a base suppression work force is approximately 12 million dollars for the Blue Mountains. The cost per acre for the combined road and pre-suppression component of protecting and maintaining our existing inventory is approximately \$2.73 per acre per year. This is probably an over estimate because assigning all of the above costs just to timber, ignores the benefit to other resources such as range and recreation.

Suitability Part C. Table for the EIS Alternatives. (the format of this table will change in the EIS.. probably add in a line for Part A acres.. or just show acres suitable)

Table 2 Land suitable for timber production by alternative (draft)						
Category	Acres (thousand acres)					
	Malheur		Umatilla		Wallowa-Whitman	
Forest land not appropriate for timber production by alternative	No action	Proposed action	No action	Proposed action	No action	Proposed action
Reason why unsuitable: Roadless	62	85	140	160	125	90
Reason why unsuitable: Riparian management area.	60	100	93	105	147	150
Reason why unsuitable: Old Forest	190	220	102	100	92	100
Other reasons:	279	53	112	5	55	70
Total land not appropriate for timber production (total from above)	591	458	447	370	419	410
Unsuited for timber production forest land (total from above and Part A acres in table 1)	1,046	913	1030	953	1,834	1,825
8. Total suitable for timber production forest land (line 3 in table 1 minus total unsuited)	654	787	370	447	566	576

See the appendix pages 15 -21 for an explanation of modeling timber suitability for the proposed action and the no action alternative.

No Action = current forest plans as amended.

Appendix

Details for suitability modeling process (Blue Mountains)

Construction of GIS Spatial layers

The following GIS layers were intersected together to create the timber suitability polygon layer for each forest: current vegetation polygon layer, Blues management area layer, administrative forest boundary layer, reforestation/harvest layer (Malheur only- see below), landtype association LTA soils layer, riparian management area layer.

Malheur GIS layers used:

/revision/mal/evg (existing vegetation layer, layer date 3/24/2006)
 /revision/mas/ma_20070628 (Blues draft management area layer, version date 6/28/2007)
 /bmprov/lisa (administered forest boundary, current bmprov layer)
 /bmprov/lta (blues soil-land type association layer, current bmprov layer)
 /revision/rma/mal_rmalsa (riparian management area layer, version date 4/10/2006)
 /bmprov/wui (wildland urban interface layer, current bmprov layer)
 /bmprov/pol (county lines layer, current bmprov layer)
 /bmprov/roadless (inventoried roadless areas, current bmprov layer)
 /revision/roadless_prj/inventory07 (2007 inventoried roadless areas, version date 2/14/2007)
 /revision/mal/mal_harv (Malheur harvest layer, layer date 2/10/2005)
 /revision/veg/emi_hrvpoly (historic emigrant district vegetation layer)
 /revision/mal/malref1990 (Malheur reforestation units 1990 to present)
 The final Malheur timber suitability layer is: /revision/timb_suit/mts08ehrvref

The emi_hrvpoly and the malref1990 layers were used to respond to concerns from the Emigrant ranger district that the forest wide current vegetation layer did not accurately reflect areas within the 1990 Burns area wildfires. Many of those areas were currently showing as “non-forested” vegetation types; the districts believed that many of those areas should show as forested potential vegetation types because they were forested before the burn and had been planted to conifers after the 1990 wildfires. See step 2 and 3 for more detailed information on how the information was adjusted based on reforestation records and pre-burn vegetation data.

Umatilla GIS layers used:

/revision/uma/evgpi (existing vegetation layer, current as of 2005, updated for 2005 school fire, layer date 2/28/2006)
 /revision/mas/ma_20070628 (Blues draft management area layer, version date 6/28/2007)
 /bmprov/lisa (administered forest boundary, current bmprov layer)
 /bmprov/lta (blues soil-land type association layer, current bmprov layer)
 /revision/rma/uma_rmalsa (riparian management area layer, version date 4/21/2006)
 /bmprov/wui (wildland urban interface layer, current bmprov layer)
 /bmprov/pol (county lines layer, current bmprov layer)
 /bmprov/roadless (inventoried roadless areas, current bmprov layer)
 /revision/roadless_prj/inventory07 (2007 inventoried roadless areas, version date 2/14/2007)
 The final Umatilla timber suitability layer is: /revision/timber_suit/U_TS20070814

Wallowa-Whitman GIS layers used:

/revision/waw/evg (existing vegetation layer, current as of 2005, layer date 10/11/2005)
 /revision/mas/ma_20070628 (Blues draft management area layer, version date 6/28/2007)
 /bmprov/lisa (administered forest boundary, current bmprov layer)
 /bmprov/lta (blues soil-land type association layer, current bmprov layer)
 /revision/rma/waw_rmalsa (riparian management area layer, version date 4/24/2006)
 /bmprov/wui (wildland urban interface layer, current bmprov layer)
 /bmprov/pol (county lines layer, current bmprov layer)
 /bmprov/roadless (inventoried roadless areas, current bmprov layer)
 /revision/roadless_prj/inventory07 (2007 inventoried roadless areas, version date 2/14/2007)
 The final Wallowa-Whitman timber suitability layer is: /revision/timber_suit/W_TS20070813

Database construction

Summary information from the maps constructed in step 1 was exported into an Access database so that each national forest polygon could be modeled into one of the 3 timber suitability categories. The database is stored in: /revision/timb_suit/tables200709/ts_9_26_2007.mdb /ts_9_26_2007.mdb. The Malheur table in the Access database is called mal_ts_10_2007_final. The Umatilla table is called uma_ts_10_2007_final. The Wallowa-Whitman table is called waw_ts_10_2007_final.

The information exported from the maps into the database included:

- Area in square meters (used to calculate acres)
- ..._ts200708 (unique polygon identifier)
- stand_tag (link to polygon vegetation data)
- admin_forest (indicator of national forest managed lands)
- subcategory (existing and proposed action land management allocation from draft Blues forest plan)
- class (riparian management area category, PACFISH/INFISH or ARCS)
- county_nam (county name)
- rd_name, rd_name_07, rd_name_01 (inventoried roadless area name)
- own (ownership status)
- lta (linking identifier to the LTA soils information)
- numerous other fields that link back to the original GIS layers that were combined into the final suitability layer.

Additional fields were added to each of the 3 forest's suitability tables so that information could be stored that would summarize the factors that were used to derive the suitability criteria. The fields that were added to the suitability tables included:

- soil suitability criteria (timber production suitability information from the land type association data table)
- veg suit criteria (vegetation based suitability criteria)
- mas criteria (land management allocation summary)
- roadless criteria (summary field for roadless areas)
- rma criteria (summary of riparian management area field)
- timber suit (final timber suitability call)

Classifying the data

Data were drawn from a number of sources to classify the individual polygons to determine timber suitability.

- soil suitability criteria
- vegetation suitability criteria
- land management allocation criteria (indicates if withdrawn from production)
- roadless criteria
- riparian management area criteria

Land management allocation criteria (step A)

Areas withdrawn from production:

- wilderness
- RNA

- Starkey experimental forest
- Wild and scenic rivers (wild portion)
- Municipal watersheds
- Scenic
- Botanical
- Historic
- Geologic

Management area codes for each forest from current plans that are “withdrawn” from timber production (code interpretations from R6 considerations for timber analysis document):

Category	Malheur code	Umatilla code	WAW code
Wilderness	6	B1,2,7	4, 4-12, 4-7
RNA	9, F5	D2	12-7, 12-8
Starkey exp forest			14
Wild & scenic rivers	22	A7	7
Municipal watershed	17, 18	F2	
Scenic area	7, 8	A8, A9	
Botanical, historic, geologic			
HCNRA			8, 9, 10, 11, 13
Admin or rec sites	12,19, F13, F28	A6	16

Soil Suitability Criteria (Step A, regeneration difficulty 219.14 a)

Spatial data were linked from the timber suitability database (lta field) to the LTA-soils tabular database called LTA_BMPROV_DATABASE . The LTA table that we used is called LTA_management_suitability_limits, and was linked to the spatial data through the LTA field. We used the timber_suitability and timber_limitations fields to populate the soil suitability criteria field in the timber suitability data table. The LTA database is stored in j.../BMPROV/LTA_DB.mdb. The information in the LTA database was previously classified by a professional soil contractor through the Umatilla National Forest (contact is Craig Buskoll, the soil scientist on the Umatilla NF) into timber suitability categories using the broad soil, vegetation, and geologic characteristics of each land type association. The following land type associations were found to be unsuitable for timber production but potentially available/suitable for timber harvest.

LTA	Landform	Geology_Group	PNV_Zone
132	Trough Walls, Cirques, & Alpine Ridges	Glacial - undifferentiated	Moist Forest
315	Basins, Fans, and Terraces	Basic Igneous Rocks	Dry NonForest
316	Mountain Slopes, Gentle	Basic Igneous Rocks	Dry NonForest
317	Mountain Slopes, Steep	Basic Igneous Rocks	Dry NonForest
318	Canyons	Basic Igneous Rocks	Dry NonForest
326	Mountain Slopes, Gentle	Clay Producing Materials	Dry NonForest
327	Mountain Slopes, Steep	Clay Producing Materials	Dry NonForest
332	Trough Walls, Cirques, & Alpine Ridges	Glacial - undifferentiated	Dry NonForest
333	Alluvial Valley Floors	Alluvial/Colluvial - undifferentiated	Dry NonForest
356	Mountain Slopes, Gentle	Acid Igneous Rocks	Dry NonForest
357	Mountain Slopes, Steep	Acid Igneous Rocks	Dry NonForest
358	Canyons	Acid Igneous Rocks	Dry NonForest

LTA	Landform	Geology_Group	PNV_Zone
365	Basins, Fans, and Terraces	Exotic Terrane Rocks	Dry NonForest
366	Mountain Slopes, Gentle	Exotic Terrane Rocks	Dry NonForest
367	Mountain Slopes, Steep	Exotic Terrane Rocks	Dry NonForest
368	Canyons	Exotic Terrane Rocks	Dry NonForest
376	Mountain Slopes, Gentle	Sedimentary Rocks	Dry NonForest
377	Mountain Slopes, Steep	Sedimentary Rocks	Dry NonForest
416	Mountain Slopes, Gentle	Basic Igneous Rocks	Moist NonForest
418	Canyons	Basic Igneous Rocks	Moist NonForest
432	Trough Walls, Cirques, & Alpine Ridges	Glacial - undifferentiated	Moist NonForest
433	Alluvial Valley Floors	Alluvial/Colluvial - undifferentiated	Moist NonForest
468	Canyons	Exotic Terrane Rocks	Moist NonForest
518	Canyons	Basic Igneous Rocks	Rock/Non-Veg
532	Trough Walls, Cirques, & Alpine Ridges	Glacial - undifferentiated	Rock/Non-Veg
558	Canyons	Acid Igneous Rocks	Rock/Non-Veg
567	Mountain Slopes, Steep	Exotic Terrane Rocks	Rock/Non-Veg
568	Canyons	Exotic Terrane Rocks	Rock/Non-Veg
736	Basins, Fans, and Terraces	Alluvial/Colluvial - undifferentiated	Non/Dry Forest/Riparian
832	Alpine Ridges	Glacial - undifferentiated	Very Cold Forest/NonForest

Reasons for identifying the land types as unsuited include potential problems with: timely regeneration, road building, logging systems, and economic production of timber (low site productivity or non-forest areas). All polygons with a label in the LTA timber suitability field starting with “U”, were added into the soil suitability criteria field in the timber suitability data table so that they could be “flagged” as unsuitable for timber production.

The unsuitable codes include:

Timber Suitability	Timber Limitations
U	unsuited
U	forest productivity, regeneration
U-S	regeneration, road-harvest systems

Forested/Non-forested Vegetation (Step A)

All non-forest lands were identified in the timber suitability criteria field as “non-conifer” and therefore unsuitable for timber production or timber harvest. Non-forest lands include land covered by water, areas with a potential tree cover never exceeding 10%, and land areas developed for other purposes. Areas with more than 10% tree cover may be identified as non-forest if the forest has concluded that the land area should not contain more than 10% tree cover (e.g. juniper lands that should be grasslands). Conversely areas with less than 10% tree cover should not be classified as non-forest if they are capable of exceeding 10% tree cover and management as forestland (e.g. non-stocked regeneration areas). Identification of forested (capable of attaining greater than 10 percent tree canopy closure) and non-forested stands was made by using the potential vegetation group (PVG) field in the vegetation database. The following PVG codes were used to classify vegetation.

PVG code	PVG name	suitability code
Cold RF	cold riparian forest	forest

Cold RH	cold riparian herbland	non-conifer
Cold RS	cold riparian shrubland	non-conifer
Cold UF	cold upland forest	forest
Cold UH	cold upland herbland	non-conifer
Cold US	cold upland shrubland	non-conifer
Dry UF	dry upland forest	forest
Dry UH	dry upland herbland	non-conifer
Dry US	dry upland shrubland	non-conifer
Dry UW	dry upland woodland	forest
Low SM RF	low soil moisture riparian forest	forest
Low SM RH	low soil moisture riparian herbland	non-conifer
Low SM RS	low soil moisture riparian shrubland	non-conifer
Moderate SM RF	moderate soil moisture riparian forest	forest
Moderate SM RH	moderate soil moisture riparian herbland	non-conifer
Moist UF	moist upland forest	forest
Moist UH	moist upland herbland	non-conifer
Moist US	moist upland shrubland	non-conifer
Moist UW	moist upland woodland	forest
Warm RF	warm riparian forest	forest
Warm RH	warm riparian herbland	non-conifer
Warm RS	warm riparian shrubland	non-conifer
Ag land/admin	Agricultural or developed land	non-conifer
water	water	non-conifer
Non vegetation	Rock, ice, etc..	non-conifer

Forest Regeneration Difficulty, veg characteristics (step A)

Regeneration difficulty is defined as sites that do not have adequate assurance of re-stocking within five years after final harvest; which means 5 years after clearcutting, 5 years after final overstory removal in shelterwood cutting, 5 years after the seed tree removal cut in seed tree cutting, or 5 years after selection cutting (CFR 219.27c3). Adequate restocking means that the cut area will contain the minimum number, size, distribution, and species composition of regeneration as specified in regional silvicultural guides for each forest type (CFR 219.37c3). Reasonable assurance is provided when:

- One or more reforestation projects are known to exist within the subject ecosystem or land strata that have succeeded in meeting the regional standards for restocking, and either:
 - The practices used in achieving the regeneration success are known and are accepted by experts in the field of reforestation as being generally applicable to the ecosystem or land stratum; or
 - Research results exist which are applicable to the subject ecosystem or land stratum and which provide the means to prescribe treatments that will lead to successful reforestation.

When a successful regeneration project cannot be found, or applicable research does not exist to demonstrate that a prescription can be written to accomplish reforestation, reasonable assurance of regeneration has not been provided and the ecotype or stratum can be classed as not suited for timber production due to regeneration difficulty.

Potential regeneration difficulty sites were identified by using the PVG, ecoclass (plant association), or forest cover type data. **Polygons coded as ninebark, whitebark, or juniper were identified as unsuitable for timber production.** These sites were also considered as low timber production potential (economics). Ninebark sites north of interstate 84 on the Umatilla National Forest were not considered unsuitable for timber production due to known reforestation projects that had successful regeneration within 5 years of final harvest.

All of the following vegetation types fall into this category (regeneration/production problem):

Ninebark sites	
ECOCLASS	VEGETATION TYPE COMMON NAME
SM1111	Ninebark-Common snowberry
CDS722	Douglas-fir/Rocky Mountain maple-mallow ninebark
CDS724	Douglas-fir/Rocky Mountain maple-mallow ninebark (floodplain)
CDS711	Douglas-fir/Ninebark
CWS412	Grand fir/Rocky Mountain maple-ninebark
SM19	ninebark-common snowberry
SM1901	Pacific ninebark
HAS211	Red alder/Pacific ninebark

Whitebark pine sites	
ECOCLASS	VEGETATION TYPE COMMON NAME
CAF322	Whitebark pine/Prickly sandwort
CAG131	Whitebark pine/Elk sedge
CAG221	Whitebark pine/Green fescue
CAS422	Whitebark pine/Mountain juniper/Pinemat manzanita
CAF323	Whitebark pine/Silvery lupine
CAS512	Whitebark pine/Mountain gooseberry/Skunk-leaved polemonium
CAS313	Whitebark pine/Grouse huckleberry/Prickly sandwort
CAS312	Whitebark pine/Grouse huckleberry/Heartleaf arnica
CAS311	Whitebark pine/Grouse huckleberry/Smooth woodrush
CAF324	Subalpine fir-whitebark pine/Prickly sandwort
CAG133	Subalpine fir-whitebark pine/Elk sedge
CAG222	Subalpine fir-whitebark pine/Green fescue
CAS424	Subalpine fir-whitebark pine/Mountain juniper
CAS423	Subalpine fir-whitebark pine/Mountain juniper-Pinemat manzanita
CAG3	Subalpine fir-whitebark pine/Drummond's rush
CAG132	Subalpine fir-whitebark pine/Parry's rush-Lemmon's needlegrass
CAF2	Subalpine fir-whitebark pine/Fleeceflower
CAF0	Subalpine fir-whitebark pine/Skunk-leaved polemonium
CAS611	Subalpine fir-whitebark pine/Mountain gooseberry/Skunk-leaved polemonium
CAS623	Subalpine fir-whitebark pine/Grouse huckleberry/Prickly sandwort
CAS621	Subalpine fir-whitebark pine/Grouse huckleberry/Hearleaf arnica
CAS622	Subalpine fir-whitebark pine/Grouse huckleberry/Ross' sedge
CAS625	Subalpine fir-whitebark pine/Grouse huckleberry/Green fescue
CAS629	Subalpine fir-whitebark pine/Grouse huckleberry/Green fescue (avalanche)
CAS627	Subalpine fir-whitebark pine/Grouse huckleberry/Wallowa lewisia

Whitebark pine sites	
ECOCLASS	VEGETATION TYPE COMMON NAME
CAS626	Subalpine fir-whitebark pine/Grouse huckleberry/Little ricegrass
CAS624	Subalpine fir-whitebark pine/Grouse huckleberry-Pink mountain heather
CAS628	Subalpine fir-whitebark pine/Grouse huckleberry/Pink mountain heather (avalanche)

Juniper sites		
PVG code	PVG name	suitability code
Dry UW	dry upland woodland	juniper
Moist UW	moist upland woodland	juniper

vegetation cover type	
cover type	veg criteria code
JUOC	juniper
JUOC mixed	juniper
LAOC	juniper
LAOC mixed	juniper
PIAL	whitebark
PIAL mixed	whitebark
PICO	whitebark
PICO mixed	whitebark

Vegetation Suitability Criteria

The following vegetation suitability criteria were included:

- Forested versus non-forested potential vegetation types (coded as non-forest or non-conifer)
- Areas that potentially could not be successfully regenerated within 5 years of final harvest (code= ninebark)
- Sites with low potential for economic return or regeneration problems (code = juniper or whitebark pine)

The hierarchy for coding the vegetation suitability criteria was first to code for non-conifer stands, followed by regeneration difficulty/production stands (whitebark, ninebark, juniper).

All vegetation criteria were identified by searching the existing/potential vegetation database that linked to the vegetation and timber suitability polygon maps through the stand_tag field. The vegetation Access databases are located in Z.../revision/veg. All vegetation polygon databases are current as of 2004/05 and were constructed from a combination of ground based stand exams, walk through exams, photo interpreted data, and Most Similar Neighbor (MSN) modeling.

Old Forest Vegetation (step c of process for “no action” alternative)

All stands meeting the Region 6 Green Book (USDA, 1992) definition for old growth were coded in the vegetation criteria field as old forest. All stands identified as old forest were given a timber suitability code of “unsuited for timber production” (for the proposed action) but available for harvest if they were located outside of wilderness. The following parameters were used to classify

the existing vegetation information into the old forest structural stage. Individual polygon classification for structure are stored in the vegetation database, structure_stage_final data field.

Old Forest**							
<u>Structure</u>	<u>Cover type</u>	<u>Overstory Canopy closure</u>	<u>Overstory Trees per ac *</u>	<u>Over-story Size class</u>	<u>Over-Story DBH</u>	<u>Understory canopy</u>	<u># layers</u>
<u>OFMS</u>	<u>LPP</u>	<u>>=20</u>	<u>60</u>	<u>>=77</u>	<u>12</u>	<u>>=10</u>	<u>>=2</u>
<u>OFSS</u>	<u>LPP</u>	<u>>=20</u>	<u>60</u>	<u>>=77</u>	<u>12</u>	<u><=10</u>	<u>1</u>
<u>OFMS</u>	<u>AF, WBP</u>	<u>>=10</u>	<u>10</u>	<u>>=77</u>	<u>13</u>	<u>>=10</u>	<u>>=2</u>
<u>OFSS</u>	<u>AF, WBP</u>	<u>>=10</u>	<u>10</u>	<u>>=77</u>	<u>13</u>	<u><=10</u>	<u>1</u>
<u>OFMS</u>	<u>ALL OTHERS*</u>	<u>>=10</u>	<u>>=10</u>	<u>>=9</u>	<u>>=21</u>	<u>>=10</u>	<u>>=2</u>
<u>OVSS</u>	<u>ALL OTHERS*</u>	<u>>=10</u>	<u>>=10</u>	<u>>=9</u>	<u>>=21</u>	<u><=10</u>	<u>1</u>

LPP = lodgepole pine, AF = alpine fir, WBP= whitebark pine
 OFMS= old forest multi story
 OFSS= old forest single story

*For cool very moist, warm very moist, or warm moist PAGs use dbh>=21 and TPA>=20, or size class >=9 and canopy closure >=20. See detailed listing of FVS structural stage keyword parameters by plant association for large tree and TPA requirements.

** Old forest parameters derived from the 1992 Region 6 Green Book Old Growth Definitions.

Roadless Criteria (step C)

All areas that were identified either through the revision team evaluation of roadless areas process or through the 2001 Clinton roadless ruling maps, were flagged as “roadless” in the roadless criteria field. This means that at a minimum they would be identified as unsuitable for timber production but available for harvest (in the proposed action).

Areas that were called suitable by looking at the current forest plan (no action alternative) management area code, but were within the RACR area, were identified as conditionally unsuitable; pending outcome of lawsuits at the national level. These conditional areas could end as suitable or unsuitable.

The following table was used for the no action alternative to identify undeveloped/backcountry management area codes that were identified as unsuited for timber production in the current plans.

	MAL management area	UMA management area	WAW Management area
Backcountry/undeveloped	10, 11, F10 (ochoco)	A1, A10, A5, A2	6

Riparian Management Area Criteria (step C)

All riparian management areas were coded as “unsuited” in the RMA criteria field. All riparian management areas were identified as unsuitable for timber production (in the proposed action use ARCS widths and in no-action use PACFISH/INFISH buffers) but potentially available for timber harvest as long as they were outside of wilderness areas. The following criteria were used to map riparian management areas in GIS.

Riparian management areas (ARCS)				
code	Stream order/class	Perennial/ non-perennial	Fish presence	Management area width on each side of stream (ft)
1	1	Perennial	Yes	300 ft
2	2	Perennial	Yes	150 ft
3	3	Perennial	No	150 ft
4	4	Intermittent	No	100 ft

Riparian management areas (PACFISH/INFISH)				
code	Stream order/class	Perennial/ non-perennial	Fish presence	Management area width on each side of stream (ft)
1	1	Perennial	Yes	
2	2	Perennial	Yes	
3	3	Perennial	No	
4	4	Intermittent	No	

Coding polygons for timber suitability

The following criteria were used to classify each polygon into one of 3 designations; not suitable for timber harvest or production (code 1), suitable for timber harvest but not timber production (code 2), or suitable for timber production (code 3).

- land management allocation (MAS) criteria
- vegetation suitability criteria
- riparian management area (RMA) criteria
- roadless criteria
- soil suitability criteria

Hierarchy for timber suitability classification. (Proposed action alternative analysis)

1. Start with the Part A suitability calls.
2. Pull in the overlay of vegetation and the proposed action management areas
3. All polygons coded as management area (MAS) category 1 (wilderness) were given a timber suitability code of 1 (unsuitable for production or harvest).
4. All veg criteria non-conifer stands were coded as timber suitability 1 (unsuitable production or harvest).
5. All areas coded as 2_3_5 in the proposed action (PA) MAS criteria field were coded as unsuitable for timber production but available for harvest (code 2).
6. All PA MAS criteria 4 (general forest) areas that were null in the timber suitability Part “A” field but had a code of old forest in the vegetation criteria field were coded as unsuitable for timber production but available for harvest (code 2).
7. All PA MAS criteria 4 (general forest) areas that were null in the timber suitability Part “A” field but had a code of YES in the riparian management area criteria field were coded as unsuitable for timber production but available for harvest (code 2).

8. All PA MAS criteria 4 (general forest) areas that were null in the timber suitability Part "A" field but had a code of YES in the roadless criteria field were coded as unsuitable for timber production but available for harvest (code 2).
9. All remaining national forest polygons were coded as suitable for timber production (code 3).

Proposed action management area cross-walk

Management area	Description	Suitable for timber production
1	Wilderness	No
2	Special Designated Areas	No
3	Undeveloped areas	No
4	General forest	Yes
5	Admin areas	No

The same process was followed for the No-action, current plans using the following tables.

Management Area Criteria for the No Action (current plans)

From: tables/management areas/blues ma (suitability for timber production from current FP
(No = unsuitable for timber production, yes = suitable for timber production)

Malheur MAS current FP code	Malheur current forest plan management area definition	Current FP MA suitability
11	Semi-Primitive Motorized Recreation Areas	no
13	Old Growth (Dedicated and Replacements)	no
14F	Visual Corridors (Foreground) 1999	yes
14M	Visual Corridors (Middleground) 1999	yes
17	Byram Gulch Municipal Supply Watershed	no
18	Long Creek Municipal Supply Watershed	no
1_2	General Forest, Rangeland	yes
20	Wildlife Emphasis Area (Scheduled Timber Harvest)	yes
21	Wildlife Emphasis Area (Non-Scheduled Timber Harvest)	no
22	Wild and Scenic River Corridor	no
3	Riparian Areas (Anadromous, Non-Anadromous)	no
4A	Big-Game Winter Range Maintenance	no
5	Bald Eagle Winter Roosts	no
6	Wilderness Areas	unavailable

Malheur MAS current FP code	Malheur current forest plan management area definition	Current FP MA suitability
7	Scenic Area	no
8	Special Interest Areas	no
9	Research Natural Areas (only 1 real, others Proposed)	no
RHCA	Riparian Habitat Conservation Area	no
2	rangeland	yes
10	semi-primitive non-motorized	no
12	Developed Recreation Sites	no
16	Minimum Level Management (Non-Forest and Low Productiv	no
19	Administrative Sites	no

OCHOCO MAS current MA	ochoco definitions	Current forest plan timber suitability
F10	SILVER CREEK ROADLESS AREA	no
F12	EAGLE ROOSTING AREA	yes
F13	DEVELOPED RECREATION	no
F15	RHCA	no
F20	WINTER RANGE	yes
F21	GENERAL FOREST WINTER RANGE	yes
F22	GENERAL FOREST	yes
F26	VISUAL MANAGEMENT CORRIDOR	yes
F28	FACILITIES	no
F29	SILVER CREEK RECREATION RIVER CORRIDOR	yes
F29	SILVER CREEK REC RIVER CORRIDOR	yes
F5	RNA	no
F6	OLD GROWTH	no
F9	ROCK CREEK UNROADED HELICOPTER	yes

UMA current forest plan MA code	Umatilla definitions	Current forest plan timber suitability
A1	DISPERSED NON-MOTORIZED REC	no
A10	WENAHA-TUCANNON SPECIAL AREA	no
A3	VIEWSHED 1	yes
A4	VIEWSHED 2	yes
A5	ROADED NATURAL	no
A6	DEVELOPED RECREATION	no
A7	WILD AND SCENIC RIVERS	no
A8	SCENIC AREAS	no
A9	SPECIAL INTEREST AREAS	no
B1	WILDERNESS	not_available
B2	RNA IN WILDERNESS	not_available
B7	WILD AND SCENIC IN WILDERNESS	not_available
C1	DEDICATED OLD GROWTH	no
C2	MANAGED OLD GROWTH	yes
C3	BIG GAME WINTER RANGE	yes
C4	WILDLIFE HABITAT	yes
C5	RIPARIAN/WILDLIFE HABITAT	yes
C7	SPECIAL FISH MANAGEMENT AREA	no
C8	GRASS/TREE MOSAIC	no
C9	SENSITIVE BIG GAME WINTER RANGE	no
D2	RESEARCH NATURAL AREA	no
E1	TIMBER/FORAGE	yes
E2	TIMBER/BIG GAME	yes
F2	MILL CREEK MUNICIPAL WATERSHED	no
F3	HIGH RIDGE EVALUATION AREA	yes
F4	WALL A WALLA RIVER WATERSHED	yes
F6	WALL A WALLA RIVER WATERSHED, SCHEDULED HARVEST	yes
A2	DISPERSED REC (OHV)	no
F5	SPECIAL WATERSHED ENHANCEMENT	yes

Current forest plan MGT_CODE	Current FP Wallowa-Whitman_definitions	Current forest plan timber suitability
1	TIMBER PRODUCTION	yes
10	FORAGE PRODUCTION (HCNRA)	no
11	DISPERSED REC/TIMBER PRODUCTION (HCNRA)	no
12	RESEARCH NATURAL AREA	no
12-7	RNA IN WILD AND SCENIC RIVER AREA	no
12-8	RNA IN SNAKE RIVER CORRIDOR (HCNRA)	no
13	HOMESTEAD FURTHER STUDY AREA	no
14	STARKEY EXPERIMENTAL FOREST AND RANGE	no
15	OLD GROWTH	no
15-7	OLD GROWTH IN WILD AND SCENIC	no
16	ADMIN SITE	no
17		yes
18	ANADROMOUS FISH EMPHASIS	yes
1W	TIMBER/BIG GAME WINTER	yes
3	WILDLIFE/TIMBER WINTER RANGE	yes
3A	WILDLIFE/TIMBER SUMMER RANGE	yes
4	WILDERNESS	not_available
4-12	RNA IN WILDERNESS	not_available
4-7	WILD AND SCENIC IN WILDERNESS	not_available
5	PHILLIPS LAKE AREA	yes
6	BACKCOUNTRY	no
7	WILD AND SCENIC RIVERS	no
8	SNAKE RIVER CORRIDOR (HCNRA)	no
9	DISPERSED REC/NATIVE VEG (HCNRA)	no

Classification of vegetation data for the Emigrant district on the Malheur.

The emi_hrvpoly and the malref1990 layers were used to respond to concerns from the Emigrant ranger district that the forest wide current vegetation layer did not accurately reflect areas within the 1990 Burns area wildfires. Many of those areas were currently showing as “non-forested” vegetation types; the districts believed that many of those areas should show as forested potential

vegetation types because they were forested before the burn and in some cases had been planted to conifers after the 1990 wildfires.

After the steps above were completed, additional fields were utilized to adjust the timber suitability calls based on pre-burn vegetation maps and post-burn reforestation data. The following adjustments were made.

- All non-conifer criteria areas with an Emigrant historic vegetation polygon code of 2 through 5 (forested non-juniper, field VE_SS) that didn't have a criteria value for vegetation, roadless, rma, or soils; were re-coded as suitable for timber production.
- All non-conifer criteria areas with an Emigrant historic vegetation polygon code of 2 through 5 (forested non-juniper, field VE_SS) that **had** a value for vegetation, roadless, rma, or soils criteria; were re-coded as unsuitable for timber production but available for harvest.
- All non-conifer criteria areas with an Emigrant historic vegetation polygon code of 6 or 7 (juniper, field VE_SS), were re-coded as unsuitable for timber production but available for harvest.
- All non-conifer criteria areas with an Emigrant reforestation code showing that the site had been planted since 1990 (malref1990 field, value not null), that **didn't** have criteria values for vegetation, roadless, rma, or soils- and weren't already re-coded; were re-coded as suitable for timber production.
- All non-conifer criteria areas with an Emigrant reforestation code showing that the site had been planted since 1990 (malref1990 field, value not null), that **did** have a criteria value for vegetation, roadless, rma, or soils- and weren't already re-coded, were re-coded as unsuitable for timber production but available for harvest.