Appendix A

Timber Resource Land Suitability

Introduction

This appendix describes the process used to identify the lands of the Tongass National Forest which are suitable for timber production. This is accomplished in two steps: 1) the identification of lands which are legally and practicably capable of timber production, called *tentatively suitable* lands, and 2) from the tentatively suitable lands, the selection of lands which are *suitable* for timber production based on all the multiple-use objectives for the Forest.

Tentatively Suitable Lands

On October 23, 1987 a task force was established to determine the criteria for the tentatively suitable forest land in conjunction with the Revision of the Tongass National Forest Land Management Plan. The task force was comprised of a technical working group and consultant/reviewers. Working group members were:

Bill Wilson	IDT Timber Planner - Chairman
Bob Gerdes	Stikine Area Forester
Dave Loggy	Ketchikan Area Soils Scientist
Jim Russell	Chatham Area Silviculturist
Jim Douglas	SAF Representative

Consultant/reviewers were:

Paul Alaback	Forest Science Lab
Don Finney	Alaska Loggers Association
Bart Koehler	SEACC

The role of the task force was limited to identifying the biologic criteria and availability of forest lands to be considered as suitable for producing industrial wood products as described in the National Forest Management Act (NFMA) Regulations 36 CFR 219.14 (a)(1) through (4). The determination of lands actually suitable for timber production begins in the analysis of the management situation (AMS) and culminates with the Forest Plan. Suitable lands in the Forest Plan constitute the land base for determining the allowable sale quantity (ASQ) and all vegetation management practices associated with timber production. The AMS and each alternative in the Forest Plan are limited to no more than the acres identified as tentatively suitable.

National Forest Management Act Regulations 36 CFR 219.14 - Timber Resource Land Suitability were used. The task force was responsible for Section (a)(1) through (4).

36 CFR Part 219

NATIONAL FOREST SYSTEMS LAND AND RESOURCE MANAGEMENT PLANNING

36 CFR Part 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.

Tentatively Suitable (Biologically Capable)

(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 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 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.

Suitable by Management Objectives

(c) During formulation and evaluation of alternative as required in 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 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 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.

Review of Not Suited

(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 219.10 (f) and (g).

NFMA Sections cited in Part 219.14 (a)(1) through (4) -

219.3 Definitions and Terminology
Forest Land: Land at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for

non-forest use. Lands developed for non-forest use include areas for crops, improved pasture, residential, or administrative areas, improved roads of any width, and adjoining road clearing and powerline clearing of any width.

219.27 Management Requirements - (c) Silvicultural Practices
(3) When trees are cut to achieve timber production objectives, the cuttings shall be made in such a way as to assure that the technology and knowledge exists to adequately restock the lands within 5 years after final harvest. Research and experience shall be the basis for determining whether the harvest and regeneration practices planned can be expected to result in adequate restocking. 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. Five years after final harvest 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.

Forest Service Planning Handbook FSH 2409.13 contains criteria for identifying tentatively suitable and suitable forest lands in accordance with 36 CFR 219.14. The process for identifying suitable lands using these criteria is summarized in the following chart.

Modifications to Process for Identification of Lands Suitable for Timber Production

Modifications to the timber resource land suitability process.

There have been several changes to the 1987 timber resource land suitability process; these changes are:

1. Process 3: Is Irreversible damage likely to occur?

   Extreme Hazard Soils. On July 5, 1995, the Forest Service published an overview of the characteristics controlling hillside stability in Southeast Alaska. The paper concluded, based on the findings, that Mass Movement Index 3 and 4 (MMI 3 and MMI 4, respectively) should be adjusted for the TLMP Revision. MMI 3 should be from 51 to 72 percent slope and MMI 4 should be slopes greater than 72 percent. Previously, 75 percent slope had been used for the cutoff.

2. Process 4: Can the area be restocked within 5 years?

   McGilvery Soils. In the 1987 process, soils which contained greater than 41 percent McGilvery soil series were removed from the tentatively suitable land base. The Area Supervisors decided (July 25, 1996) that these soils should be included in the tentatively suitable land base and harvest may occur on McGilvery soils on a case-by-case basis. The areas were included in the tentatively suitable land base since previous harvest using partial suspension on these soil series has been certified as regenerated, and are moderately productive.

PROCESS FOR IDENTIFICATION OF LANDS SUITABLE FOR TIMBER PRODUCTION (FSH 2409.13-92-1)

Is land forested? YES	NO	Unsuitable (non-forest)
Is land capable of producing crops of industrial wood? YES	NO	Unsuitable (non -industrial wood)
Is irreversible damage likely to occur? NO	YES	Unsuitable (irreversible damage)
Can area be restocked within 5 years? YES	NO	Unsuitable (restocked)
Is adequate response information available? YES	NO	Unsuitable (no information)
Is land withdrawn from timber production? NO - Then land is tentatively suitable for timber production	YES	Unsuitable (withdrawn)
Is land selected in alternative for timber production? YES - Then land is suitable for timber production	NO	Not appropriate (unsuitable in preferred alternative and Forest Plan).

Process 1.

Is Land Forested?

Forest Land. Land at least 10-percent occupied by forest trees or formerly having had such tree cover and not currently developed for non-forest use. Forest trees are defined as woody plants having a well-developed stem and usually more than 12 feet in height at maturity. Lands developed for non-forest use include areas for crops, improved pasture, residential or administrative areas, improved (constructed) roads of any width and adjoining road clearing, and powerline clearing of any width. The term occupancy, when used to define forest land, shall be measured by canopy cover of live forest trees at maturity. The minimum area for classification of forest land is 5 acre or greater, consistent with Regional mapping standards. Unimproved roads, trails, streams, and clearings in forest areas are classified as forest, if they are less than 120 feet in width.

Tentatively Suitable Criteria

1. Tongass National Forest lands meeting the definition will be classified as forested.

    a. Vegetative Inventory - National Forest lands identified as having a forested Cover Type (CT) in the Forest Plan Geographic Information System (GIS) Data Base includes all existing forest types meeting the 10% crown cover and currently non-stocked forest land formerly having had 10% crown cover.

Code	Description
F	Forested

b. Soils Inventory - National Forest lands with soils inventoried as having forested plant association in the Forest Plan GIS Data Base will be compared to the vegetative inventory to insure all nonwilderness forested lands are identified. Forested lands in the Soil Mapping Unit (SMU) are identified in the Cover Type of the SMU look-up table (SMUT).

Code	Descriptions
F	Forested

c. Lands Inventory - National Forest lands currently developed for non-forest use, including administrative sites and powerline clearings, will be identified in the Forest Plan GIS Data Base and classified as unsuitable. Forested encumbered National Forest lands satisfy the forested criteria until selections are conveyed to the State of Alaska or Native Corporations.

d. Roads Inventory - Existing specified roads and adjoining road clearings on National Forest lands will be identified in the Forest Plan GIS Data Base and classified as unsuitable. The existing road status (STATUS) is:

Code	Description
E	Existing

NOTE: All resource inventory information will not be available for existing Wilderness. As a minimum, the vegetative inventory will be used to identify forested lands within Wilderness.

Process 2. Is Land Capable of Producing Crops of Industrial Wood?

Forest Land Capable of Producing Industrial Wood. Lands that are not capable of producing crops of industrial wood are by definition to be classified as unsuitable for timber production. Species of trees which are not currently utilized or not expected to be utilized within the next 10 years, constitute the primary criterion for assigning lands to this category. This does not preclude, however, the formulation of an alternative to display management opportunities, if a demand develops.

Tentatively Suitable Criteria

1. Tongass National Forest lands meeting the criteria of forested (Process 1), but are not capable of producing industrial wood products, will be classified as unsuitable.

   a) Vegetative Inventory - Mature stands of non-industrial forest types will be identified in the Forest Plan GIS Data Base and classified as unsuitable. Forest Type (FT) codes are:

Codes	*Description*
P	Black Cottonwood
L	Lodgepole Pine
A	Alder

NOTE: A review of the soils GIS inventory indicates that there are no SMU's which have occurrences of Plant Associations with 50% or greater of the noncommercial species listed above on the Tongass National Forest. The vegetation inventory will be used to identify unsuitable lands in both wilderness and nonwilderness.

Physically Suitable Forest Land. Forest lands physically suitable for timber production are lands where technology is available to ensure timber production, without irreversible resource damage to soil productivity or watershed conditions and lands where there is reasonable assurance that they can be adequately restocked within 5 years. The latest developments in technology that are documented in current research and experience are to be considered in these determinations. Economic efficiency is not a factor in the determination of physical suitability.

The next two steps (Process 3 and Process 4) are subparts of the Physically Suitable screen.

Process 3. Is Irreversible Damage Likely to Occur?

Irreversible Damage. The first test of physically suitable forest land is for irreversible damage. This test shall be performed by an interdisciplinary team. It shall determine if activities involved in timber production can be carried out on forest land without irreversible resource damage to soil productivity or watershed conditions. As a minimum, activities considered should include access, harvesting, slash disposal, and regeneration. If these items can be accomplished with available technology and without impairment to the site or drainage, the land shall be considered tentatively suitable. Available technology is that technology that is in use or which current research and experience indicates is feasible to use. Current research and experience should indicate that the technology is feasible to use successfully for the site, species, and other factors involved. Current does not have to be within the Forest or Region.

Tentatively Suitable Criteria

1. Tongass National Forest lands meeting the criteria of forested (Process 1) and capable (Process 2), but cannot be managed for industrial wood products without irreversible resource damage, will be classified as unsuitable.

    a) Soil Inventory - Soils identified as meeting criteria for irreversible resource damage will be identified in the Forest Plan GIS Data Base and classified as unsuitable.

        i) SMU's that are unsuitable will be identified in an interpretation lookup table for very high (code 4) mass movement probability rating.

        ii) Those SMU's in the table having high (code 3) mass movement probability ratings will be identified as needing technology capable of supplying partial or full suspension over nearly the entire length of the yarding distance to ensure timber production without irreversible

resource damage to soil productivity or watershed conditions. These lands satisfy the criteria for tentatively suitable, but will continue to be tracked to insure that alternatives include the appropriate logging system.

iii) SMU's with any occurrence of McGilvery soils will meet the criteria for tentatively suitable in this process, but will be identified as requiring harvest systems capable of at least partial suspension over nearly the entire length of the yarding distance.

Classes of McGilvery Soils
HOCL
MCG
MCGF
MCGC

iv) SMU's with slopes 72 percent or greater will be classified as unsuitable.

NOTE: The soils inventory is not available for all existing Wilderness. As a minimum, the Digital Elevation Model (DEM) will be used to identify forested lands (from the vegetative inventory) with slopes 75% or greater. These lands will be classified as unsuitable.

Process 4. Can Area be Restocked Within 5 years?

Restocking Within 5 years. The second test of physically suitable forest land (after irreversible damage discussed in Process 3) is whether there is reasonable assurance that the remaining forest lands can be adequately restocked within 5 years of final harvest, based on existing technology and knowledge. Current research and experience shall be the basis for determining whether the practice planned can be expected to be successful at the time final harvest is planned. If existing knowledge is inadequate to determine which practices will be successful on certain lands, but research is underway which should resolve this question prior to when final harvest is planned; then, the applicable lands may be included as tentatively suitable, but shall be maintained as a separate, noninterchangeable component of the allowable sale quantity. For the purpose of this test, final harvest is defined in 36 CFR 219.27(c)(3). Such assurance applies to normal conditions for the site and does not constitute a guarantee. Abnormal conditions, such as drought, disease, or other unplanned events, may preclude meeting this requirement. Forest lands failing to meet this test shall be classed as unsuitable for timber production.

Tentatively Suitable Criteria

1. Tongass National Forest lands meeting the criteria of forested (Process 1), capable (Process 2), and not causing irreversible resource damage (Process 3), but restocking cannot be assured within 5 years, will be classified as unsuitable.

   a) Soils Inventory - Soils Mapping Units not restockable will be identified in the Forest Plan GIS Data Base and are classified as unsuitable. These include:

      i) SMU's in the data base identified with the dominant plant associations as listed below can be restocked but require special

technology to meet restocking within 5 years. These plant associations will satisfy the restocking criteria for tentatively suitable, but will be tracked to insure that alternatives include the cost of these special restocking requirements (planting and site preparation).

Code	*Description*
330	Spruce - Devils Club
335	Spruce - Devils Club/Salmon Berry
340	Spruce - Devils Club/Skunk Cabbage
350	Spruce - Alder
380	Spruce - Salmon Berry
800	Spruce - Black Cottonwood/Alder
810	Spruce - Black Cottonwood/Willow
830	Spruce - Cottonwood/Devils Club
840	Spruce - Cottonwood/Alder - Devils Club
850	Spruce - Cottonwood/Blueberry - Devils Club

NOTE: The soils inventory is not available for all existing Wilderness. The vegetation layer will be used to establish a correlation between soils and vegetation outside of wilderness to be applied within wilderness.

Process 5. Is Adequate Response Information Available?

Inadequate Response Information. Forest land shall be classified as unsuitable for timber production, if there is not adequate information available, based on current research and experience, to project response to timber management practices. These lands shall be identified as needing further inventory, research, or information and shall not be considered as part of the tentatively suitable land base, until such time that adequate response data are available. Give special attention to lands classified as incapable of producing 20 cubic feet/acre/year if they formerly met this criterion and were included in the timber base. In those situations where significant acreages are involved, the lands shall be considered tentatively suitable for timber production. The yield projections for these lands shall be limited to regeneration harvest practices, where response data to intensive management practices is inadequate, during the development of management prescriptions.

Tentatively Suitable Criteria

1. Tongass National Forest lands meeting the criteria of forested (Process 1), capable (Process 2), not causing irreversible resource damage (Process 3), and restocking assured within 5 years (Process 4), but have inadequate response information, will be classified as unsuitable.

    a) Vegetative Inventory - Low site forested lands that have never been managed for industrial wood products have no response information and will be identified in the Forest Plan GIS Data Base and classified as unsuitable. These include forested lands with Forest Productivity (FPROD) identified as:

Code	Description
A	Low Productivity due to Alder
G	Low Productivity due to Glacier Forest
H	Low Productivity due to High Elevation
M	Low Productivity due to Muskeg
R	Low Productivity due to Rock cover
S	Low Productivity due to Recurrent Slide Zone
T	Low Productivity due to Willow
L	Low Productivity due to Low Site Index

b) Soils Inventory - Soils with inadequate response information will be identified in the Forest Plan GIS Data Base and classified as unsuitable. These include:

(1) All Soil Mapping Units having site index of less than 40 (on a 50 year base).

(2) Soil Mapping Units which have never been logged and have no response information available.

Code	Description
305	Spruce - Myrica Gale/Sedge
315	Spruce - Willow
325	Spruce - Blueberry/Willow

NOTE: The soils inventory will not be available for all existing Wilderness. As a minimum, the vegetative inventory will be used to identify land with inadequate response information.

Process 6. Is Land Withdrawn from Timber Production?

Forest Land Withdrawn From Timber Production. Lands designated by the Congress, the Secretary, or the Chief for purposes that preclude timber production are to be classified as unsuitable. The act, order, or decision must include a legal description of the designated land, or a reference to a map, pending boundary survey and description, and include an effective date. Congressionally designated wilderness study areas and roadless areas endorsed by the Administration for wilderness classification are also withdrawn from timber production. Examples are units of the National Wilderness Preservation System, Primitive Areas, Research Natural Areas, and areas withdrawn by the Tongass Timber Reform Act. No other RARE II lands shall be considered withdrawn unless an individual State wilderness act so designates. Lands not withdrawn shall be further considered for timber production suitability.

Management objectives for Experimental Forests shall be obtained from the Station Director. Where objectives preclude timber production, the areas shall be considered withdrawn.

Tentatively Suitable Criteria

1. Tongass National Forest lands meeting the criteria of forested (Process 1), capable (Process 2), not causing irreversible resource damage (Process 3), restocking assured within 5 years (Process 4), and having adequate response

information (Process 5), but are withdrawn from timber management, will be classified as unsuitable.

a) Administrative Inventory - National Forest Wilderness and Monument Areas identified in the Forest Plan GIS Data Base. Forested land within these areas will be classified as unsuitable.

b) Boundaries Inventory - Existing Research Natural Areas, Enacted Municipal Watersheds, and Experimental Forests identified in the Forest Plan GIS Data Base are classified as withdrawn. These include:

Research Natural Areas	***Municipal Watersheds***
Cape Fanshaw	Ketchikan
Dog Island	Petersburg
Limestone Inlet	Sitka
Old Tom Creek	
Pack Creek	***Experimental Forests***
Red River	Young Bay
Gambier Bay	Maybeso

c) Tongass Timber Reform Act:

- Lands within 100 feet of either side of all Class I streams, and Class II streams that flow directly into Class I streams
- Lands given a Congressional designation of "Land Use Designation II"
- Additional Wilderness

Summary of Tentatively Suitable

Tentatively Suitable Forest Lands. Tentatively suitable lands, identified in accordance with this process, is fixed input to the Forest planning model in the establishment and evaluation of benchmarks and alternatives, unless trade-offs, such as wilderness areas, are to be analyzed. Acres of tentatively suitable lands are shown in Table A-1.

Suitable Lands

This section describes the process used to identify the suitable lands, or more precisely, the portion of tentatively suitable lands that are not appropriate for timber production. The criteria used for this process are contained in 36 CFR 219.14 (c) and (d).

Lands identified as appropriate for timber production are classified as *suitable* lands. The lands identified as not suitable for timber production are classified as *unsuitable*. The number of acres assigned to each of these categories is displayed in Table A-1 for each of the alternatives.

Suitable lands are those lands identified from the tentatively suitable land base as appropriate for timber production. Tentatively suitable lands not appropriate for timber production were identified (36 CFR 219.14(c)) using the following criteria:

(1) *Multiple-use Objectives.* These lands are identified as not appropriate for timber production because of other multiple-use values, or the land is proposed for resource uses that preclude timber production. Land Use Designations that preclude timber production include Old-growth Habitat, Remote Recreation, Semi-remote Recreation, proposed Research Natural Areas, Special Interest Area, proposed Wild Rivers, and others. Beach fringe and estuarine areas

may also be unavailable for timber production depending on the alternative.

(2) *Management Requirements.* These lands are identified as not appropriate for timber production activities because it is anticipated that the management requirements of 36 CFR 219.27 cannot be met. 36 CFR 219.27 includes direction for resource protection, vegetative manipulation, silvicultural practices, even-aged management, riparian areas, soil and water, and diversity. Most lands that would have met these criteria, such as: 1) the 100 feet on either side of class I streams and 100 feet on either side of those class II streams that flow directly into class I streams (as a result of the Tongass Timber Reform Act), and 2) lands with extreme mass movement hazard soils, were removed from timber harvest consideration in the analysis of tentatively suitable timber lands (36 CFR 219.14(a)).

The classification of unsuitable lands will be reviewed at least every 10 years (36 CFR 219.14(d)). This review is part of a monitoring item contained in Chapter 6 of this Forest Plan. Land suitability may be adjusted at any time due to changed conditions; monitoring will assess the magnitude of any changes and could lead to amendments to the Plan.

Table A-1 displays the results of the tentatively suitable process (36 CFR 219.14(a)) and lists those lands identified as not appropriate for timber production in accordance with 36 CFR 219.14(c) and (d).

Table A-1
Timber Resource Land Suitability (Thousands of Acres)

Classification	Stikine	Chatham	Ketchikan	Tongass
Total National Forest land (item 1 & 2)	**3,579**	**8,140**	**5,164**	**16,883**
1. Non-forest land (includes water)	1,227	4,499	1,223	6,949
2. Forest land	2,352	3,641	3,940	9,933
3. Forest land withdrawn from timber production	475	1,841	1,862	4,179
4. Available Forest land (item 2 minus item 3)	**1,876**	**1,800**	**2,078**	**5,755**
5. Forest land not capable of producing crops of industrial wood	829	725	847	2,400
6. Available Timberlands (PFL) (item 4 minus item 5)	**1,047**	**1,075**	**1,231**	**3,354**
7. Timberlands physically unsuitable	205	163	157	524
8. Timberlands - inadequate information	158	138	133	429
9. Tentatively suitable timberlands (item 6 minus items 7 and 8)	**684**	**774**	**942**	**2,400**
10. Tentatively Suitable lands not appropriate for timber production				
a. Research Natural Areas	1	0	0	2
b. Remote Recreation	28	32	16	76
c. Old Growth	105	167	171	443
d. Municipal Watersheds	1	2	0	4
e. Semi-Remote Recreation	100	187	172	459
f. Scenic Viewsheds (Beach Fringe, Riparian)	27	22	6	55
g. Modified Landscapes (Beach Fringe, Riparian)	14	12	39	65
h. Timber Production (Beach Fringe, Riparian)	30	32	67	129
I. Wild, Scenic or Recreational Rivers	16	3	22	40
j. Special Areas	3	10	22	35
k. Other Beach Fringe	6	7	3	17
Total for Item 10	***331***	***474***	***518***	***1,324***
11. Model Implementation Reduction Acres[1]	91	148	106	345
12. Net Remaining (Item 9 minus items 10 and 11)	**262**	**152**	**318**	**732**
13. Scheduled (Suitable)	**247**	**140**	**289**	**676**

[1] See Appendix B of the FEIS for a description of Model Implementation Reduction Factors (MIRF).
Totals may be off due to rounding errors.