KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX FIFTEEN

CORRIDOR CRITERIA

May 1982

Criteria for Identifying Corridor Exclusion Areas, Avoidance Areas and Windows in Montana

The Utility-Transportation Corridor Study for Montana (November 1981) recommends a combined exclusion area, avoidance areas and window concept for identifying and selecting corridors in Montana. The first step in this approach is to develop and agree on criteria for identifying these areas. The following paragraphs define each area and then list identification criteria. The criteria are designed for application to all lands; however, the USDI-Bureau of Land Management, USDA-Forest Service and State agencies will only apply the criteria on lands within their jurisdiction. Local governments and other federal agencies have the option to consider these standards in their planning.

A. Exclusion Areas - Land areas determined to be unavailable for corridor allocation or facility siting.

- Include only those areas with a legal Congressional mandate that excludes linear facilities, example - National Wilderness lands.

Jurisdiction - USFS, US-BLM

B. Avoidance Areas - Land areas that pose particular land use or environmental impacts which would be difficult or impossible to mitigate. (May vary by type of facility.)

1. Areas where establishment and use of corridors conflict with land use/land management objectives.

Examples:

- Specially managed areas; such as areas designated for developed and primitive recreation, research natural areas, environmental education areas.
- Environmentally sensitive areas (certain wildlife habitat areas, faults, wetlands, slump areas, etc.)
- Archeological and historical sites
- Areas with specific visual objectives which conflict with facility placement.
- Active coal mining units

(over)

Jurisdiction: USFS, US-BLM, State

2. Areas with special or unique values that have been accorded specific and sometimes protected management status through "legislative" action. These values conflict with facility placement.

Examples:

- National Recreation Areas (NRA)
- Wild, scenic, and recreational rivers
- Nationally classified trails
- State recreation areas

Jurisdiction: USFS, US-BLM, State

3. Areas which have been identified by local government bodies (within their areas of jurisdiction) as not suitable for the placement of linear facilities.

Examples:

- Urban residential areas
- City parks

Jurisdiction: Cities, Counties

C. Windows - Usually short, narrow passageways through constrained areas which are the most feasible potential locations for linear facilities, considering engineering and/or environmental factors.

Examples:

- Areas recognized as critical corridor segments because of physiographic or technical suitability.

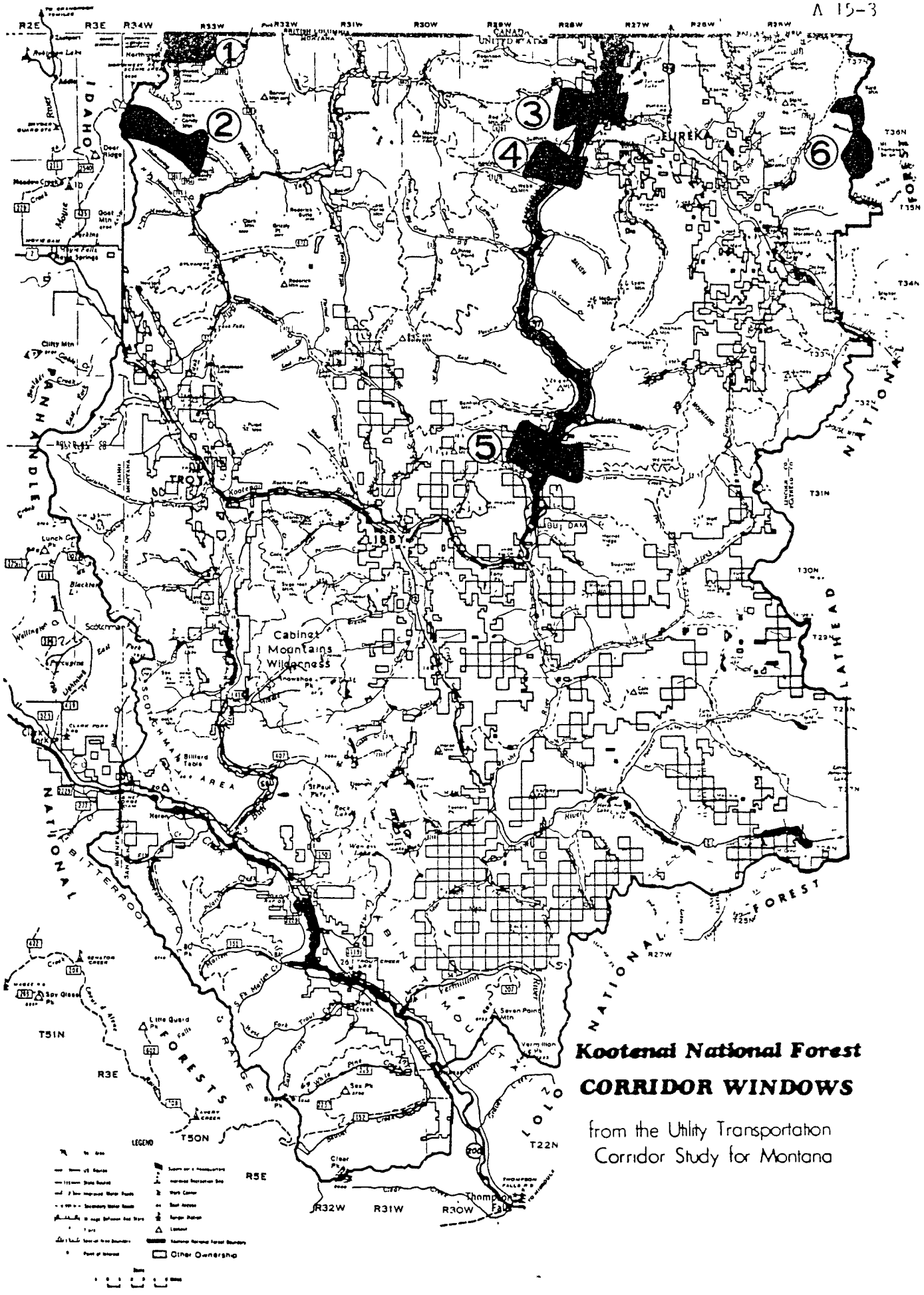
Jurisdiction: USFS, US-BLM, State, Counties

- Restricted passages identified as a result of allocation for exclusion or avoidance areas.

Jurisdiction: USFS, US-BLM, State

- Existing critical corridor segments through sensitive areas, such as urban, residential areas or areas of intensive land use.

Jurisdiction: Mainly Counties, Cities and State



Kootenai National Forest

CORRIDOR WINDOWS

from the Utility Transportation Corridor Study for Montana

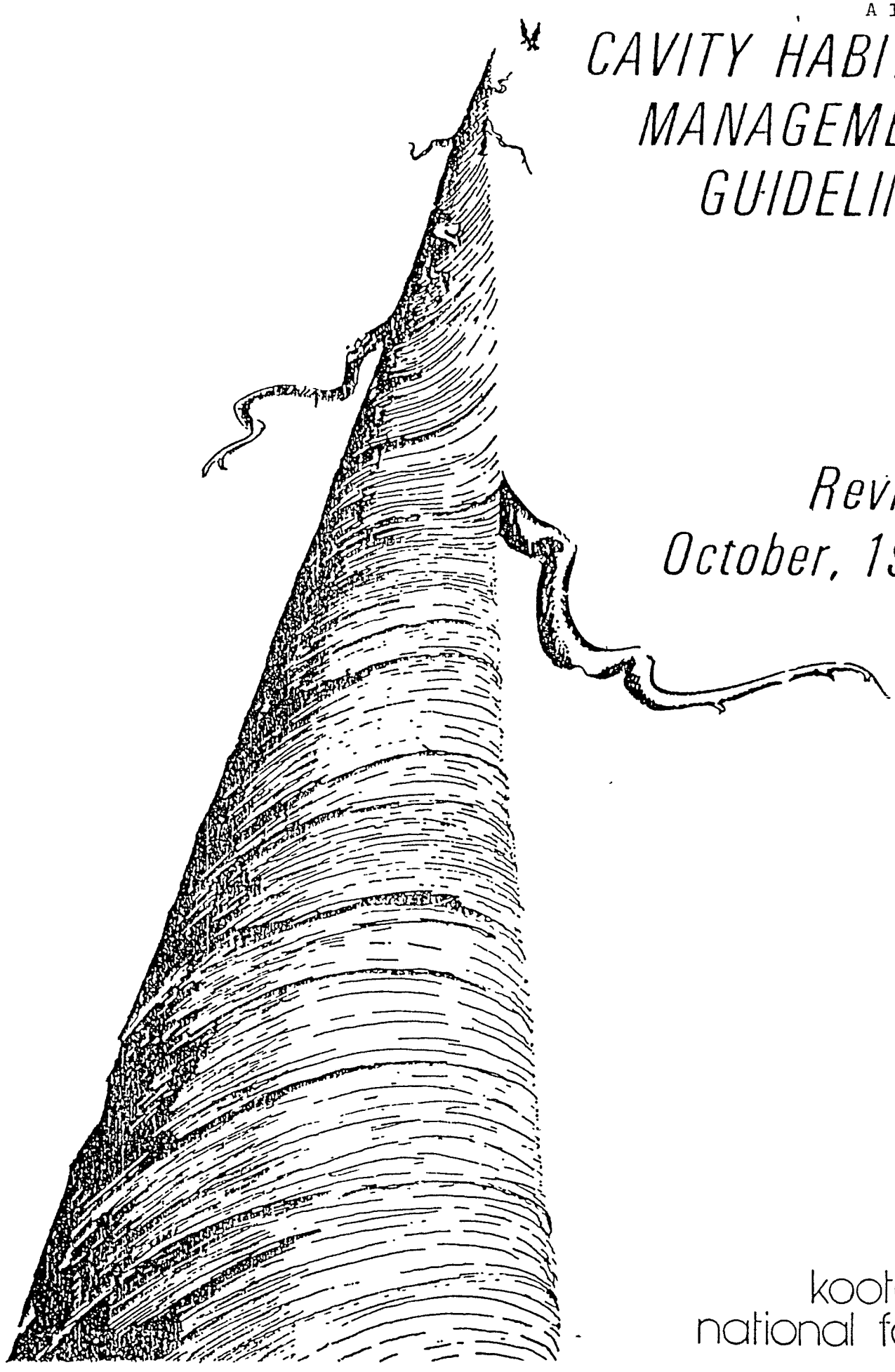
KOOTENAI NATIONAL FOREST

FOREST PLAN

APPENDIX SIXTEEN

CAVITY HABITAT MANAGEMENT GUIDELINES

CAVITY HABITAT MANAGEMENT GUIDELINES



Revised
October, 1984

kootenai
national forest

CAVITY HABITAT MANAGEMENT GUIDELINES

U.S. FOREST SERVICE
KOOTENAI NATIONAL FOREST
LIBBY, MONTANA 59923

Early in FY 84, the need for an activity review of cavity habitat management on the Kootenai was discussed and approved by the management team. Input on concerns and changes needed in existing policy or direction was solicited from each district and staff officer. An activity review group was formed to review input and develop new policy/direction. This group included: Chuck Brooks, Resources Staff Officer; Don Godtel, Wildlife Biologist; Tom Hope, District Ranger; Reed Kuennen, Wildlife Trainee; Steve Petro, Forester-- Sale Administration/Logging Systems Specialist; and Ron Pierce, Fire Management Officer. The following guidelines have been reviewed and accepted by the management team.

I would like to thank all the individuals who contributed to this effort and hope that these guilelines will result in better coordination and on-the-ground management of this important resource.

Approved by: James F. Rathbun Date: 10/9/84
JAMES F. RATHBUN
Forest Supervisor

Policy

The Forest Service has the responsibility to manage the timber resource in harmony with snag-dependent wildlife habitat on public lands and strive to maintain at least minimum viable populations of species utilizing this habitat (NFMA, 1976; Regional Policy 2631.7). Management policy and guidelines were developed in 1979 (KNF Supplement 2631.1; Managing Snag Dependent Wildlife in a Managed Forest, Godtel et. al., 1979) in order to help coordinate cavity habitat needs with other management and efforts have been made to implement them. Recently, however, a need to update these guidelines was recognized.

The policy of the Kootenai National Forest is to provide cavity habitat to meet wildlife needs while satisfying human needs for safety, fuel, fiber, and esthetics. This policy and guideline statement replaces the 1979 policy. It is intended to direct cavity habitat management while helping to ensure that practical objectives are carried from planning stages to on-the-ground accomplishments.

Introduction

Snags, broken-topped live trees, and down logs (all of which provide a substrate for excavation of cavities) are used by a great variety of wildlife species for nesting, denning, perching, roosting, feeding, and cover. Forty-two species of birds, fourteen species of mammals, and several species of amphibians are recognized as totally or largely dependent on cavity habitat on the Kootenai National Forest (Table 1). Snags located where they can eventually fall into streams and lakes are important in contributing to aquatic habitat through creation of pools, cover, and spawning beds. They also provide organic energy input to the stream.

The economic values of retaining snags and down logs in the forest ecosystem should not be overlooked. Franz (1961) cites 229 references to support his conclusion that birds, along with insectivorous bats, small mammals, microbes, and predatory insects (all of which utilize dead or decadent trees) help hold forest insect populations at endemic levels or exert some control during early stages of an outbreak. Thomas (1979) mentions the great expense that European foresters have gone to in order to provide nest boxes for insectivorous birds. Snags also provide an important energy source for the human community and the need to maintain firewood opportunities is an important consideration in project coordination.

Since approximately 1,454,000 acres (65%) of the Kootenai have an expected timber yield, the majority of the forest will be in a managed condition. Without active efforts to maintain cavity habitat it becomes apparent that we would reach a point in the future where a lack of snags of adequate diameter and distribution could seriously limit dependent wildlife populations and possibly render them non-viable. It takes more than 100 years to create a suitable snag for many species, so the decisions we make today with respect to cavity habitat will affect management long into the future.

Ten species of woodpecker are found on the forest. Since woodpeckers must excavate new nest and roost holes each year as part of their nesting or mating behavior, their needs cannot be mitigated by provision of nest boxes. Maintenance of adequate numbers of snags suitable for woodpecker nesting is essential for maintenance of viable populations of these species. In addition, abandoned woodpecker holes are available for use by other cavity-dependent species which are not capable of excavating their own holes. If the needs of woodpecker species are met, the needs of the secondary cavity nesters will be met (to a large extent).

Different species have different territory sizes and preferences which affect nest site selection. For example, McClelland's study of cavity nesters in northwest Montana (McClelland et. al., 1979) found that 74 % of 373 nests sampled were in broken-topped live or dead trees. Only 8% of the nest trees were intact-top snags. Fifty-six percent of nests sampled were in western larch; 30 % in aspen, cottonwood, or paper birch; 6% in Douglas fir or ponderosa pine, 2% in Englemann spruce, and 1% or less in other species. The snag/replacement selection guidelines included later in this document are based on these findings.

Cavity nesting species also select different cover types for locating nests. Species such as bluebirds and Lewis' woodpeckers prefer to nest in snags in the open, while species such as pileated and three-toed woodpeckers prefer to nest in clumps of snags. The large territorial requirements of some cavity dependent species (up to 600 acres) neccessitates that habitat is well distributed throughout a management area such as a compartment or drainage. If a great deal of cavity habitat is provided in one area but is totally lacking in surrounding areas, territorial behavior may limit use of available snags.

The Kootenai Forest Integrated Plan recognizes a need to account for cavity habitat throughout the forest. However, it is also recognized that due to soil conditions, past fires, and other natural factors there are areas which do not, and have not, supplied cavity habitat. In management of such sites and surrounding lands, those conditions will be taken into account when cavity habitat needs are calculated. Old growth areas and non-commercial timber lands can meet a good part of the need for cavity habitat, but do not provide for an adequate number and distribution of snags in some compartments or drainages. Minimum levels for cavity habitat retention should be applied on a drainage or compartment area basis at the following recommended levels: atleast 40% of the potential capacity will be maintained throughout commercial forest lands and at least 60% of the potential will be maintained in riparian areas.

The population capacity figures listed above were derived from Thomas' publication (1979), "Wildlife Habitats in Managed Forests", and are based on the territory sizes and nesting habits of various woodpeckers (primary excavators). Thomas states that management below the 40% level may be too low to maintain self-sustaining populations of many species. Although the concrete limits for population viability are not known, the lower the population level selected, the higher the risk of excluding a species from an area. A large degree of management flexibility can be used in attaining the desired snag level. For instance, managing snags at the 100% level on 60% of the land base would result in 60% of population potential. Another option in achieving this level would be to manage snags at the 60% level on 100% of the land base.

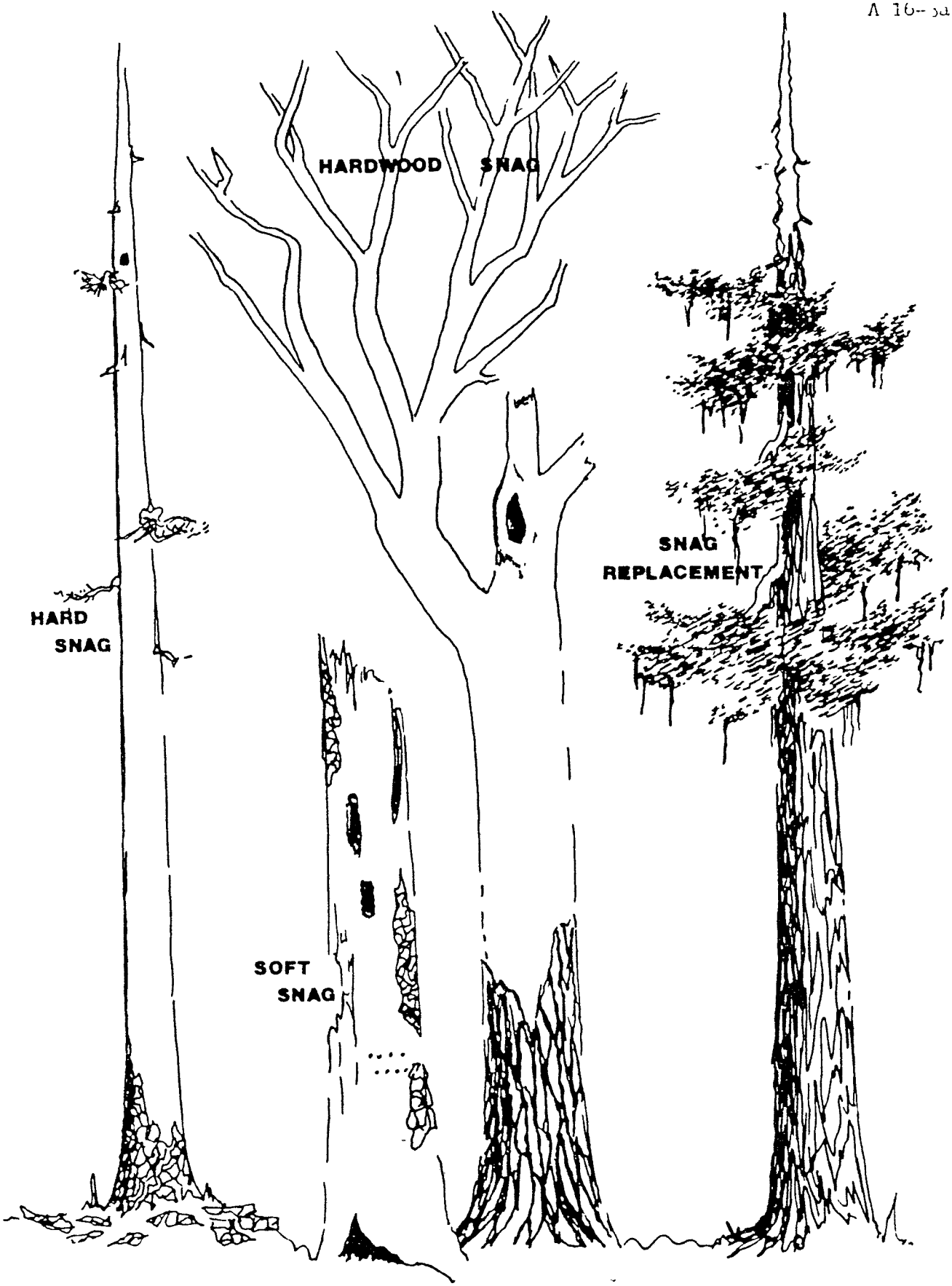


FIGURE 1

For example, in the mixed conifer timber type the various levels of management are:

Number Snags Needed Per 100 Acres	100% Level	60% Level	40% Level
	14 > 20"	8 > 20"	5 > 20"
	136 > 12"	82 > 12"	55 > 12"
	75 > 10"	45 > 10"	30 > 10"
TOTALS	225/100 AC.	135/100 AC.	90/100 AC.

High stumps can fulfill some of the needs for snags. If trees which exhibit insect infestations and feeding activity at their base and lower levels are cut off as high as a sawyer can reach, an important feeding site can be maintained. Such stumps, if supplied at a rate of 3 or 4 per acre, will last for many years and, if they project above normal snow levels, will provide important feeding sites during winter months. These should be considered in addition to (not in place of) snag requirements, because they do not fulfill any function for nesting sites (reproduction).

Due to the need to provide a continuous supply of snags over time, and in light of the fact that snags of adequate diameters may not be produced in the future under normal rotations, there is a need to designate green trees as snag replacements (see fig. 1). In the Forest plan, growth models for timber yield had reductions of 1000 bd ft/acre at harvest to account for cavity habitat needs in coordination. Non-merchantable material and cull trees will be left as replacements wherever possible, but if these trees are not available merchantible trees may be left where it is deemed neccessary to meet future cavity habitat needs. As a multiple-use land management agency, the Kootenai has the responsibility to supply adequate habitat to maintain viable populations of all native species. In some circumstances maintaining this habitat will mean incurring some additional cost.

Goals and Objectives

Goal - The primary goal is to maintain viable populations of cavity-dependent wildlife species throughout the Kootenai National Forest.

Objective I - to actively manage habitat to maintain woodpecker (and secondary excavator) populations in excess of 40 percent of their potential population capacity, and in excess of 60 percent of their capacity in riparian areas. Recognize and account for cavity habitat management on all acres throughout a compartment. Strive for good snag distribution; accounting for acreage currently devoid of snags/replacements such as road clearing zones and past cutting units.

Objective II - Implement I (above) by providing neccessary coordination information, guidelines, and training to appropriate Forest personnel. Utilize prescriptions, contracts, and administration to achieve this objective.

Objective III - utilize mitigation measures when the goal cannot be accomplished through coordination. Such measures as K.V. projects and direct habitat manipulation are appropriate mitigation considerations. Examples include; providing nest structures or nest boxes, girdling and topping replacement trees, providing nest cavities and properly sized faceplates, and pulling fuels away from designated snags and replacement trees.

Objective IV - abide by the intent of the timber sale contract and safety regulations.

Standards and Management Guidelines

These standards and guidelines provide general guidance for coordinating cavity habitat with all resource management activities. Standards provide specific direction and Forest Supervisor approval is needed for deviation from standards. Guidelines, on the other hand, provide broad direction that should be strived for in management activities but may be altered on the basis of site specific needs.

	Standard	Guideline
Timber/silviculture		
1. Cavity habitat needs will be addressed in timber sale EA's, and will be included under management requirements/constraints. The individual responsible for contract preparation on the district will review this list to ensure that needed specifications are included in the contract.	X	
2. Timber management activities (such as small and large sales, rehab areas, pre-commercial thinning, pulp, sanitation/salvage, and firewood sales) will be coordinated to provide a continuous supply of sizes and types of snags necessary to meet identified wildlife needs.	X	
3. On existing sales where snag management was not addressed, recognize the opportunity to amend the EA to include cavity habitat needs and amend contracts accordingly.		X
4. Silvicultural prescriptions and marking guides will identify cavity habitat management needs. Marking guidelines specific to unit type, logging system, and site prep method will be provided to marking crews. The district biologist will provide training as needed in the rationale for, and use of these guides. (Suggested guidelines are included in Appendix I of this document).	X	
5. Trees to be left in cutting units will be painted with a blue 'W' and stump spot. Marking of snags or replacements is a cost incurred as a result of timber management and will be payed for by the timber function (030 or 031).	X	

6. Information gathered by Timber Stand Inventory crews on pre-harvest snag/cull densities will be entered into appropriate fields in the data base for use in determining cavity habitat management needs.	X
7. Marking crews will tally the number of snags and replacements marked in the 10-20" and 20"+ DBH classes. This information will be stored in the stand folder and in a designated field in the timber stand data base. Locations of snag clumps will be shown on a map stored in the stand folder. Clump boundaries will be marked with blue paint and signed with metal tags, if neccessary.	X
8. If a tree marked for wildlife must be felled because it is a safety hazard, then it should be left on the site to provide down and dead wildlife habitat and another standing tree should be marked to leave as a substitute.	X
9. Leave logs > 12 " diameter scattered throughout dozer-piled units (a few pieces per acre) to provide cover and feeding sites for birds and small mammals. Five to fifteen tons per acre is recommended and is generally compatible with silvicultural needs.	X
10. Replacement trees with broken tops, scars, signs of heartrot, or buttrott should be left wherever possible without harming regeneration. If replacement trees with mistletoe are left then K.V. money can be collected to girdle them after the sale (to prevent infection of regeneration).	X
11. L.D.S. (leave dead standing) and L.D.D. (leave dead down) will be used around all units. If there is a need to remove snags which are potential fire hazards or in areas of beetle infestation, timber and fire personnel will coordinate snag removal with the wildlife biologist.	X
12. Leave high stumps: 1)In steep cable units or adjacent to firelines in broadcast burn units where it is not feasible to leave snags, or 2)In riparian areas where high stumps have high value for wildlife and can aid in preventing debris from entering streams. Select trees which show signs of bird feeding, buttrot, carpenter ant infestation or other defect. This action is best handled through administration during the sale.	X
13. Prescriptions and contracts will address the need to leave aspen, cottonwood, and birch standing in cutting units due to their high value to wildlife.	X

Engineering

1. Retention of snags will be stressed during road construction in order to make them available to the public for firewood. Snags which are within the clearing limits or are a safety hazard will be felled, but can be decked along roads or unburned in burn-bays for future public firewood use. High stumps can be left where not in conflict with viewing or engineering needs. X

2. Contract administrators will not allow snag removal outside the road construction limits. X

Wildlife

1. Cavity habitat will be de-emphasized within the roadside strip (generally 100' from centerline, depending on slope) and snags in this zone will be available for public use. Where open roads are adjacent to designated old growth or other key habitat, signs designating it as a "wildlife leave area--no firewood cutting" will be displayed as needed. X

2. Where cavity habitat is lacking due to past management activities, mitigation needs will be identified in EA's, and SAI plans will be developed and implemented to correct the situation. X

3. Cavity habitat will be monitored following timber management activities as specified in the Integrated Forest Plan. X

Fire

1. Marking guidelines will provide direction for marking snags and replacements so that they do not pose a hazard, and should be coordinated with fire personnel on a unit-by-unit basis. If leaving snags in certain units poses a hazard, a greater number of snag replacements should be left standing to compensate for this. X

Management

1. Contract administrators will not make changes affecting snags (other than safety) without prior line officer and/or wildlife coordination. X

2. Efforts will be made to inform the public, contractors, and forest service personnel of cavity habitat needs and opportunities to get firewood which will minimize cavity habitat conflicts. X

APPENDIX I --GUIDELINES FOR MARKING SNAGS AND REPLACEMENTS

These guidelines provide general direction for marking snags and replacements. They will be modified as needed on a site-specific basis. Guidelines for selecting types of snags/replacements to mark are included at the end of this section. For all unit types, snags/replacements should be marked with a blue 'W' and the number of snags/replacements marked should be tallied by diameter class (10-20" and 20"+) as stated above. It is important to recognize that snags reach their highest potential when located adjacent to riparian zones and should be left wherever posssible without posing safety hazards or management problems. Unsound snags pose a high hazard in units and landings where helicopters will be operating and will be felled if unfirm and over 16 feet in height. If snags are felled, they should be high-stumped if possible. Snag replacements should be retained.

1. Clearcut Unit

Since the majority of cutting units in a sale area are often clearcuts, it is neccessary to leave some snags and replacements in clearcuts in order to meet cavity habitat objectives. Leave strips will be future cutting units in most cases, so managing snags only within leave strips is not consistent with good long-term management. On cable ground the ability to retain snags and replacements is severely limited, and should be taken into account in long-term planning. The following guidelines apply to clearcut units:

1. On dozer piled units, leave all unmerchantable WL, PP, DF, and WRC snags > 10" dbh which do not pose a safety hazard. Leave additional snag replacements as needed to provide for long-term habitat needs and as identified in the prescription. This will often be twice the number of snags needed. Leave a few down logs per acre > 12" diameter scattered throughout the unit to provide cover and feeding sites for birds and small mammals.

2. In broadcast burn units of less than 35% slope or with light fuel loading follow the guidelines in 1 above, but avoid marking snags along the top center of the unit or along the side facing prevailing winds (often the NE side). Sound snags outside the boundary which are not leaning towards the unit can be left. Snag replacements should be marked in clumps so that they will be easier to burn around. In the top portions of the unit L, DF, or PP snag replacements greater than 18" DBH are preferrred as they have the best chance of surviving. In other portions of the unit trees greater than 14" DBH have the best chance of withstanding fire.

3. In broadcast burn units of greater than 35 % slope retain only snags which are greater than 10" DBH (generally not taller than 40'),favoring those greater than 18" DBH with broken tops for retention. Give low priority to marking snags within 100' of the unit boundary, because these are often felled before the unit is burned. Wherever possible, snags/ replacements should be marked in clumps so that they will be easier to burn around.

4. In cable clearcut units, retain clumps of snags/replacements from 1/2- 4 acres in size along the lower edge of the unit boundary (see figures in Appendix II for illustrations of different types of marking in cable units). Snags/replacements can also be left between cable corridors if it is cost effective and agreeable to the purchaser.

II. Leave Tree Units (Includes all other harvest prescriptions except ITM)

1. Same as I-1 above for snag marking on tractor ground. On cable ground mark snags as in I-4 above.

2. It is best to designate cull trees as snag replacements on the initial entry so that trees with high merchantability values will not have to be left in the future. Wildlife trees should be marked with a blue W so that the purchaser will not be charged for damaging them. Scarred trees have entryways for fungal infection which is valuable for future snag creation.

3. Hardwoods (10" DBH +) will not be cut without coordination with the district biologist and written approval.

III. Individual Tree Mark Units

Wildlife snags will be actively marked with a blue 'W' in ITM units at the time that individual trees are marked for harvest.

In OSR units all existing snags should be left since snag densities should already have been addressed in the previous entry. It may also be neccessary to paint snag replacements in these units. Trees damaged by logging or with other cull are preferred.

IV. Other Timber Management Activites

When timber management activities occur which could result in removal of desirable wildlife snags or replacements, but where trees to be removed are not actively marked (i.e. pre-commercial thinning, species designation, salvage, etc.) the need to retain wildlife snags/replacements will be addressed in the contract. If it is cost effective to mark snags/replacements prior to the activity they will be marked. If not, contract language or a letter to the purchaser will specify the types of snags/replacements to be left.

SNAG/REPLACEMENT SELECTION RECOMMENDATIONS [a]

I. Existing Snags

A. Size

1. Diameter

a. Maximum: none-- the larger the better
b. Minimum: Approximately 10" DBH.

Strive to select a range of diameters including at least 14/100 acres greater than 20" DBH.

B. Characteristics

1. Any showing obvious wildlife use such as nesting, feeding, or denning.

2. Soft snag

a. Broken-topped preferred (this is usually a result of decay)
b. Intact top but showing rot, decay, or any indication of a soft interior.

3. Hard snags, sound

a. broken-topped preferred
b. Intact top-- retain a mixture of these with soft snags. They can be used by pileated woodpeckers for nesting (generally if over 20" DBH) and by others for drumming or perching.

C. Species

1. Conifers (In order of preference if of sufficient diameter): WL, PP, DF, WRC. All species get used, but others are not as highly preferred by birds and/or may not stand as long. If preferred species are not available, leave less preferred species.

2. Hardwoods: Cottonwood, aspen, and birch >10" DBH should be retained through contract language, but occassionally large diameter cottonwood, aspen, or birch will need marking. These trees have high wildlife values.

D. Quantity

The number of snags to be marked will vary according to what is available elsewhere in the drainage, logging system, site prep type, etc. Numbers to be marked should be analyzed and included in marking guides on a site specific basis.

a- developed by the Sylvanite Ranger District, 1984

E. Distribution

Snag clumping should be used when the opportunity exists. Clumps should not exclude marking solitary snags throughout units. Clumps should be designed to include replacement snags intermixed in the clump. Clumps can be marked out as islands (with blue paint and metal tags) or as individual trees to facilitate logging of some species. Clump size will be based on site specific needs and will be applied to the overall number of snags needed per acre. A clump can also be just a few snags in a tight pocket (with or without replacements.)

II. Replacement Trees

A. Size

1. Diameter: select a mix of diameters from 10-25" DBH

2. Height: none-- select broken-topped trees when available

B. Characteristics (in order of preference)

1. Any showing obvious signs of wildlife use: nesting, feeding, denning, etc.

2. Broken-topped trees or trees with dead tops.

3. Cull trees with low timber value-- trees showing signs of heartrot are preferred, also scars from fire, lightening, or old logging.

4. Non-cull trees as needed to meet minimum quantity per acre.

C. Species

1. Conifers: in order of preference-- WL, PP,DF,WRC,LP, Spruce or fir

2. Hardwoods: mark only those showing signs of wildlife use.

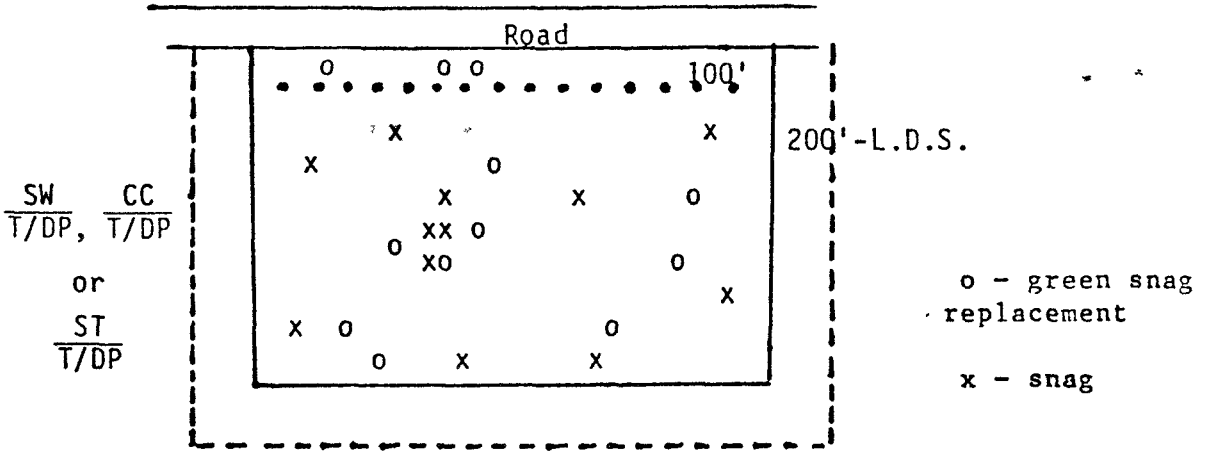
D. Quantity: Usually 2 replacements are needed for every snag needed. Numbers to be marked will be analyzed and included in marking guides on a site specific basis.

General reminders on locating snags to leave

A. Snags within 100' of p-lines will probably be removed by firewood cutters unless in a remote area. Snags within falling distance of broadcast burn unit boundaries will often be felled. When marking snags always keep site specific factors in mind such as terrain, location of unit edges and p-lines, logging system constraints, etc. Try to mark snags/replacements which have a good chance of making it through road construction, logging, site prep, and subsequent firewood access.

APPENDIX II -- ILLUSTRATIONS OF SNAG MARKING BY LOGGING AND SITE PREP. METHOD [c]

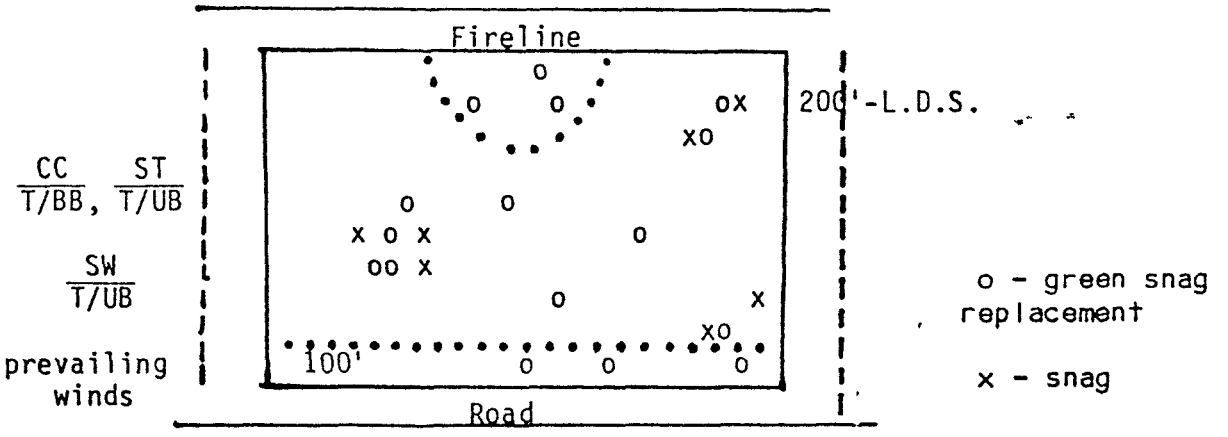
Tractor Clearcut or Leave Tree Unit - Tractor Piling



- No snags marked within 100' of the road.
- Green snag replacement trees left throughout the unit.
- If a marked snag is felled for safety reasons an additional replacement tree will be left in its place.
- Snags in 200' strip around unit not felled unless unsafe to logging operators or fuels treatment operations. Use L.D.S. on the sale contract map. (B2.31- CC only).
- Use clause C2.301 or C2.36 to designate snags and replacements.

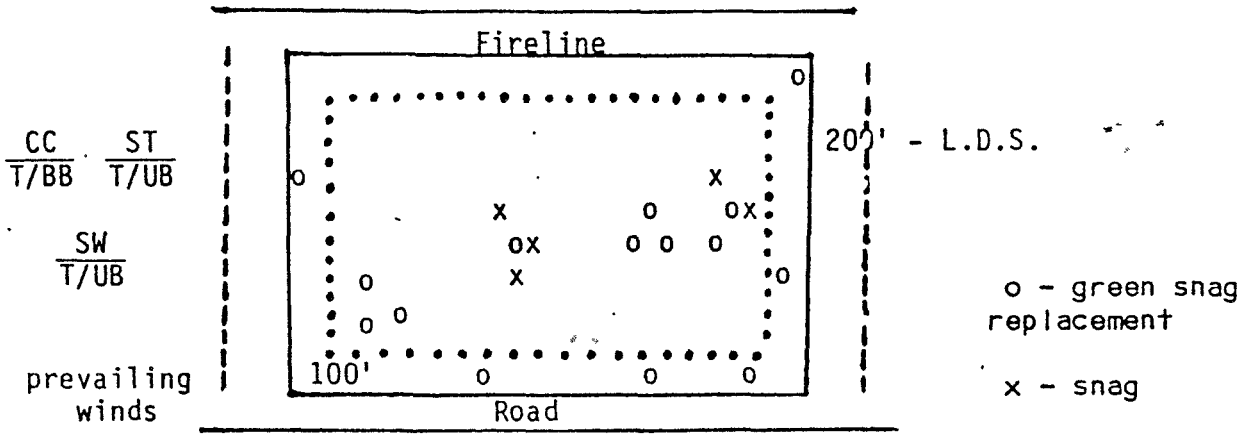
c - illustrations adapted from Gifford Pinchot N.F.-- Fish and Wildlife Workshop on Snags and Reserve Trees, 1977.

Tractor Clearcut or Leave Tree Unit -- Broadcast Burn, Less Than 35% Slope



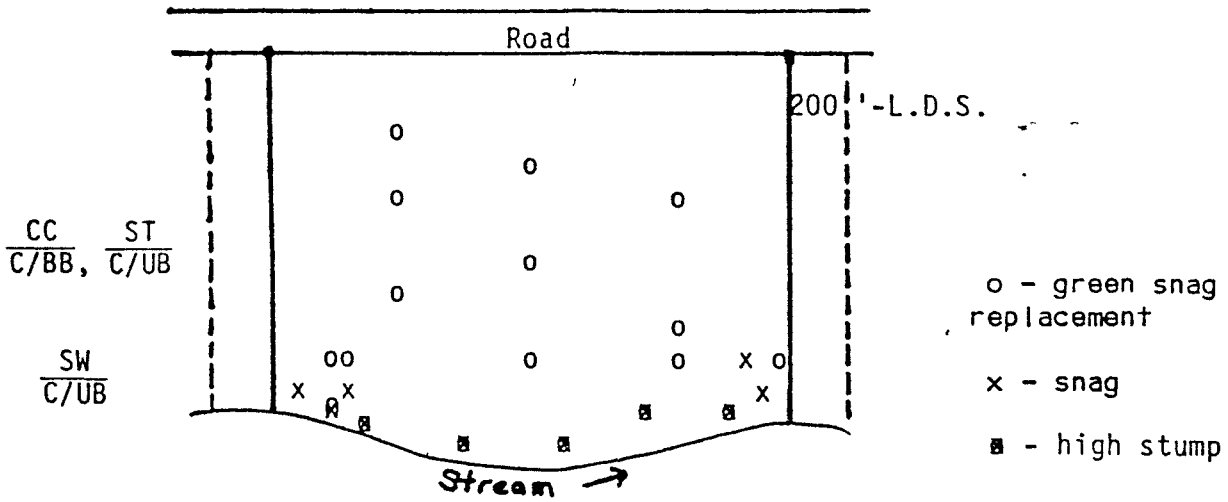
- No snags marked within 100' of the road.
- No snags marked in uphill, center of unit or on side of unit facing prevailing winds.
- 18" + DBH DF, L, or PP replacements marked in uphill center of unit. Replacements 14"+ DBH left elsewhere in unit.
- Many of snags and replacements marked in clumps to make it easier to burn around them.
- If a marked snag is felled for safety reasons an additional replacement tree will be left in its place.
- Snags in 200' strip around unit not felled unless unsafe to logging operators or fuels treatment operations. Use L.D.S. on the sale contract map. (B2.31- CC only).
- Use clause C2.301 or C2.36 to designate snags and replacements.

Tractor Clearcut or Leave Tree Unit -- Broadcast Burn, Greater Than 35% Slope



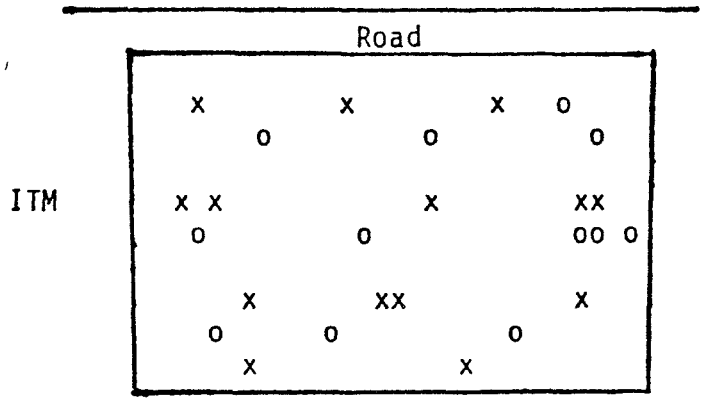
- No snags marked within 100' of the road or unit boundary.
- Snags marked in rest of unit. Sound snags > 10" DBH with broken tops preferred for marking to reduce safety hazard.
- Many of snags and replacements marked in clumps to make it easier to burn around them.
- If a marked snag is felled for safety reasons an additional replacement tree will be left in its place.
- Snags in 200' strip around unit not felled unless unsafe to logging operators or fuels treatment operations. Use L.D.S. on the sale contract map. (B2.31-CC only).
- Use clause C2.301 or C2.36 to designate snags and replacements.

Cable Clearcut or Leave Tree Unit



- Snag replacements left in downhill corners of unit and between cable corridors.
- Sound snags which don't pose a safety hazard left in clumps with replacements.
- High stumps left adjacent to stream on downhill side of unit.
- Snags in 200' strip around unit not felled unless unsafe to logging operators or fuels treatment operations. Use L.D.S. on the sale contract map. (B2.31-CC only).
- Use clause C2.301 or C2.36 to designate snags and replacements. High stumps and replacements left between cable corridors by agreement.

Individual Tree Mark Unit-- Tractor Piling



- Leave all existing snags which do not present a personnel or fire safety hazard. Clear debris from around snags during piling operations.
- Snags in 200' strip around unit not felled unless unsafe to logging operators or fuels treatment operations.
- Clause C2.301 may be used to save snags and replacements or a letter may be written to the purchaser under B2.35.

TABLE 1. Species and their Association with Ecological Zones and Snags [b]

	Occurrence by Ecological Zones				Uses of Snags				
Species	Riparian Zone	Douglas fir Ponderosa Pine Zone	Cedar-Hemlock-Spruce-Grand Fir Zone	Lodgepole pine Alpine fir Zone	Cavity Excavator	Cavity Nester	Snag Nester	Roost or Perch tree	Food Source
Pileated Woodpecker	X	X	X		X	X		X	X
Red Shafted Flicker	X	X	X	X	X	X		X	X
Lewis' Woodpecker	X	X			X	X		X	X
White-headed Woodpecker		X	X		X	X		X	X
Yellow-bellied Sapsucker	X				X	X		X	
Williamson's Sapsucker		X	X		X	X		X	
Hairy Woodpecker		X	X	X	X	X		X	X
Downy Woodpecker	X				X	X		X	X
Black-backed three toed Woodpecker		X		X	X	X		X	X
Northern three-toed Woodpecker				X	X	X		X	X
Wood Duck	X					X			
American Golden-eye	X					X			

b- from, Managing Snag Dependent Wildlife in a Managed Forest, Godtel et. al., 1979.

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Barrow's Golden eye	X					X			
Bufflehead	X					X			
Common Merganser	X					X			
Hooded Merganser	X					X			
Kestrel	X	X	X			X			
Screech Owl	X					X		X	
Flammulated Owl		X	X			X		X	
Saw-whet Owl	X	X	X	X		X		X	
Pigmy Owl		X	X			X		X	
Vaux's Swift			X	X		X		X	
Violet-green Swallow	X	X				X			
Tree Swallow	X	X				X			
Black-capped Chickadee	X	X				X		X	
Mountain Chickadee		X	X	X		X		X	
White Brested Nuthatch		X	X			X		X	
Red Brested Nuthatch			X	X		X		X	

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Pygmy Nuthatch		X				X		X	
House Wren	X	X	X	X		X			
Western Bluebird		X	X			X		X	
Mountain Bluebird		X	X			X		X	
English Sparrow	X					X		X	
Starling	X	X				X		X	
Canada Goose	X						X		
Mallard	X						X		
Red-tailed Hawk	X	X					X	X	
Golden Eagle	X	X					X	X	
Bald Eagle	X	X					X	X	
Osprey	X	X					X	X	
Barn Owl	X	X	X				X		
Little Brown Myotis	X	X	X	X		X		X	
Yuma Myotis	X							X	
Long-eared Myotis	X	X	X	X		X		X	
Long-legged Myotis	X	X	X	X		X		X	

TABLE 1. Species and their Association with Ecological Zones and Snags

	Occurrence by Ecological Zones				Uses of Snags				
Species	Riparian Zone	Douglas fir Ponderosa pine Zone	Cedar-Hemlock-Spruce-Grand Fir Zone	Lodgepole pine Alpine fir Zone	Cavity Excavator	Cavity Nester	Snag Nester	Roost or Perch tree	Food Source
Silver-haired Bat	X	X	X	X		X		X	
Big Brown Bat	X	X	X	X		X		X	
Martin			X	X		X			
Fisher	X		X	X		X			
Shorttail Weasel		X	X	X		X			
Longtail Weasel	X	X	X	X		X			
Yellow Pine Chipmunk	X	X	X	X		X			
Red Squirrel		X	X	X		X			
Deer Mouse	X	X	X	X		X			
Northern Flying Squirrel	X	X	X	X		X			
Total in Zone	38	37	30	22					
% in Zone	69%	67%	54%	40%					

KOOTENAI NATIONAL FOREST

FOREST PLAN

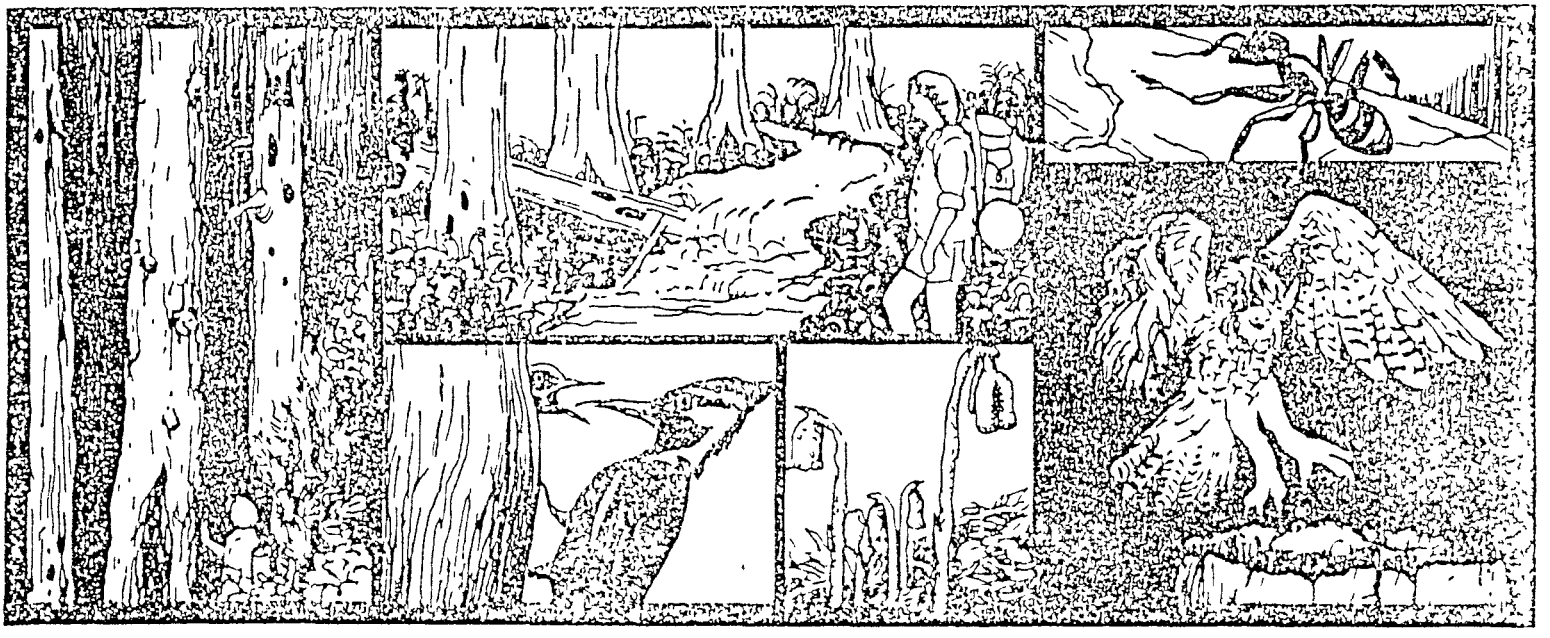
APPENDIX SEVENTEEN

OLD-GROWTH HABITAT MANAGEMENT GUIDELINES

APPENDIX 17

OLD GROWTH

HABITAT CHARACTERISTICS AND MANAGEMENT GUIDELINES



kootenai national forest

United States Department of Agriculture

U S Forest Service

Region One

August 1984

Introduction - Old growth is an oft-used term but one which few people describe in the same way. With respect to wildlife it represents a distinct successional stage that is an important component of wildlife habitat on the Kootenai National Forest. Conversion of old growth stands was once considered a priority for productive forest management. Now, however, the importance of "hanging onto all the pieces" is recognized while efforts to gain a better understanding of wildlife needs in a complex forest environment are continued.

The "classic" idea of an old growth stand is one which is physically imposing with tall, full-crowned trees; large standing dead material; fallen dead material; a dense canopy; and temperature moderating conditions. Actually the physical conditions are what make an old growth stand, but age generally dictates the development of those conditions. As stands increase in age, growth rates slow and vegetative conditions become relatively stable over time. Some trees in the stand die and eventually fall to the ground, leaving an opening in the canopy which allows increased light penetration. The extra light stimulates the germination of forbs, shrubs, and conifers which develop into small enclaves of site specific, high diversity. As shade tolerant conifers grow they block out the sunlight and the forbs or shrubs eventually die away. The cycle is repeated throughout the stand so that at any time a number of enclaves of forbs, shrubs, and shade tolerant conifers are just starting, are in full development, or are dying out. This results in a mosaic of habitats which meets the needs of a wide variety of wildlife species but is contained within the confines of an old growth stand. This phenomena has been referred to as a "shifting mosaic steady state" (Bormann and Likens, 1979) and is very descriptive of the stable nature of old growth stands, yet recognizes the inherent variety constantly evolving within the stand.

Richness in habitats translates into richness in wildlife. Roughly 58 wildlife species on the Kootenai (about 20 percent of the total) find optimum breeding or feeding conditions in the "old" successional stage, while other species select old growth stands to meet specific needs (e.g., thermal cover). Of this total, five species are believed to have a strong preference for old growth and may even be dependent upon it for their long-term survival (see Appendix I). While individual members of old growth associated species may be able to feed or reproduce outside of old growth stands, biologists are concerned that viable populations of these species may not be maintained without an adequate amount of old growth habitat.

Wildlife richness is only a part of the story. Floral species richness is also high, particularly for arboreal lichens, saprophytes, and various forms of fungus and rots. Old growth stands are genetic reservoirs for some of these species, the value of which has probably yet to be determined.

Since old growth stands often have high wood volumes per acre and are not producing new wood as fast as their younger counterparts, they have often been considered a high priority for harvest. On the West Coast it is feared that under current harvest projections, old growth will be eliminated in all but wilderness areas or parks (Juday, 1978; Harris et. al., 1982) if not given special management emphasis. Once harvested, old growth will not be replaced under normal rotations. Frequently the best old growth occurs on the most productive timber sites and reaches its highest value for wildlife when in close proximity to riparian zones (McClelland, 1977). This situation exists on the Kootenai and long range management of old growth habitat requires recognition that several resources are inherent on many of the same sites.

In recognition of the need to maintain old growth habitat, the Kootenai has made a preliminary inventory of existing old growth and designated specific areas for old growth management through the Integrated Forest Plan. The following guidelines will provide: 1) a description of old growth on the Kootenai, 2) the importance of old growth habitat to wildlife, and 3) management recommendations for old growth.

I. DESCRIPTION

Several authors have described old growth conditions (Juday, 1978; McClelland, 1977; McClelland, et al., 1979; Thomas, 1979) with certain features appearing to be universal. These features include: 1) large diameter trees (often exceeding 20" dbh) with a relatively dense, often multilayered canopy, 2) the presence of large standing dead or dying trees, 3) down dead trees, 4) stand decadence associated with the presence of various fungi and heartrots, 5) an average age often in excess of 200 years, and 6) a basal area ranging from 150-400 square feet per acre. Some of the individual features listed above may occur in other successional stages, but old growth stands are unique in integrating all these features in a complex and diverse whole.

During the winter of 1982-83, each District on the Kootenai completed a preliminary inventory of existing old growth using a broad definition similar to the one described above as a goal. Aerial photos, stand exam information, and ground knowledge were used to identify and map those stands having a high potential for old growth. These data were incorporated in a revision of the draft Integrated Forest Plan. It was recognized that field surveys were needed to determine the accuracy of the inventory. Consequently, during the 1983 field season a field survey of about 70 stands which were listed on District old growth inventories was completed.

A subjective determination was made in the field as to whether a stand was: 1) existing old growth, 2) "replacement old growth", or 3) neither existing nor replacement old growth. Forty-one (60%) of the sampled stands were classified as existing old growth, meaning they contained features # 1-4 described above. Seventeen (25%) of the sampled stands were classified as near-term replacement old growth. These stands had an abundance of live large-diameter trees, but were lacking in decadence or the large dead tree component which characterizes old growth wildlife habitat. Eleven stands (15%) were classified as not meeting old growth habitat criteria now, nor could they be expected to in the near future.

In analyzing the survey results, stands were grouped into three habitat groups: 1) warm and moist, 2) cool and moist, and 3) warm and dry. A dry, cold group was not identified on the Kootenai since most of these stands are above 5500' in elevation and are not suitable for reproduction of most old growth associated wildlife species. Neither did the forest identifymonotypic lodgepole pine stands since they are relatively short-lived. Although lodgepole stands do receive use by some old growth related wildlife species, they are not as diverse as other old growth types and

often lack many of the physical characteristics of old growth (e.g., trees greater than 20", large downed trees, and large standing trees suitable for cavity excavation). These stands are also difficult to maintain over long rotations (> 140 years), and generally occur within the normal rotation period without special management emphasis.

A description of old growth for each habitat group is listed below. Table 1 displays (for stands classified as "existing old growth") the mean, range of measured values, and 95 percent confidence interval generated from the results of the 1983 field survey. Parameters are such that the descriptions fit well with stand exam data. The table represents a description of the "best" old growth stands in each habitat group. At present, it is as close as we can get in terms of defining old growth wildlife habitat on the Kootenai. Old growth stands are representative of a variety of characteristics and it is not possible to define them with a "minimum number" for any one characteristic. For example, a stand may have 14 trees per acre greater than 19" DBH, but does not necessarily qualify as old growth unless it also has some of the other old growth characteristics such as defect or snags. By the same token, a stand may have only 10 trees per acre greater than 19" DBH but have a large number of larch snags and trees with heartrot. This stand would be valuable to manage as old growth even though it did not have an ideal number of large, live trees.

Habitat Group 1 (Warm-Moist)

Habitat types (Pfister, 1977) representative of this group are Thpl/Clun, Tshe/Clun, Thpl/Opho, Abgr/Clun, and Abgr/Libo. Sampled stands contained two or more of the following overstory species; western redcedar, western hemlock, western larch, Douglas-fir, grand fir, white pine, or Engelmann spruce. Of all old growth types sampled, this one had the densest canopy and often had the greatest number of trees/acre exceeding 19" DBH (up to 48/acre). Stands in this group often bordered streamcourses and had large numbers of trees 30-40"+ DBH, with ages up to 310 years. Canopy closure ranged from 70 to 95 percent. These stands generally had a high incidence of defect such as heartrot or broken-topped trees and also contained large diameter snags. The understory was sparse in heavily canopied areas, although there may have been patches of very dense regeneration. These stands often have the appearance of what is regarded as "classic mixed-conifer old growth." Forty-three percent of sampled stands had evidence of feeding by pileated woodpeckers and two had possible nest sites. Pileated feeding sign was observed at the base of live cedar, larch, and hemlock as well as on standing dead trees. Numerous small holes, assumed to be made by mammals, were found at the base of large diameter (25"+ DBH) cedar, hemlock, and spruce.

Habitat Group 2 (Cool-Moist)

Habitat types representative of this group are Abla/Clun, Abla/Mefe, Abla/Xete, Abla/Vagl, Tsme/Mefe, and Plen/Clun. Sampled stands contained two or more of the following overstory species: Engelmann spruce, lodgepole pine, mountain hemlock, subalpine fir, western larch, or Douglas-fir. Stands in this group were often in "cold air drains" along streamcourses or at elevations greater than 4500 feet. Sampled stands ranged in age from

127-482 years and canopy closure ranged from 78-90 percent. In general, these stands were not as heavily canopied as stands in Habitat Group 1. They also had heavier concentrations of down logs ≥ 12" DBH, and fewer snags ≥ 12" DBH. The total basal area of these stands was comparable to those in habitat group 1, but the basal area of trees ≥ 17" DBH was lower. Stands at higher elevations often didn't have as many trees/acre ≥ 19" DBH and trees appeared to die and fall down faster than in stands at lower elevations. One stand contained a possible pileated woodpecker nest site and 57 percent of the stands sampled showed pileated feeding sign.

We did not sample enough stands in habitat group 2 to develop meaningful 95 percent confidence intervals at this time, but the mean values are listed in Table 1 to provide a rough comparison.

Habitat Group 3 (Warm-Dry)

Habitat types representative of this group are; Psme/Phma, Psme/Fesc, Psme/Libo, and Psme/Caru. Stands contained a mixture of two or more of the following species: Douglas-fir, ponderosa pine, and western larch. Old growth stands in this group were more "open" than those in the other two groups and had as few as 10 trees/acre ≥ 19" DBH. These stands often had numerous broken-topped Douglas-fir snags 12"+ DBH as well as scattered, firescarred larch and ponderosa pine. Due to their history of more frequent fires, these stands also had fewer down logs/acre. No pileated nest sites were observed in stands within this group, but 45 percent showed pileated feeding sign. Although these stands do not fit the classic mixed conifer description of an old growth stand, they do contain many of the physical and structural characteristics which are important to wildlife, and they represent a distinct ecological type on the Kootenai.

Table 1 - Characteristics of Sampled Old Growth Stands--1983

M=mean, R=range, CI=95% confidence interval

Parameter	Habitat Group 1 (Warm-Moist)	2 (Cool-Moist)	3 (Warm-Dry)
# of old growth stands sampled	(n=23)	(n=7)	(n=11)
# trees/acre ≥ 19" DBH	CI=16.8<M<25.1 M=20.9 R=11.4-47.9	M=19.9 R=14.4-24.9	CI=14.3<M<24.7 M=19.5 R=9.4-34.1
# trees/acre 17-19" DBH	CI=4.7<M<8.8 M=6.8 R=0-19.8	M=7.6 R=3.0-18.8	CI=3.6<M<12.0 M=7.8 R=0-22.9
stand age	CI=201<M<239 M=220 yrs. R=170-306	M=303 yrs. R=127-482	CI=169<M<203 M=186 yrs. R=163-230
# down logs/acre 12-20"	CI=10<M<18 M=14 R=3-41	M=37 R=8-81	CI=10<M<22 M=16 R=3-31
# down logs/acre 20"+	CI=21<M<37 M=12.7 R=9-77	M=4.3 R=6-50	CI=3.2<M<7.4 M=5.3 R=0-38
# snags/acre 20"+[a]	CI=10.2<M<15.2 M=12.7 R-0-17.0	M=4.3 R=0-10.0	CI=3.2<M<7.4 M=5.3 R=0-37.5
# snags/acre 12-20"[a]	CI=.17<M<2.4 M=1.3 R=0-11.1	M=4.5 R=0-10.7	CI=3.8<M<10.8 M=7.3 R=0-37.5
stand basal area	CI=133<M<181 M=157 sq.ft. R=145-218	M=164 sq.ft. R=135-204	CI=91<M<167 M=129 sq.ft. R=67-177
basal area ≥ 17" DBH	CI=76<M<132 M=104 sq.ft. R=56-153	M=73 sq.ft. R=60-92	CI=0<M<74 M=37 sq.ft. R=13-87
canopy closure **	CI=84<M<89 M=87% R=70-95	M=83% R=78-90	CI=67<M<73 M=70% R=53-83

[a] Due to the uneven distribution of snags throughout a stand, our sampling method did not generate the actual density of snags found in the field, but provides a relative figure to use in evaluating stands from stand exam information.

** Measured with a spherical densiometer.

All old growth stands sampled contained some type of defect or decadence such as heartrot, buttrot, broken tops, mistletoe, or firescars. Ninety percent of the old growth stands sampled were photo interpretation (PI) types 11 and 17, but many stands typed as 11 or 17 were mature stands which lacked the special characteristics of old growth.

II. VALUE OF OLD GROWTH HABITAT TO WILDLIFE

A listing and analysis of wildlife species that occur yearlong or seasonally on the Kootenai was conducted as an initial part of developing the data base for the Integrated Forest Plan. This analysis of about 280 species was conducted in a manner similar to that done for wildlife in the Lolo National Forest Plan (Mike Hillis, Forest Wildlife Biologist, pers. comm.). Using concepts similar to those described in Ag Handbook 553 (Thomas et al., 1979), each of six distinct successional stages (grass-forb through old growth) was rated for its value to each wildlife species for feeding or reproduction, two primary life functions. Based on this analysis it was demonstrated that about 20 percent of the wildlife species listed find optimum feeding or breeding conditions in old growth habitat (see Appendix I). This is consistent with data for bird species feeding in the northern Rocky Mountains (McClelland et al., 1979) and serves to highlight the significance of old growth habitat to wildlife.

Because of the complex biological and physical composition of old growth habitat, wildlife utilizes it in a variety of ways;

1. Old growth trees are vertically complex and offer many functional habitats; e.g., trunk, branches, foliage, crown, cavities, large roots, overturned stumps.

    a. A large surface area of deeply fissured bark upon and in which wildlife seek insects, shelter, and nests.

    b. Strata upon which mosses and lichens grow, some of which are partial to older trees (Juday, 1978) and due to the height of older trees, which reflect microhabitats associated with various height zones on the trees.

    c. An extensive root system and interface between soil and tree which creates opportunities for burrows, insect infestation, rots, and feeding sites.

    d. Often abundant litter and lichen fall which is utilized by ungulates, small mammals and soil pathogens.

e. Decadence, which in turn attracts insects and other pathogens that provide food for wildlife.

f. Needles, buds, cones, and seeds for wildlife--food sources for mammals and birds.

G. A dense and abundant canopy upon which foliage gleaning birds seek insects and plant material.

2. Old growth stands offer physical features which provide favorable conditions for many species of wildlife;

a. Often excellent thermal cover is associated with old growth stands and is important to many birds and mammals in winter and summer. A multistoried, dense canopy provides opportunities for thermal regulation by allowing birds to perch at different heights in the canopy.

b. The cool, moist conditions and deep duff layer found in some old growth stands is important to many small mammals and amphibians.

c. Old growth stands are selected nest sites by many bird species because of available cavities and broken-topped trees, relatively dense foliage which provides seclusion, large and stable branches for nesting platforms, and preferred height associated with large trees.

d. A standing and downed dead component which contributes food and nesting or denning cover to many wildlife species. Large, down logs provide cover for some small mammals in deep winter snows and provide hunting sites for small predatory mammals year-round. The availability of a dead tree component directly affects many species. Without a dead or decadent component, primary excavators (such as pileated woodpeckers) are not present and the cavities associated with their feeding and nesting are not available to the many secondary cavity dependent species (such as bluebirds and flying squirrels). Down dead material also contributes to nutrient cycling and moisture retention.

3. Drainages with predominantly old growth stands often have the highest water quality and are generally very stable (Juday, 1978). Logs and root wads provide some of the highest quality pools in certain Kootenai streams (Al Bratkovich, District Biologist, D-5; John Lloyd, Forest Fisheries Biologist, pers. comm.).

III. MANAGEMENT RECOMMENDATIONS

Old growth should be recognized as an important habitat and managed to ensure its availability and utility to wildlife over time. The first step in management should be to identify the existing situation. Questions germane to old growth management are;

1. How many acres in an analysis area (such as a drainage or compartment) are providing old growth conditions?

2. Are old growth stands representative of habitat types in the area and are they well distributed in the analysis area?

3. Are (a) and (b) sufficient to support viable populations of dependent species?

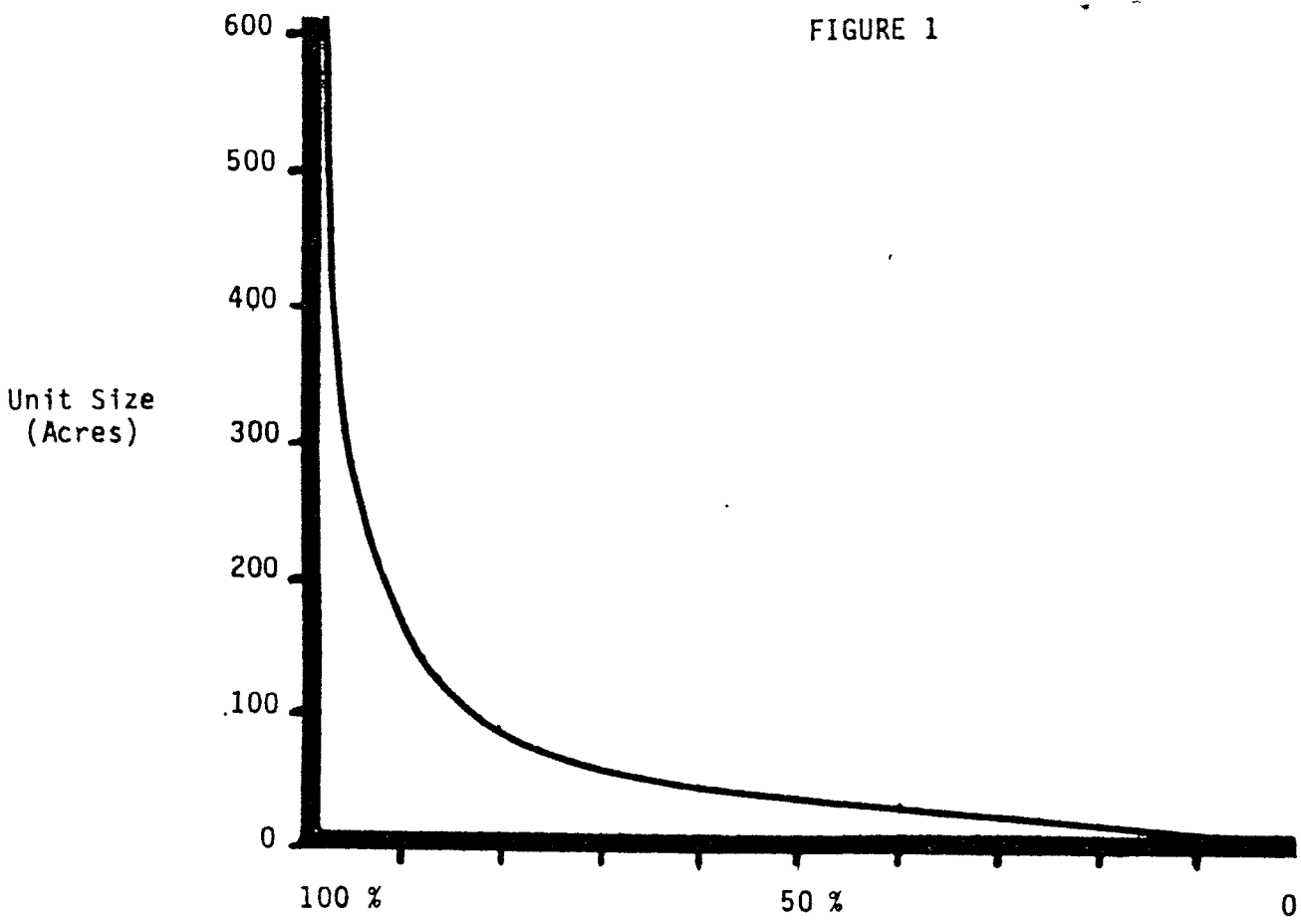
The Kootenai completed step 1 in this process during the winter of 1983 (see Interim Guidelines dated January 31, 1983). Although this inventory needs to be further refined through continued field verification, it provided more reliable baseline information than was formerly available through P.I. type inventories. Each District mapped old growth stands on 2.64" or 1":mile maps and analyzed the percentage of old growth currently existing in analysis units such as third order drainages or compartments (averaging about 10,000 acres in size). This inventory pointed out that some areas have a good distribution of old growth while others were almost entirely lacking in old growth. Harsh sites, extensive fires in 1910 or the 1930's, and past timber harvest have all contributed to a lack of old growth in some areas on the Forest. The following section describes goals to strive for in the distribution and amount of old growth, recognizing that in some cases past activities or events may preclude reaching these goals in the near future.

Distribution and Amount of Old Growth Habitat

A review of applicable literature on wildlife species and their habitat needs indicated that a minimum of 8-10 percent of available wildlife habitat should provide old growth conditions (McClelland, 1978; Juday, 1978) at any given time. This habitat should be: 1) well distributed geographically to allow breeding and genetic exchange between individuals of the same species, 2) representative of timber types available in the area (e.g., Douglas-fir/larch/ponderosa pine, cedar/hemlock, and spruce/fir) to ensure adequate diversity, and 3) in units of a size which meets the biological needs of related wildlife species.

A unit of 1000 acres would probably meet the needs of all old growth related species (Munther, et al., 1978) but does not represent a realistic size unit in conjunction with most other Forest management activities. On the other hand, units of 50-100 acres are the smallest acceptable size in view of the nesting needs of pileated woodpeckers, a primary excavator and an old growth related species (McClelland, 1979). However, managing for a minimum size of 50 acres will preclude the existence of species which have larger territory requirements. In fact, Munther, et al. (1978), report that units of 80 acres will meet the needs of only about 79 percent of the old growth dependent species (see Figure 1). Therefore, while units of a minimum of 50 acres may be acceptable in some circumstances, 50 acres should be the exception rather than the rule. Efforts should be made to provide old growth habitat in blocks of 100 acres or larger. If, due to past fires or management activities, the only remaining old growth blocks are less than 50 acres, they may still be useful habitat provided that several small blocks are clustered together or are surrounded by mature timber. Isolated blocks of old growth which are less than 50 acres and surrounded by young stands contribute very little to the long-term maintenance of most old growth dependent wildlife species.

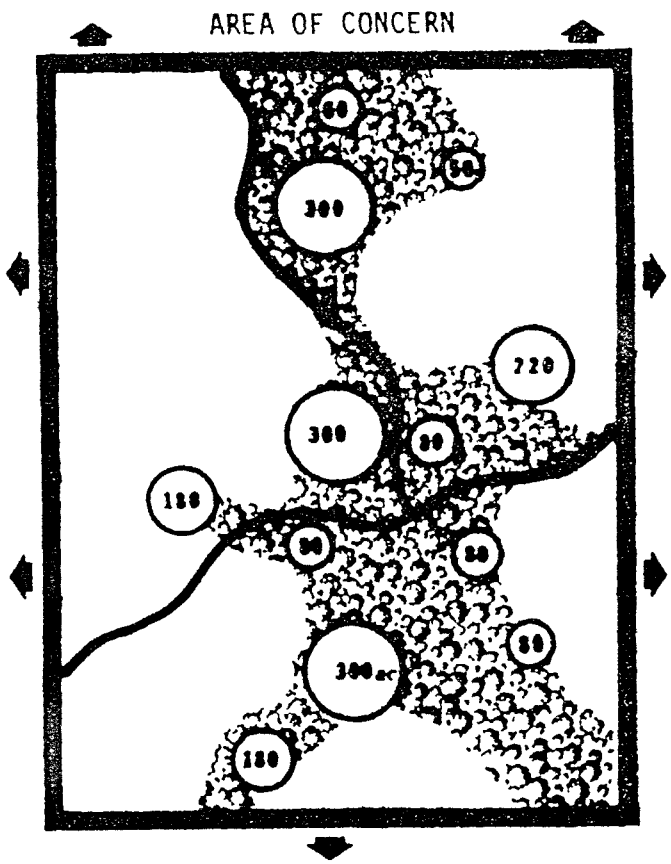
FIGURE 1



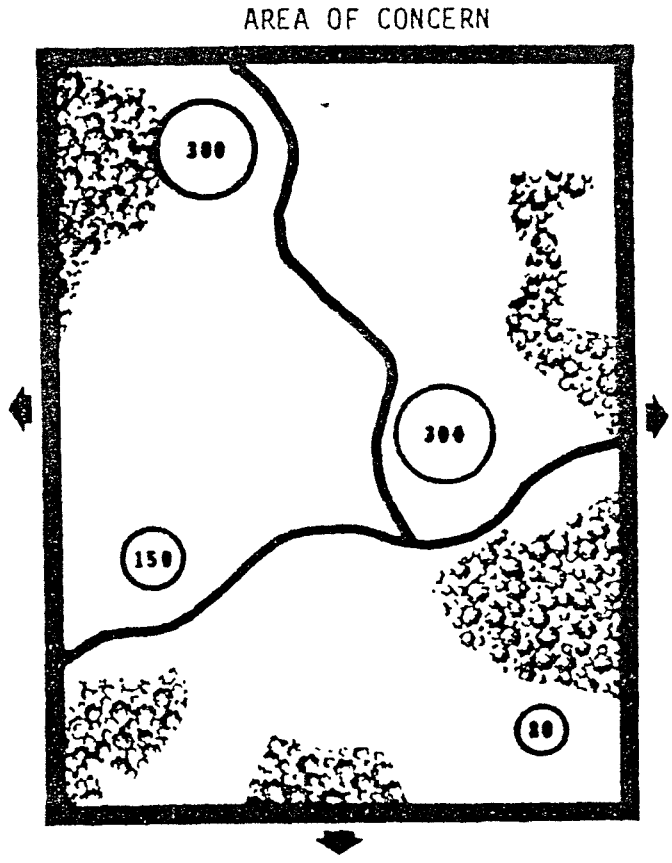
*From Munther et. al., 1978

Cutoff, isolated patches of old growth that are greater than about 1-2 miles from other old growth patches will be severely restricted in genetic exchange between breeding species. These patches probably will not sustain viable populations of those old growth dependent species with short dispersal distances. In effect, such areas become islands and the number and composition of species will dwindle as the size of the island and the exchange with similar areas decreases. An ideal situation could be described as a drainage with: 1) variably sized old growth stands no more than 1 mile apart, 2) old growth stands ranging up to several hundred acres in size with a well distributed pattern, and 3) interconnected with timbered corridors (see Figure 2).

FIGURE 2



Good Distribution of Old Growth Areas within 3 watersheds -- old growth stands interconnected with timbered corridors



Poor Distribution of Old Growth Areas within 3 watersheds -- isolated old growth stands

In riparian areas, units of old growth should preferably be in a "block" type configuration but can extend in a linear fashion along streams if at least 300 feet wide. On some unstable streams (such as Keeler Creek) excessive recruitment of large diameter logs may contribute to channel degredation. In this situation, stream management plans should be utilized to provide direction for management of old growth stands adjacent to streams.

All the old growth should not be crowded into the stream bottoms or up on a ridge. Of the minimum 8-10 percent overall, 2-3 percent should be managed on productive, main stem sites in an analysis area. The remaining 5-7 percent should be well distributed in and representative of the analysis area. This 2-3 percent should be <u>within</u> a 1/4 mile wide zone in the stream bottom area and, preferably, adjacent to the stream (at least partially).

While the distribution and amount of old growth described above is the desirable situation throughout the Forest, in some cases it is necessary to

"hang onto" whatever old growth is left. At present, efforts should be made to identify old growth stands to retain for the near future, achieving the best distribution possible.

If there is not enough "legitimate" old growth (as earlier defined) in the area to meet the 8 percent minimum level at present, mature stands with key components of old growth (large snags and down logs, defect, scattered large trees) should be maintained. In the long term it will be necessary to designate younger stands to be managed as old growth for the future, but it is premature to make extensive designations of future old growth until a clear picture of the existing status and distribution can be determined.

Managing Old Growth

Old growth exists on the Kootenai in two broad types of management situations;

1. old growth which occurs within Forest Plan management allocations which are not programmed for timber harvest (unregulated MA's 2, 3, 5, 7, 8, 10, 18, 19, 29).

2. old growth designated as MA 13 (Wildlife/Timber) which is in the regulated base.

Old growth in the first type of management situation was inventoried and will be protected from hazards in most cases. It will remain unroaded or have low road densities and will not be logged in the forseeable future. This old growth will essentially be the "natural" old growth component and will undoubtedly have inherently longer rotation periods than "managed" old growth. (possibly 400+ yrs.)

Old growth in the second type of management situation (MA 13) will be "managed" on an extended rotation (250 years for planning purposes). Individual stands may be regenerated when they can be replaced by another old growth stand of equivalent acreage in the same analysis area so that available, legitimate old growth does not drop below minimum levels.

Until the end of the rotation, stands identified as MA 13 will be managed to retain their old growth characteristics (multi-storied canopy; large trees, snags, down logs, trees with spike tops, heartrot, etc.). Given our current level of knowledge; intermediate harvest, salvage sales, or firewood sales are not compatible with maintenance of old growth characteristics. In the future it may be demonstrated that certain types of logging can occur within old growth stands and still maintain their value to old growth dependent species, but until that time old growth stands should not be scheduled or planned for salvage, pulping or intermediate harvest.

Large snags (especially larch, hardwoods, Douglas-fir, and ponderosa pine) are a necessary component of old growth but are also highly sought after by firewood cutters. Management of firewood gathering activities in or near old growth stands is very important. While a certain amount of old growth can be managed simultaneously with human use, the behavior of some wildlife species will preclude their presence in areas of heavy people use--particularly during the nesting season. Road management should be used as a tool to limit people use where this is necessary to protect old

growth values. Old growth should also be protected from extensive blowdown. This is not to say that buffer strips should be left around old growth stands, but that harvest methods used in adjacent stands should reflect consideration of blowdown potential.

Fire was a naturally occurring event in many of the ponderosa pine/Douglas-fir/larch old growth stands and can still be used as a management tool if used judiciously. Old growth values can still be maintained with cool or patchy burns which leave the overstory and patches of snags intact. A case-by-case consultation with fire management personnel and wildlife biologists will be needed in such instances. In most other old growth types (cedar/hemlock, spruce, mixed conifer) fires are stand regenerating and these stands should be protected from fire.

Monitoring/Tracking of Old Growth Stands

Although this aspect of old growth management has not been fully developed at this time, some generalizations can be made:

1. During the next decade, each District will work towards completing a field inventory of designated old growth stands. Specific information items will be gathered which will help in monitoring and determining habitat suitability for several indicator species and will help to rate the relative value of each stand. The key information items will be stored in some type of data base to help facilitate use of habitat suitability models for monitoring of dependent wildlife species. A list of dependent species has been developed and tentative indicator species have been delineated as part of the forest planning process (see Appendix I).

2. It is anticipated that as old growth field verification and other stand exams continue, we will find that some designated stands are not suitable old growth habitat while others not previously designated will be found to be suitable. Records of these findings should be kept so that the Forest Plan data base can be updated.

3. Some type of system will be developed for keeping track of the location of old growth stands so that they will not be planned for harvest until they can be replaced by an equivalent acreage of timber coming into old growth. At present, each District has old growth stands mapped on 1":mile or 2.64":mile maps. Regulated old growth (MA 13) will be displayed in the final Integrated Forest Plan. Personnel in Timber, Silviculture, and Fire should make themselves fully aware of the existence of the old growth data and consult wildlife biologists before planning activities in old growth stands. In the future, we may also keep track of old growth by establishing new codes in key fields within the timber stand data base.

4. At some point in the future a rotational scheme will be developed for stands in MA 13. Designated young stands (called replacement old growth) will be treated silviculturally to encourage development of old growth characteristics. These stands will then "replace" currently designated old growth. Although the silvicultural treatments necessary to produce old growth have not been proven, the following have been suggested (Thomas, 1979):

a. precommercial and commercial thinning to age 80 to encourage diameter growth, select for desirable tree species, and allow understory growth,

b. allowing the stand to stagnate after age 80 to encourage development of heartrot, development of standing and down dead, and development of understory layers,

c. final harvest at age 250.

Since normal thinning guides are designed to develop stands of healthy, evenly-spaced, vigorously growing trees it may be necessary to use special marking guides for thinning old growth replacement stands. For instance, heavily stocked clumps might be left within thinned areas so that suppressed trees more susceptible to disease would remain. These details will be worked out with silviculturists when management of old growth replacement stands is initiated.

CONCLUSIONS

Old growth habitat is now recognized as an important and necessary element of diversity that supports a myriad of wildlife species. Maintenance of adequate old growth will assist in ensuring viable populations of native species and in maintaining diversity as requried by the National Forest Management Act of 1976 (16 U.S.C. 1600).

There are several basic elements inherent to old growth management; 1) definition, 2) identification, 3) analysis of status, and 4) management recommendations. These guidelines contain all those elements and should provide a framework within which old growth management can be initiated. These guidelines are consistent with available, applicable research and will be updated as new research becomes available. The Kootenai's approach is similar to that of the Flathead, Lolo, and Idaho Panhandle National Forests.