Tumbledown Hazardous Fuel Reduction Project

Forest Vegetation Report

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1.1 FOREST HEALTH AND PRODUCTIVITY

1.1.1 Regulatory Framework

Regulatory constraints applicable to managing forest vegetation within the project area include the Idaho Forest Practices Act, Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), National Forest Management Act of 1976 (NFMA), IPNF Forest Plan (USDA 1987), Forest Plan, and Forest Service policy.

1.1.2 Analysis Area

The direct, indirect and cumulative effects analysis area for forested vegetation is the 5611 acre project area (Figure 2), since proposed activities would only change the forest characteristics within this area. The acreage proposed for treatment is not large enough to affect forest parameters at the subbasin scale.

1.1.3 Analysis Methods, Data and Information Used

Existing and historic vegetation conditions for the project area were determined using aerial photos (1933 to present, Figures 1 and 2 on page 9 of this report), stand exam data (stand files and the Timber Stand Management Record System (TSMRS) data base at the Sandpoint Ranger District office), field surveys (district stand files located at the Sandpoint Ranger District and recent field review notes located in the project file), historic information, the Interior Columbia Basin Ecosystem Management Project (ICBEMP) Scientific Assessment (Quigley and Arbelbide 1997), the Northern Region Overview (USDA 1998a) and data from the Pend Oreille Geographic Assessment (USDA Forest Service unpublished report). Vegetation conditions on private lands have been obtained from aerial photos, historical records, and personal knowledge.

1.1.4 Affected Environment

1.1.4.1 Characterization of the Coniferous Vegetation

The following sections provide an ecological overview of forest conifer conditions at the very large landscape scale of the Interior Columbia Basin, and step down through several geographic levels to conditions at the scale of the project area. As the geographic areas get smaller, the ecological information becomes more specific.

1. Columbia River Basin

Disturbances such as fire and insect mortality have played an important role in determining forest tree composition. In northern Idaho and eastern Washington, the most significant historic natural disturbance was fire. Land management activities and introduced pathogens have dramatically altered the species composition and age of trees in the overstory (Quigley and Arbelbide 1997).

Historically, coniferous tree composition in the Interior Columbia Basin was dominated by ponderosa pine, western larch and western white pine.

Effective fire suppression, the loss of white pine due to the introduced blister rust, and land management activities such as logging have caused the forests to change. Forests across the Interior Columbia Basin are now dominated by shade-tolerant grand fir, western hemlock, and Douglas-fir. These species are more vulnerable to disturbances such as insects, diseases, and fires. They are less adapted to fire, drought and natural climatic variability than the species they replaced. The results are more insect and disease activity and higher fire risk.

Ponderosa pine, western larch and western white pine were typically established after some form of disturbance and have the potential to occupy a site for 200-300 years. Many of the local disturbances not only initiated these long-lived species, but also maintained them in mature conditions. Stands of these trees were adapted to regenerate in and survive local fire regimes. Other disturbances, such as historic levels of insect populations and wind and winter storm damage, contributed to stand mortality. As trees died, they became fuel wood and over time created conditions for stand-replacing fires.

2. Northern Region Overview

The Northern Region Overview (USDA 1998a) focused on priorities for restoring ecosystem health and availability of recreation opportunities. The assessment describes changes in coniferous vegetation:

> "In northern Idaho and moist portions of western Montana, Douglas-fir was largely an early succession species that regenerated well after wildfire in various mixes with white pine and larch, but then was largely eliminated by root diseases and bark beetles after 100-140 years, giving way to pine and larch. In the absence of white pine and larch, we have experienced an increase in Douglas-fir during early succession, and an apparent increase in root disease inoculum levels as succession proceeds. This condition, with ladder fuels, promotes and increases risk of stand-replacement fire."

The Northern Region Overview further states:

> "The most significant societal and ecological risk is associated with fire; particularly where ladder fuels exist or are developing near or adjacent to urban interface locations."

3. Pend Oreille Subbasin Geographic Assessment

Pend Oreille Geographic Assessment

In the Pend Oreille Geographic Assessment, the level below the Columbia River Basin scale was defined as "subbasin." The Tumbledown Hazardous Fuels Reduction Project is located in the Pend Oreille Lake subbasin, one of 164 subbasins in the Columbia River Basin. The IPNF has been assessing ecological conditions in the Pend Oreille Lake area, which includes the Pend Oreille Lake subbasin (USDA Forest Service unpublished report). The assessment has identified ecosystem trends and changes over the last 100 to 200 years. Findings of the geographic assessment are similar to those of the Northern Region Overview and Interior Columbia Basin Assessments, but provide more specific information on lands in the Pend Oreille subbasin ecosystem.

- There is a loss of long-lived tree species such as western larch, western white pine, and ponderosa pine, and an increase in Douglas-fir and grand fir.
- There is a lack of wildfire as a natural disturbance factor.
- There is an increased risk of severe stand-replacing fire on dry habitats due to fuel accumulations from the exclusion of fire.

4. Project Area (History and Disturbance)

Much of the area was severely burned in 1926. This fire was severe enough to destroy most of the tree cover, based on the current age, structure and tree heights.

In the 1950's, a large electrical transmission line was constructed through the analysis area. This resulted in what is essentially a strip clearcut with grasses, brush and small trees (generally a mix of Douglas-fir, lodgepole pine, ponderosa pine and western larch).

In the 1950's and 1960's selective harvests removed large ponderosa pine, Douglas-fir and western larch in much of the lower half of the analysis area. Forest Service timber sales occurred in the late1980's – portions of Falls Creek, and the 1990's – portions of Upper Cedar and Barton Hump. The silvicultural prescriptions called for regeneration harvesting in small blocks (group selection; 1-3 acre patch cuts), scattered shelterwood and seed tree cuts, and commercial thins. Ponderosa pine and larch seedlings were planted in regeneration harvest units and are now well established. Commercial thins generally were to the upper level of the management zone and in many cases did not remove enough of the understory fir from around the dominant ponderosa pine. Specific information pertaining to these sales can be found in the Vegetation section of the project file. Currently, most trees are 50 to 110 feet tall and are generally in the 70-80 year old age range.

Following the 1926 fire, a few scattered individuals and patches of large diameter trees remained. These small patches and scattered individual trees within stands do not meet Old Growth Definitions (Green and others.1992 (2/05 errata correction)).

Vegetation conditions in the project area have similarities to the Columbia River Basin Assessment, Northern Region Overview and Pend Oreille Subbasin Assessment. The historic stand composition has changed dramatically from pine and larch dominated to Douglas-fir dominated. The structure of the stands is primarily immature/medium size trees.

5. Reference and Current Conditions

Habitat Types

Forest vegetation in northern Idaho and in the project area is shaped by several complex physical and environmental factors. To simplify the measurement of some of these physical and environmental factors, a classification system called habitat typing is used.

Habitat types (Cooper et al. 1991) are a classification used to reflect the relationship between climate, site, and potential vegetation species.

Habitat Type Groups are aggregates of habitat types and are used for areas of similar natural disturbance regimes, successional patterns, and structural characteristics. (R-1 Landscape Ecology Peer Group 1995 Biophysical Classification, and Smith and Fisher 1997). These groups are based on mature stand structure and not climax forest structures, as with habitat types themselves. The habitat types in the analysis area are primarily in either the moderately warm and dry or moist habitat type groups. To allow comparison to information for the Pend Oreille subbasin, these habitat type groups are included and referred to as dry and moist. The moderately warm and dry group falls within the mid-range of those groups in the dry category and the moist group is within the midrange of those groups in the moist category.

It is important to recognize that there are inclusions of dry habitat within moist habitat descriptions. These dry areas would be treated as such with the understanding that the overall habitat type is described as moist.

Forest Cover Type, Structure and Pattern

Cover Type (Existing Dominant Trees)

Forest cover types describe the tree species that dominate a particular site. These cover types were used to describe the existing and historical forest composition. (From the TSMRS database).

Compared to historical situation, the Pend Oreille subbasin, and the project area, has experienced a major decline in forest stands historically dominated by white pine, western larch and ponderosa pine, with corresponding increases in grand fir, cedar, western hemlock, Douglas-fir and lodgepole pine.

Structure

In drier habitat types of the Pend Oreille subbasin and in the project area, historic, short-interval, underburning fires maintained many of the stand structures as large, open-grown ponderosa pine, western larch and Douglas-fir. It is estimated that over 40 percent of these habitats over the landscape consisted of open grown mature and old growth structures, with lesser amounts in the early succession and immature forest structures.

In moist habitat types, both white pine and western larch made up a high percentage of the species composition. Over large landscapes, approximately one quarter was in the early successional stage and less than one quarter was in the old growth stage of stand development. The remaining acreage was in the seedling-sapling, pole, and immature and mature stand structures because lethal (stand-replacing) and mixed-severity fires were common in moister habitat types.

In many cases, the old growth existing today is different from old growth stands of the past. Large old white pine is no longer present and western larch has been reduced

significantly. Today, the existing old growth stands in the Pend Oreille subbasin in moist habitats are primarily cedar, hemlock, and grand fir stands. In the project area, the majority of the immature forest is nearing mature forest structure. Due to the shift from potentially long-lived species such as western larch, ponderosa pine and white pine (Fins, Byler et al.2001, USDA1971, Fiedler and Loyd 1992, Arno 1996) to the shorter-lived Douglas-fir (USDA Forest Service unpublished report, Rockwell 1917), much of immature and mature forest structures will not reach old growth conditions with this species due to insect and disease.

Table 1 displays the current and historic cover types and structures in the Pend Oreille Subbasin and the Analysis Area. The vegetation analysis area is for National Forest Lands only. The Existing Condition information represents the cumulative effects of past disturbances and present activities including past harvest, fire suppression, disease and insect attack, and vegetation growth to the present.

Table 1
Comparison of Stand Characteristics
(Percentage of Total Acres*)

Stand Parameter	Pend Oreille Subbasin (Historic)	Pend Oreille Subbasin (Existing)	Analysis Area (Existing)
Cover Type			
PP, WP, or WL	55	8	4
GF, DF, H, C, LP,	45	92	96

Structure

	Size	Age in Years	Pend Oreille Subbasin (Historic)	Pend Oreille Subbasin (Existing)	Analysis Area (Existing)
Shrub/Seedling/Sapling (early succession)	0-5”		23	28	11
Pole/Small	5-8”		13	4	13
Immature/Medium	> 8”	<100	23	39	49
Mature/Large	9-21+	>100	21	21	27
Old Growth	>21	All >150	19	7	0

- Percents are calculated for the stand level. There may be individual acres within stands that have different cover types and structure, which are not reflected in the percentages.
- PP=ponderosa pine, WP=white pine, WL=western larch, GF=grand fir, DF=Douglas-fir, H=hemlock, C=cedar, LP=lodgepole pine,

Douglas-fir is the most abundant cover type in the project area. There are **no** stands that meet the minimum criteria for old growth in the project area.

Unlike historic conditions, there have been few fires effects on forest vegetation within the last 80 years. Root disease is causing mortality in areas dominated by Douglas-fir and is beginning to change the structure of some stands. Overly dense patches of immature trees are beginning to thin from competition or breakage caused by wind and snow.

Trees in these dense patches are contributing to an increasing fuel load in the analysis area. Trees damaged by wind and snow are also providing habitat for tree killing insects. For example, fir engraver bark beetles have caused extensive patches of grand fir mortality in many stands.

Landscape Pattern

Natural disturbances such as fires, insects and disease have historically fragmented landscapes of northwest forests. The variability of frequency and severity of fires produced conditions in which some forests were dominated by small habitat patches while others were characterized by larger forest patches (Rochelle 1998).

Historic fire regimes (large stand-replacing fires at long intervals with smaller fires in the interim) tended to create large areas of similar stand structure. Immediately following disturbance, shrubs and seedlings would dominate these large areas. As trees in these areas grew through the various structural stages, minor disturbances would alter stand structure on a smaller scale. Some watersheds would be composed mainly of old forest structural stage with "islands" of younger age classes where small-scale disturbances occurred. Other watersheds would consist mainly of younger age classes with "islands" of mature and old structural stages that survived the large stand-replacing fires.

Since the late 1800s, timber harvesting and fire suppression have replaced natural disturbance as the primary forces shaping forest landscapes in northwest forests. Perhaps the most important consequence of timber harvesting has been the significant reduction in amounts of old growth on private land and its high degree of fragmentation on federal lands. Fire suppression over the last several decades is also altering natural disturbance patterns and is generally recognized to be "defragmenting" some northwest forests (Rochelle 1998).

In the Pend Oreille subbasin, large areas of mature and old growth timber are lacking, although the total amount of mature forest has not changed much from historic levels. Mature forest now tends to occur in long narrow stringers with more edge. There are large areas of immature/medium-sized timber that resulted from the high-intensity stand-replacing fires in the early 1900s and the effects of subsequent fire suppression (USDA 2003a pgs. 100-103 Monitoring Report). These areas are homogeneous, single-aged, single-storied stands. This analysis area has similar characteristics.

Conclusions

Based on a comparison of historic and present conditions across the subbasin area, the following conclusions were made:

- Disturbance and forest succession processes have been altered since European settlement in northern Idaho.
- With the introduction of blister rust, the suppression of wildfires, and past timber harvesting, the character of the forest has changed. Across the project area, there has been a reduction in the percent of the landscape composed of long-lived tree species such as white pine, ponderosa pine and western larch, and an increase in Douglas-fir and grand fir. These latter species are more vulnerable to disturbances such as insects, diseases, and fires. They are less adapted to disturbance such as fire and to natural climatic variability than the species they replaced. The results are more insect and disease activity and higher fire risk.

- Across the project area, there is an increased risk of severe stand-replacing (lethal) fire due to fuel accumulations from the past exclusion of fires.
- The decline in white pine, western larch, and ponderosa pine has led to a forest that lacks variety in tree species. Because some species are present in small quantities and in some areas not at all, they are less likely to reseed themselves through natural regeneration.
- Across the project area, there has been a shift in forest structure from early succession and old growth to small pole and immature size-class stands. This is primarily the result of stand-replacing fire and subsequent fire suppression activities. There is no anticipated large-scale increase in old growth on much of the landscape due to the shift from long-lived tree species to Douglas-fir, which is generally a shorter-lived species in this area. Currently, **none of the project area contains old growth stands**. Across the Forest, the IPNF meets the requirements of greater than 10% old growth (USDA 2004 Monitoring report)
- Across the project area, there is a moderate level of root disease and a high level of fir engraver activity (see project Vegetation section of project file) due to the increase of Douglas-fir and grand fir within the watershed and the size, density, and age of the Douglas-fir and grand fir present.
- Across the project area, there is a long-term loss of timber productivity as species composition has changed from white pine, western larch and ponderosa pine to Douglas-fir. The loss of timber productivity on these areas does not meet the intent of the Forest Plan.

Recommendations

The above conclusions support the following recommendations for the project area. The recommendations are listed in order of priority.

1. Use methods such as cutting and prescribed fire to reduce fuel levels to decrease the risk of a large stand-replacing fire in the watershed and reduce the risk of destruction by fire to private property.
2. In stands where they are present, promote the maintenance of potentially long-lived early seral trees species such as ponderosa pine, western larch and white pine through thinning, improvement cutting methods and underburning where possible.
3. Restore desired potentially long-lived early seral tree species through regeneration cutting and planting in areas where shorter-lived species (e.g., Douglas-fir, grand fir) have high mortality or are at risk of high mortality.

1.1.5 Forest Vegetation - Environmental Consequences

1.1.6 Analysis Process

Existing conditions of forest vegetation in the area are described at the stand level in the silvicultural prescriptions (see Vegetation section of the project file). These descriptions provide a baseline of vegetation conditions to compare differences in environmental effects between alternatives.

The time frame for the estimated direct and indirect effects analysis of all alternatives is 10 years. Some discussion refers to the general progression of structural stages over time, which could occur over a span of 200 years.

Past harvesting in the project area was either selective cutting or regeneration cutting and salvage logging after the fire in 1926. We can only assume that the trees removed were large relics that survived the fire (see figures 1 and 2). These trees were likely scattered

across the landscape and the removal of these did not have an effect on the cover type or structure that we see today. If anything there could have been more scattered snags on the landscape than currently however, structure or cover type was probably not affected by harvest after the 1926 fire.

Figure 1. 1933 Photo including the south end of the Tumbledown Project area.

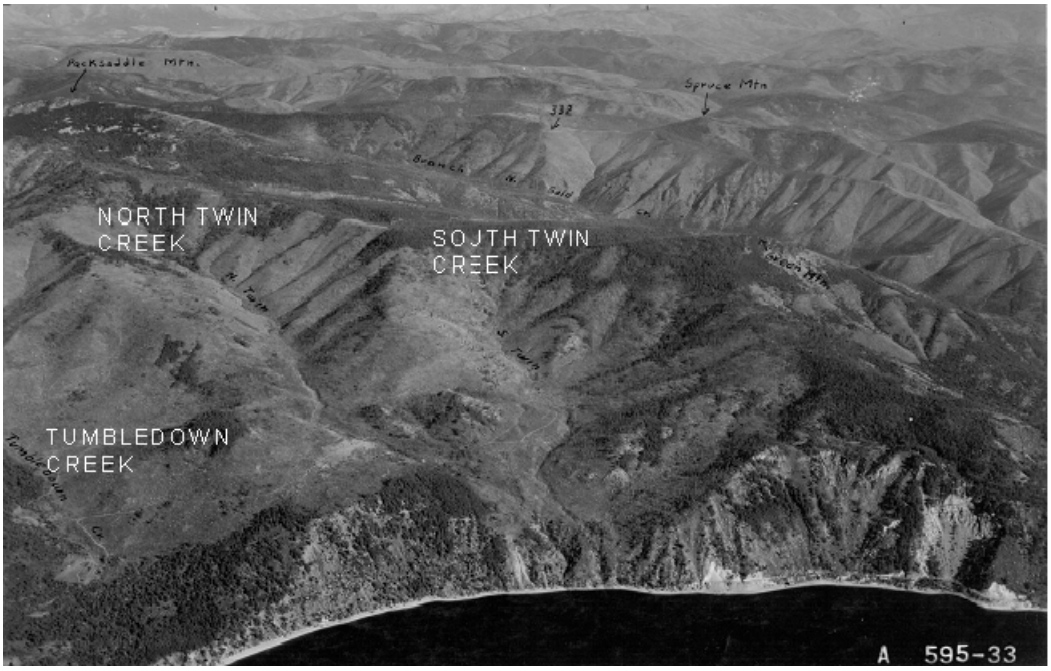

Figure 2. 1933 Aerial Photo Showing North Twin Creek, South Twin Creek, and Tumbledown Creek.

Table 2 shows the predicted percent of stand cover type and structure for the proposed action and the failure to implement alternatives for the analysis area. The changes were calculated for National Forest lands only. An explanation for this can be found in the Analysis Area section in the beginning of the Forest Health section 1.1.3.

Table 2
Vegetation Cover Type and Structure
(Percentage of 5611 Acre Analysis Area*)

Stand Parameter	Proposed Action (Alternative B)	No Action (Alternative A)
Cover Type		
PP, WWP, or WL	6	4
DF, GF, H, C, LPP,	94	96
Structure		
Shrub/Seedling/Sapling (Early Succession)	18	11
Pole/Small	12	13
Immature/Medium	44	49
Mature/Large	26	27
Old Growth	0	0

*Percents are calculated for the stand level. There may be individual acres within stands that have different cover types and structure which are not reflected in the percentages.

PP=ponderosa pine, WP=white pine, WL=western larch, GF=grand fir, DF=Douglas-fir, H=hemlock, C=cedar, LPP=lodgepole pine,

The following table (3) shows the various existing forest characteristics for each unit in the project area Douglas-fir is the most abundant cover type in the project area. There are no stands considered to be old growth in the project area. (See Vegetation project file-Old Growth Review).

Table 3
Existing Forest Characteristics by Forest Stand

Stand (Unit)	Total Acres	Habitat Type	Habitat Type Group	Cover Type	Structure[3]
62702009 62702024 (**1**)	22	TSHE/CLUN	Moderately Cool and Moist	Cedar	Immature/ Mature
6280104,05 (**2**)	39	THPL/CLUN	Moderately Warm & Dry	Cedar	Immature
62801001,4,6, 19,38 62702002,40, 43 (**3**)	93	PSME/PHMA	Moderately Warm & Dry	Douglas-fir	Pole/Immature
62802081 (**5**)	5	ABGR/PHMA	Moderately Warm &Dry	Ponderosa Pine	Immature
62802007,24,	40	THPL/CLUN	Moderately Cool and Moist		Immature

Table 3 Existing Forest Characteristics by Forest Stand					
Stand (Unit)	**Total Acres**	**Habitat Type**	**Habitat Type Group**	**Cover Type**	**Structure[3]**
68 (**6**)				Douglas-fir	
62802008 (**7**)	22	THPL/CLUN	Moderately Cool and Moist	Douglas-fir	Mature
62802008 (**8**)	18	PSME/PHMA	Moderately Warm & Dry	Douglas-fir	Mature
62802008,74 (**9**)	14	PSME/PHMA	Moderately Warm & Dry	Douglas-fir	Mature
62803018 (**10**)	11	PSME/PHMA	Moderately Warm & Dry	Douglas-fir	Small Pole
62802019,42 (**12**)	49	PSME/PHMA	Moderately Warm & Dry	Douglas-fir	Small Pole/Immature
62802036,48 (**14**)	18	THPL/CLUN	Moderately Cool and Moist	Douglas-fir	Small Pole/Immature
62803016,18 (**15**)	21	PSME/PHMA	Moderately Warm & Dry	Douglas-fir	Small Pole/Immature
62803008,14, 15 (**16**)	33	TSHE/CLUN	Moderately Cool and Moist	Larch	Immature
62803012,14 (**17**)	14	TSHE/CLUN	Moderately Cool and Moist	Larch	Small Pole
6280318,19 (**18**)	11	THPL/CLUN	Moderately Cool and Moist	Grand fir	Small Pole
62803005 (**19**)	25	TSHE/CLUN	Moderately Cool and Moist	Cedar	Sapling/ Immature
62904009,20, 22 (**20**)	56	PSME/PHMA	Moderately Warm & Dry	Douglas-fir	Mature
62904021,43 (**21**)	17	PSME/PHMA	Moderately Warm & Dry	Douglas-fir	Mature
62904023,43 (**22**)	7	PSME/PHMA	Moderately Warm & Dry	Douglas-fir	Small Pole
62803018,42 (**23**)	6	PSME/PHMA	Moderately Warm & Dry	Grand fir	Small Pole/Immature
62802020 (**25**)	33	THPL/CLUM	Moderately Cool and Moist	Grand fir	Immature
62802020 (**26**)	28	THPL/CLUM	Moderately Cool and Moist	Grand fir	Immature
62802,023,67 (**30,31**)	53	ABGR/PHMA	Moderately Warm & Dry	Douglas-fir	Immature
62802007 (**32**)	25	THPL/CLUN	Moderately Cool and Moist	Grand fir	Immature
6270802, 62802019,25,35,41, 42,73 **Fuel Break**	11	A variety	Warm Dry to Cool Moist	Grand fir	Immature brush Mature

1 Habitat Types: THPL=Thuja plicata; PSME= Pseudotsuga menziesii; TSHE= Tsuga heterophylla CLUN= Clintonia uniflora; SYAL= = Symphoricarpos albus; PHMA= Physocarpus malvaceus; ASCA= Asarum caudatum Symphoracarpus albus; PHMA= Physocarpus malvaceus; ASCA= Asarium caudatum

2 Composition: Cover Type from stand exam files (R-1 Edit, TSMRS).

3 Structure: Determined by Size/Age Class from stand exam files (R-1 Edit, TSMRS).

Unlike historic conditions, there have been no fires affecting forest vegetation within the last 80 years or more. Root disease is causing mortality in areas dominated by Douglas-

fir and beginning to change the structure of some stands. Overly dense patches of immature trees are beginning to thin from competition or breakage caused by wind and snow. Trees in these dense patches are contributing to an increasing fuel load in the analysis area. Trees damaged by wind and snow are also providing habitat for tree-killing insects.

1.1.6.1 Direct and Indirect Effects

Proposed Action (Alternative B)

The proposed action would have an affect on species composition by reducing the amount of Douglas-fir, grand fir, and lodgepole pine. This reduction in some stands would be enough to cause a reduction to the Douglas-fir cover type by approximately eleven percent (see Table 2 above).

While the actual cover type would not change for some stands, the relative abundance, vigor and health of the desired tree species would increase. Therefore, the biggest effects of the proposed treatments would be to increase the composition of desired species and to increase the diameter and crowns of trees in the remaining stand, thus prolonging the presence of these trees over time.

In all units except for Units 5, 8, 19 and 21 the prescription calls for portions of units to have regeneration cutting. This type of cutting would leave an open stand condition, allowing for enough sunlight and growing space for desired tree species to become established and subsequently dominate the site(See Table 4 below).

In some areas selective cutting would enhance the health and promote desired species on dry and moist site immature forest stands, some of which in time could become old growth.

In many stands with a high composition of Douglas-fir the potential for future old growth would be limited as root disease would eventually kill susceptible species. (USDA Forest Service unpublished report, Rockwell 1917). However, planting root disease resistant ponderosa pine, white pine and western larch would likely increase the acreage of potentially long-lived seral old growth in the long run, which is currently lacking. (Fins, Byler et al.2001, USDA1971, Fiedler and Loyd 1992, Arno 1996)

In most units the prescription calls for an irregular shelterwood intermixed with commercial thinning. This would result in portions changing structure from immature to early succession (shrub/seedling/sapling structural stage). Converting immature forest structure to the early succession stage of stand development would increase the early succession average patch size while reducing those related to immature. These changes are greater than what would occur under the failure to implement scenario. The stands would not move back into the immature structure in the 10-year long-term effects analysis period.

Based upon silvicultural diagnosis of the 1000-acre project area, approximately 671 acres is proposed for treatment. Units would range in size from 5-93 acres. Table 4 below

summarizes the silvicultural diagnosis and preliminary prescriptions for the Proposed Action.

Table 4 – Silvicultural Diagnosis Summary for the Proposed Action

Unit	Silvicultural Prescription	Proposed Treatment Acres	Harvest System*			Underburn Acres	Grapple/Hand Pile Acres	Reforestation Acres
			CTL	T	S			
1	ISW/CT	22	22				22	16
2	ISW/CT	39		39			39	33
3	ISW/CT	93			93	93		40
5	ISW/CT	5		5			5	
6	ISW/CT	40			40	40		27
7	ISW	22		22		22		22
8	CT	18		18		18		
9	ISW	14			14	14		14
10	ISW/CT	11		11			11	9
12	ISW/CT	49		49			49	40
14	ISW/CT	18		18		18		8
15	ISW	21		21			21	21
16	ISW/CT	33	33				33	23
17	ISW	14	14				14	14
18	ISW	11			11	11		11
19	LIBERATION	25		25			25	
20	ISW/CT	56		56		56		28
21	CT	17		17			17	
22	ISW	7			7		7	7
23	ISW	6		6			6	6
25	ISW/CT	33	33				33	22
26	ISW/CT	28	28				28	17
30	ISW/CT	44	44			10	34	34
31	ISW/CT	9	9				9	6
32	ISW/CT	25	25			12	13	13
Fuel Break	SELECTIVE	11					11	
Total		**671**	**208**	**287**	**165**	**294**	**377**	**411**

Cut to Length (CTL), Tractor (T), Skyline (S)

No Action (Alternative A)

Under the no action alternative, overall forest cover type would not change in the next 10 years. Stand composition of Douglas-fir and grand fir would continue to increase in relative abundance, with pine and larch decreasing over time. In the long term (more than 10 years), the cover types would likely become dominated by Douglas-fir and grand fir as well, due to a decrease in stand conditions favorable to western larch.

Barring large disturbances such as fire, storm damage or insect epidemic, forest structural classes are estimated to remain the same in the next 10 years. Mortality would continue

throughout the stands along with some increase in growth on remaining trees. Mortality in root disease areas would continue to "open up" these areas and eventually trend them to early succession as the majority of large Douglas-fir are killed.

1.1.6.2 Cumulative Effects

Cumulative effects analysis includes disclosure of the potential additive effects of past, present and reasonably foreseeable activities combined with the effects of the proposed action on Federal and non-Federal lands. The cumulative effects analysis area boundary is defined by where the effects are no longer apparent. For the reasons discussed below, the cumulative effects analysis boundary is the same as the vegetation analysis area boundary.

Past activities and natural processes, which have created the existing vegetation condition, are described in the Affected Environment section. Natural processes such as insect and disease induced mortality are discussed as reasonably foreseeable influences on vegetation change.

Ongoing activities that may cumulatively affect forest vegetation include fire suppression, and firewood cutting. Fire suppression would continue to allow understory trees (nearly always shade-tolerant) to proliferate and continue adding to the current condition without further intervention.

Project activities guided by Scientific Findings of the Interior Columbia Basin Ecosystem Management Project, Northern Region Overview, and Pend Oreille Subbasin Geographic Assessment would contribute towards restoring historic forest composition and structure. The proposed treatments would trend many acres of both dry and moist site stands towards those conditions found historically on these sites. Without treatment, all stands would continue to develop along successional pathways that are outside the historic averages for the sites in the area. In this context, the area would continue to contribute to the imbalance between historic and existing forest composition at the subbasin scale.

Private Lands in the Project Area – Activities on private land, such as urban development and logging, have and will continue to modify the adjoining landscape in private ownership. From a vegetation standpoint, only a small percentage of private lands are trending toward the desired forest cover types of larch, white pine, and ponderosa pine, since private landowners are not choosing to invest in managing in this direction. Significant increases in late mature structures or old growth is not expected on private lands, and fragmentation is expected to continue with smaller patch sizes, more edge effect and less core area. It is predicted that historic ranges of variability in vegetation would not be restored on a landscape scale. The effects of proposed vegetation treatments with the proposed action are expected to be localized, therefore the cumulative effects analysis boundary is the same as the vegetation analysis area boundary.

The added, cumulative effect of the no-action alternative on the forest vegetation resources are an impact created by considering the existing conditions (a result of past

activities), coupled with future, foreseeable actions, and the no-action alternative (of not treating hazardous forest fuels in the project area.)

As stated already, the no-action alternative would indirectly influence the continuance of the trend for widespread root-disease and insect mortality in Douglas-fir and grand fir, a slow decline in shade-intolerant species, and a general increase in the risk of a landscape level, stand-replacing wildfire event.

When coupled with foreseeable, future actions including the need for continued fire suppression in this wildland-urban interface, further development of private land within the project area, and the maintenance or increase in recreational use levels, many potential cumulative impacts should also be considered. Furthermore, we must assume that in the absence of disturbance, the natural ecological processes in the forest would continue, including stem exclusion, forest insect and disease pathogens, tree mortality, and additional accumulations of coarse woody debris as trees die and fall over. The increased private land development and continued or increased recreational use in the area could increase the number of human-caused wildfire ignitions and further influence the forest vegetation across the project area. Therefore, the cumulative effect would potentially also amplify an increased risk of a landscape-level, stand-replacing wildfire event, as well as the associated widespread disturbance to existing vegetation cover types that such a wildfire would produce. In essence, a large portion of the project area could be regenerating or "starting over" from square one. With such an event, not only would widespread vegetation cover type changes occur, but there would also be potential effects to soil physical properties and productivity, which could potentially negatively influence forest vegetation.

1.1.7 Consistency with Forest Plan and Other Laws and Regulations

The Proposed Action is consistent with Idaho Panhandle National Forests Forest Plan direction. The specific Standards, with their location in the Forest Plan, are referenced below in parentheses.

The IPNF Forest Plan designated management areas (MAs) to guide the management of National Forest lands within the IPNF. Each MA provides for a combination of activities, practices, and uses appropriate to the management goals and objectives of that specific management area. Management areas are described in detail in the IPNF Forest Plan on pages III-1 through III-87. The Tumbledown project area is comprised of lands in two MAs and riparian habitat conservation areas (RHCAs). Summaries of the management area goals specific to the Tumbledown project area are as follows:

Management Area 4: Consists of lands designated for timber production within big game winter range. The management goal for this MA is to provide sufficient winter range requirements, through scheduled timber harvest and permanent forage areas.

Management Area 9: Consists of lands designated as non-forest lands, lands not capable of producing industrial products, lands physically unsuited for timber production, and lands capable of timber production but isolated by the above landtypes or nonpublic

ownership. These areas are managed to maintain and protect existing improvements and resource productive potential with minimum investments.

There are three stands in the project area (stands 628-02-023, 628-02-067, and 628-03-014) currently designated as unsuitable for timber production that should be classified as suitable. Documentation of this recommended change in classification is located in the project file.

Both even-aged and uneven-aged silvicultural systems were considered for areas proposed for harvest. On the Sandpoint Ranger District, it was determined that both systems were appropriate where regeneration harvests were proposed (Timber Standard 1, page II-31).

Regeneration harvests are proposed where mortality is either high or expected to increase, and where undesirable species are occupying the growing space. Site preparation and fuels reduction activities are proposed to provide appropriate sites for planting. Site preparation via grapple piling or underburning would be followed by planting seral species (white pine, larch, and ponderosa pine). The resulting stand structure and species composition would reduce susceptibility to insect and disease. This is consistent with Forest Plan direction that "reforestation would feature seral tree species." All stands proposed for regeneration harvest are on lands suitable for timber production and can be adequately restocked within five years of the final harvest. As directed by the Forest Plan, stands would be regenerated with trees from seed that is well adapted to the specific site conditions, and would be regenerated with a variety of species (Timber Standard 4 and 5, page II-32).

Site-specific silvicultural prescriptions are compatible with management area goals, and preferred species management has considered both biological and economic criteria (Timber Standard 9, page II-32). Silvicultural practices including harvest, site preparation and planting with seral species are designed to reduce the perpetuation of pest problems (Forest Protection Standards 1 and 2, pages II-37 and II-38).

Management of competing understory vegetation would be accomplished, where necessary, as a consequence of fuels reduction/site preparation treatments (Forest Protection Standard 3, page II-38)

Failure to implement the proposed action would not be consistent with Forest Plan objectives for promoting stand structures and a species mix which reduce susceptibility to insects and diseases (p. II-32, (4)).

Forest Plan Standards for Old Growth

The 2004 Idaho Panhandle National Forests Plan Monitoring And Evaluation Report, pages 66 through 74 describe the Old Growth Inventory and Monitoring done on this National Forest. This report provides most of the information used in discussing compliance with the following 1987 Forest Plan standards:

10a. A definition for old growth is being developed by a Regional task Force and will be used by the forest when completed. As an interim guideline, stands classified as old growth should meet the definition given by Thomas (1979).

Forest plan standard 10a incorporates the definitions of old growth developed by the Regional Old Growth Task Force, documented in: *Green, and others. 1992 (errata corrected 02/05). Old Growth Forest Types of the Northern Region. USDA, Forest Service, Northern Region.*

10b. Maintain at least 10 percent of the forested portion of the IPNF as old growth.

The 1987 Idaho Panhandle National Forest (IPNF), Forest Plan, Standard 10b. calls for maintaining "10% of the forested portion of the IPNF as old growth". The Forest Plan identified 2,310,000 forested acres on the IPNF. Therefore, the Forest Plan Standard requires maintaining 231,000 acres of old growth on the Forest.
The IPNF is using a multi-scale approach to monitoring old growth, based on two separate, independent tools. These are:

1) Forest Inventory and Analysis (FIA) data used to calculate IPNF Forest-wide and mid-scale old growth percentages. (FIA old growth results for the IPNF are available for the first time this year.)

2) IPNF stand map displaying all stands allocated for old growth management, with old growth allocation recorded in the TSMRS database.

1) Old Growth Estimates from FIA Data

The National Forest Inventory and Analysis (FIA) program provides a congressionally mandated, statistically-based, continuous inventory of the forest resources of the United States. Since 1930 the FIA program has been administered through the Research and Development branch of the Forest Service, which makes it administratively independent from the National Forest System. The people who administer the FIA inventory on the IPNF are employees of the Interior West Forest Inventory and Analysis work unit, headquartered at the USFS Rocky Mountain Research Station in Ogden, Utah.

FIA inventory design is based on the standardized national FIA grid of inventory plots that covers all forested portions of the United States (all ownerships). FIA protocols specify sample plot location within this systematic grid. Both sample plot location and data collection standards are strictly controlled by FIA protocols. The sample design and data collection methods are scientifically designed, publicly disclosed, and repeatable. Data collection protocols are publicly available on the internet (http://www.fia.fs.fed.us/). There are also stringent quality control standards and procedures, carried out by FIA personnel of the Rocky Mountain Research Station. All of this is designed to assure that there is no bias in sample design, plot location, trees selected for measurement, or the measurements themselves.

FIA does not provide a 100% annual census of very tree on every acre in a national forest. With approximately 2,500,000 acres on the IPNF alone, and hundreds to thousands of trees per acre, that would not be possible. Rather, the FIA design provides a

statistically sound representative sample designed to provide unbiased estimates of forest conditions at large and medium scales. This inventory design is appropriate for making estimates of old growth percentages at the scale of a national forest, or large areas of forest land. (More detail on the statistical foundation of using FIA data to assess old growth on national forests is found in: *Application of Forest Inventory and Analysis (FIA) Data to Estimate the Amount of Old Growth Forest and Snag Density in the Northern Region of the National Forest System by Raymond L. Czaplewski, Ph.D. November 5, 2004* [available from Northern Region, US Forest Service]).

Because FIA data comes from a statistical sample rather than a 100% census, we describe attributes calculated from this data as estimates and the accuracy of these estimates can be computed and reported as confidence limits. The IPNF is using a 90% confidence interval for old growth estimates. That means that if a different set of randomize sample points was collected 100 different times, the estimates of old growth amounts would be within this interval 90% of the time. This indicates that if we measured every acre there is a 90% probability that the proportion of old growth for this entire population would be within this confidence interval. There is a 5% probability that the proportion of old growth would be less then the lower confidence limit. There is an equal 5% probability that the proportion of old growth would be greater than the upper confidence limit.

Using FIA data to assess the percent of old growth allows us to base our monitoring on an unbiased, statistically sound, independently designed and implemented representative sample of forest conditions on the Idaho Panhandle National Forest (IPNF). This inventory is reasonably current because FIA plots on the IPNF were installed during 2000 to 2004. To remain current, FIA re-measures 10% of its plots every year. As these re-measured plots accumulate, we will periodically update our FIA old growth report. Current FIA old growth estimates are presented at this time. Updated reports of old growth on the IPNF, as estimated from FIA plots, will be available in subsequent years.

FIA plot data is tested against the old growth minimum criteria in Table 1 of *Green and others (2005)*. The old growth minimum criteria are the number of trees per acre that exceed old growth minimum ages and diameters, and a minimum forest density measured as basal area per acre. The values are specific by Habitat Type and Forest Type combinations. Plots that meet old growth minimum criteria are classified as old growth. Data analysis is automated in the Forest Service, Northern Region, "FIA Summary Database".

Based on FIA data, the estimated percent of old growth on the forested lands of the IPNF is 12.85%. The 90% confidence intervals of this estimate are 10.55% to 15.27%. Given these values, we conclude that the IPNF is meeting Forest Plan Standard 10b. that calls for maintaining "10% of the forested portion of the IPNF as old growth".

FIA old growth percentages by Ranger District also provide evidence that our old growth is well distributed across the IPNF. Note that as the sample size becomes larger, the confidence intervals are tighter. Estimates for the IPNF as a whole provide the tightest confidence intervals. Results are as follows:

Table 25. FIA Current Estimated Percent Old Growth By Ranger District

Ranger District	90% Confidence Interval Lower Bound	Point Estimate	90% Confidence Interval Upper Bound	# of Subplots
Wallace	5.9%	11.4%	17.6%	236
Avery	10.9%	16.6%	22.8%	340
Fernan	2.5%	6.3%	10.8%	224
St. Maries	0.8%	5.0%	10.5%	120
Sandpoint	5.3%	10.8%	17.2%	188
Bonners Ferry	12.9%	19.2%	25.8%	264
Priest Lake	7.2%	13.7%	20.9%	216
Total IPNF	**10.55%**	**12.85%**	**15.27**	**1588**

2) IPNF Stand-Level Map of Old Growth

This is the first year we've had FIA old growth data available for the entire Forest. In past years we've reported forest-wide old growth results by tallying up the acres of stands allocated for old growth management, and comparing this total to the Forest Plan 10% standard. We continue to do that this year, and will also compare it to the FIA old growth estimates, which have a known statistical accuracy. This comparison should provide an additional measure of the reliability of old growth monitoring results.

The IPNF stand-level old growth map represents a census of those stands allocated for old growth to meet Forest Plan standards. The stand-level old growth allocation allows us to distribute old growth across the Ranger Districts and landscape in ways that makes ecological sense at the landscape scale, and serves as a basis for project planning. This forest-wide stand map also provides a useful starting point when we are considering any management activity, and need to take a more detailed look at old growth allocations within a potential project area. The stand map also allows us to display to the public that adequate amounts of old growth are allocated and distributed across the landscape.

The IPNF stand-level old growth allocation represents a different approach to monitoring old growth than the FIA sample, and was designed and implemented independently from the FIA inventory. Forest stand information is gathered by Ranger District personnel. Allocation of old growth stands is usually based on a field examination. Most old growth stands are examined with a formal systematic grid of stand exam plots that counts and measures trees on these plots. A smaller proportion of stands were allocated to old growth based on notes and measurements from of walk-thru, field verification surveys by foresters and forestry technicians knowledgeable about old growth definitions. Less than 1.5% of old growth stands were allocated from photo inventory, and all of those will be field verified before any forest management projects are carried out in those watersheds.

Ranger district stand-level old growth allocation utilizes the latest stand inventory data to assess how well stands meet the old growth definitions in the IPNF Forest Plan, as specified in *Green, and others (2005).* The old growth definitions in *Green and others (2005)* are in two parts. First, there are tables of "Old Growth Type Characteristics". These tables include both "minimum criteria" (minimum age, tree diameter, number of old large trees, and basal area) and "associated characteristics" (ranges of numbers or proportions of broken topped trees, snags, canopy layers, diameter distributions, broken tops, and large down wood). Pages 11 and 12 of *Green and others (2005)* explain that:

"The minimum criteria are used to determine if a stand is potentially old growth. Where these values are clearly exceeded, a stand will usually be old growth. The associated structural characteristics may be useful in decision making in marginal cases, or in comparing relative values when making old growth evaluations." *Green and others (2005)* also warns that: "A stand should not be accepted or rejected as old growth simply on the basis of associated characteristics." The associated characteristics are not part of the base old growth definition. Speaking of the minimum criteria, *Green and others (2005)* further says: "Because of the great variation in old growth stand structures, no set of numbers can be relied upon to correctly classify every stand. . . . Do not accept or reject a stand as old growth based on the numbers alone; use the numbers as a guide." Second, on pages 11 and 12, *Green and others (2005)* provides guidance for incorporation of landscape ecology considerations, and a full range of resource values (including human values) in the selection of stands to be managed as old growth. Professional consideration of a wide and complex variety of factors is necessary to make old growth allocations at the stand scale.

When making old growth allocation decisions for individual stands in individual landscapes, ranger district personnel use the *Green, and others (2005)* tables of "Old Growth Type Characteristics", but also incorporate the variety of other old growth resource values and landscape design criteria, as explained in pages 11 to 12 of *Green and others (2005).* Taking these other considerations into account is fully consistent with Forest Plan standard 10c., which states: "Areas will be selected as old-growth management stands based on a combination of wildlife, cost efficiency, and other resource values (interdisciplinary process)."

In response to old growth concerns, from 1990 through 1993 the IPNF did a forest-wide inventory of old growth resources, and worked with local public Forest Watch groups to allocate and map old growth. This is the original source of the IPNF stand-level old growth allocation and map. Since that time, we have continued to update our old growth stand allocation and map as the forest has changed by natural events, and as new information has became available.

Starting in 2001 the Idaho Panhandle National Forest began a comprehensive review of old growth data, and did some new field reviews and exams, to incorporate changes in conditions on the ground. This ongoing review, monitoring and updating of the old growth stand allocation and map results in some changes in old growth stand acres reported in annual Monitoring Reports over the years, in response to changing conditions on the ground and better information. These changes are evidence that we are working to keep the stand-level allocation current as conditions change on the ground. Each year's Monitoring Report contains the most current old growth stand information available. The stand information below was extracted from our database in March 2005, and represents the approximate situation at the end of 2004. Evaluating this stand-level old growth allocation information together with the FIA old growth estimates provides the most comprehensive picture of old growth amounts on the IPNF.

The IPNF does not do timber harvest that removes allocated old growth. We ceased regeneration harvest of allocated old growth stands a number of years ago. However, old growth distribution will never be entirely static because forests are living, changing

natural communities. Disturbances such as fire, insects, pathogens, and weather events may reduce the amount of old growth in some areas. Meanwhile, other stands will grow and age into old growth status. The IPNF has approximately 600,000 acres of mature forest (generally dominated by trees 100+ years old), substantial amounts of which have the potential to grow into old growth in the next few decades. We will continue to update our old growth stand data in response to changing conditions on the ground, and as we obtain new information. The priority for our updating efforts will be those watersheds where we are considering management activities.

The IPNF has approximately 6,500 individual old growth stands distributed across 2.5 million acres of National Forest. It is not practical to visit every old growth stand every year. Because natural changes are going on continually (this includes both disturbances that remove old growth, and other stands maturing into old growth), information about some allocated stands may be outdated at any given time. However, to ensure that all management actions are designed based upon current old growth conditions, we take a closer look at old growth allocations within a project area whenever any management activity is being considered that could possibly impact old growth. And to ensure that we're meeting Forest Plan old growth standards forest-wide, we use FIA estimates to monitor the amount of old growth across the forest and at other large scales.

This forest-wide stand map provides us with stand-level information that is useful starting point at the project scale when we are considering any management activity. Before making any management decisions that could possibly impact old growth, we take a detailed look at old growth allocations for that project area. We closely review and verify all old growth allocations within the project area, as well as review all potential treatment stands, and look for previously unidentified stands that may now meet old growth criteria. The objectives of this review are to be sure we have the best old growth allocation and landscape arrangement possible within that project area, and to be sure we're not inadvertently, negatively impacting old growth. Where appropriate, project design may also include identification of potential future old growth in the area. Project-scale review often results in changes in old growth status for a few individual stands. We sometimes find that some previous old growth stands no longer meet criteria because of insect and disease or weather mortality. However, because other stands have grown into old growth status, or because we also find previously un-inventoried old growth, this project-scale review commonly results in a net increase in old growth in the project area.

We record old growth allocations in the Forest Service Northern Region, Timber Stand Management Record System (TSMRS) database, because there are database fields and codes designed for recording stand old growth status. TSMRS is a very large Forest Service database used across the Northern Region. Any database is simply an electronic box with pre-defined fields to store specific information items. It is not possible to make meaningful sweeping general statements about the reliability of a large, widely used database. The completeness and reliability of any specific data field in any database depends upon the local effort devoted to gathering and maintaining that specific information. In the last few years the IPNF has spent over $320,000 in District-wide reviews and updating of old growth stand information in TSMRS. In addition, for all potential management projects, TSMRS old growth information is subject to additional project area review and validation (as explained above) prior to any management action

on the ground. This assures that we don't, inadvertently, take any management action that negatively impacts old growth, and that all our project plans are based on the current old growth status for that project area. The old growth information currently in the Idaho Panhandle National Forest portion of the TSMRS Database has been substantially reviewed a since 2001, with updates made as appropriate. Much of this updating has taken place within the last 2 years. That updating continues as the forest changes and new information becomes available.

The TSMRS database contains codes indicating individual stand old growth status. The actual stand data that's the basis of the old growth determination is found in stand exam data stored in the FVEG database, and other information and field notes in the individual stand folders. This information is updated when new exams are done.

Our database allows us to track old growth in several categories, depending upon how it was identified in the inventory and how it is currently allocated. We separate our old growth into the "allocated" old growth stands that are specifically identified and "retained" to meet the 231,000-acre forest plan standard, and "additional" old growth that serves old growth ecological functions, even though it is not formally allocated.

"Existing Old Growth" (TSMRS Special Uses code 9) meets (and often exceeds) *Green and others (2005)* old growth minimum criteria at the stand level. "Ancient Cedar" (Special Uses code 2) is also part of our existing allocated old growth, but we track it separately because we want to take special note and care of these unique stands. "Ancient Cedar" stands contain trees over 5 feet in diameter, with ages over 500 years old; they far exceed minimum old growth criteria.

"Potential Old Growth" (Special Uses code 11) meets, or comes close to meeting a number of old growth minimum criteria, but is lacking somewhat in some criteria. However, if it is listed as "allocated", it does contribute to old growth functions at some scale. The most common situation is that the "potential old growth" has more than enough <u>large</u> trees to meet old growth criteria, but some of the trees are not quite <u>old</u> enough. However, these are usually the largest and oldest trees we have in a given area, and with a little more time can be expected to meet the age criteria as well. Some "potential old growth" is included in our old growth allocation because it is close to meeting the minimum criteria, is the best that we have available in an area, and contributes to distribution of old growth characteristics across the landscape. Other allocated "potential old growth" stands are small patches that contribute to the integrity of a larger block of old growth, or serve as part of a corridor or as stepping stones, linking two larger old growth blocks. Larger old growth patches are generally more valuable as wildlife habitat, and linkages across the landscape are important. Allocated potential old growth contributes to the functional integrity of old growth at the landscape scale, and is managed as part of our old growth allocation. This is consistent with the direction in *Green and others (2005)* about the importance of using landscape ecology considerations, as well as individual stand attributes, in selecting land to be allocated as old growth.

Old growth can be monitored by tallying up acres of stands allocated and mapped as old growth. Totals from the IPNF stand-level map are presented in Table 26. Forest Plan Standard 10b. calls for maintaining 231,000 acres of old growth (10% of

our forested acres). <u>We have identified and allocated 278,552 acres of forest stands (12.1% of IPNF forested acres) to be retained as old growth.</u> Old growth status in 98.5% of these stands has been field verified. Clearly, the IPNF has allocated enough acres of old growth stands to meet and exceed Forest Plan Standard 10b. for the amount of old growth to be retained. We also have an additional 7,444 acres (0.3% of forested acres) of previously field examined, unallocated old growth stands, which provides old growth habitat for wildlife and serves other ecological functions.

Table 26. Acres of Old Growth Stands By River Sub-Basin

Sub-Basin (River)	Allocated Ancient Cedar *(code 2)*	Allocated Field Verified Old Growth *(code 9)*	Allocated Photo Inventory Old Growth *(code 10)*	Allocated Potential Old Growth *(code 11)*	Total Allocated Old Growth *(codes 2, 9, 10, 11)*	Additional Field Verified Old Growth *(code 12)*	Total All Old Growth *(codes 2, 9, 10, 11, 12)*
St. Joe	1,945	58,920	971	13,160	**74,996**	7,444	**82,440**
Coeur d'Alene	208	56,216		8,836	**65,260**		**65,260**
Pend Oreille	63	19,265	55	5,208	**24,591**		**24,591**
Kootenai	516	59,737	254	5,346	**65,853**		**65,853**
Priest	1,880	40,866	2,833	2,273	**47,852**		**47,852**
Forest Total	**4,612**	**235,004**	**4,113**	**34,823**	**278,552**	**7,444**	**285,996**

If we just count the field-identified stands that correspond to the minimum criteria in Table 1 of *Green and others (2005)*, (codes 2, 9, & 12 above), regardless of allocation status, the IPNF shows 247,060 acres, which equals 10.7% of IPNF forested acres. This also meets and exceeds Forest Plan Standard 10b. for the amount of old growth to be retained, and does so without counting any of our "Allocated Potential Old Growth".

<u>Summary -- Comparison of Two Tools for Monitoring Old Growth</u>

As explained above, the IPNF is using a multi-scale approach to monitoring old growth, based on two separate, independent tools. These are:

1) Forest Inventory and Analysis (FIA) data used to calculate IPNF Forest-wide and mid-scale old growth percentages.

2) IPNF stand map displaying all stands allocated for old growth management, with old growth allocation recorded in the TSMRS database.

These two independent tools use significantly different designs, and are administered and carried out by different people. FIA old growth estimates are based on a statistically sound, representative sample of the entire National Forest, administered by the Rocky Mountain Research Station in Ogden, Utah. This sample is designed to provide unbiased estimates of forest conditions at medium and large scales. Total acres from the IPNF old growth stand-level map are a census of stands allocated for old growth management, based upon examination of selected individual forest stands for old growth characteristics. The stand inventory is carried out by IPNF Ranger District personnel. The stand-level map is a fine-scale tool that allows us to allocate old growth stands across the Ranger Districts and landscape in a way that serves as a basis for project planning.

As displayed above, the two independent Forest Service old growth monitoring tools produce remarkably similar results at the forest scale:

- **Based on FIA data, the current estimate of the proportion of old growth on the forested portion of the IPNF is 12.85%. The 90% confidence intervals of this estimate are 10.55% to 15.27%.**

- **The IPNF total acres of mapped stands allocated and maintained for old growth is 12.1% of forested lands.**

The percent of forested acres of stands allocated for old growth is well within the 90% confidence interval of the FIA inventory. From statistical perspective, at the 90% confidence level, the two numbers are not significantly different. Together, these two monitoring tools offer compelling evidence that the IPNF is meeting Forest Plan standards for the amount of old growth to be retained.

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10c. Select and maintain at least five percent of the forested portion of those old growth units that have five percent or more of existing old growth.

The project area falls within two old growth management units, OGMUs 15 and 16. OGMUs 15 and 16 have 4.9% and 5.6% allocated old growth respectively, all of which is outside the project area. While several stands in the project area have a component of large, old trees, there are no unallocated stands in the project area that meet minimum old growth criteria (based upon field reviews by the District Wildlife Biologist and Silviculturist completed in July 2005 located in the Vegetation section of the project file).

Table 1. Current old growth allocations within Project Area Old Growth Management Units (OGMU)

OGMU (Unit #)	Total Acres Of OGMU	Allocated Old growth (OG)		Acres of Project Area per OGMU	Acres of OG in Project Area
		Acres	Percentage of OGMU	Acres	Acres
15	13,560	660	4.9	961	0
16	14,378	812	5.6	4613	0
Total	27,938	1472	5.2	5574	0

10d. Existing old growth stands may be harvested when there is more than 5% in an old growth unit and the Forest Total is more than 10%.

Harvest of allocated old growth was not proposed for any of the alternatives.

10e. Old growth stand should reflect approximately the same habitat type series distribution as found on the IPNF.

The following table displays habitat type series distribution for old growth compared to all our forested acres.

Table 28. Old Growth Habitat Type Series Distribution

Habitat Type Series	% IPNF Acres by Inventoried Habitat Type Series	Allocated Old Growth Acres by Habitat Type Series	% of Allocated Old Growth Acres by Habitat Type Series
Ponderosa Pine	< 0.1%	0	0.0%
Douglas Fir	6.8%	7,997	2.9%
Grand Fir	14.6%	14,648	5.3%
Western Red Cedar	15.9%	50,863	18.3%
Western Hemlock	37.7%	110,646	39.7%
Subalpine Fir	15.2%	52,081	18.7%
Mountain Hemlock	9.7%	41,911	15.0%
Lodgepole Pine	< 0.1%	0	0.0%

As displayed above, old growth on the IPNF does reflect approximately the habitat type series distribution of the forest. On 79% of the land the amount of old growth is proportional to, or more than proportional to the distribution of that habitat type series.

Old growth distribution is less than proportional to habitat type series distribution only in the Douglas-fir and grand fir series, which occupy the driest 21% of the land. The dry habitat type group (all of the Douglas-fir and the dry end of the grand fir series) occupies approximately 10% of IPNF land. The moist end of the grand fir series (which is still drier than the rest of the forest) covers another 11 % of IPNF land, and is often found at lower elevations and southerly aspects, and is subject to significant moisture stress during drought years.

The low proportion of old growth in these two dry habitat type series is a function of the combined effects of the huge 1910 fire and other big early 20th century fires, subsequent suppression of most low and mixed severity fires, early 20th century timber cutting, root diseases, and bark beetles. Much of the old growth inventoried on these two habitat type series is currently dominated by Douglas-fir or grand fir, which are at risk from bark beetles and root diseases. Where the moister, non-riparian grand fir habitat types are adjacent to dry sites, fires, root diseases, and bark beetles that strike the dry sites have a high probability of carrying over into adjacent Douglas-fir / grand fir stands. During drought years, grand fir growing on upland grand fir habitat types is at risk from *Scolytus* bark beetles. Active management will be necessary to restore more resilient tree species, and increase the proportion of old growth on our dry habitat types and adjacent grand fir habitat types.

The natural processes that maintained old growth on dry sites were very different than on moister sites. Historically, most of these dry forest habitat types were subject to frequent low-severity underburns and mixed severity fires that thinned out smaller trees and favored large trees of the most fire-resistant species (ponderosa pine and western larch). Frequent low-severity fires reduced the total number of smaller trees (thus limiting moisture demands that caused tree stress on these dry sites), and reduced dead woody fuels and live ladder fuel accumulations (thus reducing the risk of stand replacing crown fires). These low and mixed-severity fires were the keystone natural process that maintained dry site old growth forest structures.

Now, on dry habitat types, approximately 70 years of effective fire suppression has allowed in-growth of dense stands of smaller trees and accumulation of high woody fuel loads. Lack of fire has favored Douglas-fir and grand fir over ponderosa pine and larch. The large number of trees in these denser stands creates higher moisture demands than in the historic, fire-maintained open stands. This higher moisture demand stresses the old growth trees during drought years, and predisposes stands to bark beetle outbreaks. During drought years this can result in unusually high levels of mortality amongst old trees in these unnaturally dense stands. Dense Douglas-fir and grand fir are also more susceptible to root diseases and bark beetles than historic forest structures. Compared to the historic forest, dense Douglas-fir / grand fir stands on dry sites have a lower probability of surviving long enough to become old growth. Those dry site fir stands that do get old enough are less likely to be as resilient as the historic old growth structures. In addition, during fires the dense small trees in the understory serve as fuel ladders that carry flames into the upper canopy of large old trees. This new situation creates an unnaturally high risk of stand replacing crown fire, which will kill old trees that historically were able to survive surface fires. Decades of fire suppression on dry sites

has transformed stand structures in a way that threatens the continued existence of old growth on these dry sites, and reduces the chances of current younger stands surviving long enough to become old growth.

On these dry sites, hands-off management of existing overly dense mature and immature fir-dominated stands is not likely to increase the amount of future old growth. Active restoration by mimicking of historic disturbance processes may be necessary to meet Forest Plan standard for maintaining old growth on dry habitat types. In those places where we find dry site old growth stands with unnatural in-growth of dense smaller trees (particularly firs), we may consider restoration opportunities. Restoration may include various mixes of prescribed fire, thinning, and planting of historic shade-intolerant, fire-adapted tree species. The existing large old trees will be retained. In existing old growth, the driving objectives will be maintenance of old growth characteristics, and restoration of historic old growth structures and processes. In mature and immature stands where old growth and fire-adapted species are lacking, restoration activities may be necessary to create forests that are more likely to survive long enough to become old growth.

10f. One or more old growth stands per old growth unit should be 300 acres or larger. Preferences should be given to a contiguous stand; however the stand may be subdivided into stands of 100 acres or larger if the stands are within one mile. The remaining old growth management stands should be at least 25 acres in size. Preferred size is 80 plus acres.

No harvest of allocated old growth is proposed in the Tumbledown project area; therefore, the size of allocated old growth stands within the OGMU would not be reduced by the alternatives.

10g. Roads should be planned to avoid old growth management stands to maintain unit size criteria.

No road construction is proposed in or adjacent to allocated old growth stands.

10h. A long-term objective should be to minimize or exclude domestic grazing within old growth stands.

Activities proposed do not include domestic grazing allotments. There are currently no grazing allotments in the project area.

10i. Goals for lands to be managed as old growth within those lands suitable for timber production are identified in the management area prescriptions.

The 2004 Forest Plan Monitoring Report (USDA Forest Service 2004a) includes a table showing the Forest Plan management areas that have acre goals associated with them for old growth allocation. The table also shows the existing amounts of allocated old growth for those same areas. Current old growth allocations meet and far exceed those Forest Plan goals. Therefore, old growth standard 10i has been met.

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