# APPENDIX G

# Forest Management

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# Forest Management

## Silvicultural Practices

Silvicultural practices are those forestry techniques used to manage forest lands. They are normally divided into the broad categories of even-aged management and uneven-aged management.

Even-aged management practices are intended to promote the response and growth of tree species which are shade intolerant (sun-loving). Such species are ponderosa pine, western larch, lodgepole pine, and in some instances and on some sites, Douglas-fir. Conversely, uneven-aged management techniques promote the establishment and growth of species that grow and reproduce well in shaded situations. These species include western red cedar, Engelmann spruce, the true firs and, again depending on site, Douglas-fir.

Clearcutting, seed tree harvest, and shelterwood harvest, are silvicultural techniques used to convert or maintain forest stands in the even-aged management regime. Selective harvest, and in some instances shelterwood cutting, will promote the uneven-aged forest species. This is not to state that the sun-loving species cannot be managed in an uneven-age situation. Ponderosa pine and western larch both need sunlight to generate and grow rapidly, but small openings within stands may be sufficient to do so. Normally these species, along with lodgepole pine do not grow well in an understory, shaded situation.

In the Swan Valley, Douglas-fir responds to a wide variety of climatic, moisture, hydrologic and elevational conditions. It does not do well at very high, subalpine elevations, but for the most part will reproduce and grow at most other environmental conditions in the Swan Valley.

Even-aged practices are carried out for a variety of reasons; primary among which is the fast production of higher-value, more marketable lumber species. To produce these species economically, even-aged management techniques are used. Another reason for harvesting timber in these manners (clearcutting, shelterwood, seedtree) is the economics of logging. It is much more economical to log everything than to select each tree to be harvested. Because older timber has less vigor and may contain heavy defect, even-aged management converts these stands to more vigorous, healthy young stands for the next generation.

Even-aged management techniques are used less extensively today than previously due to the desire to maintain a more diverse forest structure. An increase in the knowledge and science of ecosystem management has led to silvicultural practices and techniques that minimize impacts and effects on water regimes, wildlife species, scenery and other human values.

## Timber Harvest Activity

Timber was the major economic resource of the Swan Valley in the last half of the 20th century. Since forest age class, species, and age mix and distribution are integral parts of sustainability and connectivity of all the other aspects of our ecosystems, an in-depth discussion of timber harvest follows.

### Flathead National Forest (Public Lands)

The widespread spruce bark beetle infestation in riparian stream courses was the major contributing factor increasing timber harvest activity on national forest lands in the 1950s. This triggered increased emergency road construction and the sale of dead, infected and high-risk stands of Engelmann spruce. It also marked a major change in entry and access to mature and old growth stands of timber, heretofore generally considered inaccessible. During the 1950s approximately 80 million board feet (mmbf) of timber were removed. Harvest records from 1946 to 1975 provide an insight to the relative composition of the forests at that time period on national forest lands. These records of the former Condon Administrative Ranger District, Flathead National Forest, closely approximate the area called the Upper Swan planning unit. Total harvest from public lands from1946 to 1972 was approximately 220 million board feet (mmbf) of all species. The following indicates the relative annual activity.

**Table G-1.** *Volume Harvested from Federal Lands on the Condon Ranger District*

| Year | Volume (mbf*) | Year | Volume (mbf*) | Year | Volume (mbf*) |
|---|---|---|---|---|---|
| **1946-55** | 30,677 | **1961** | 7,761 | **1967** | 4,873 |
| **1956** | 15,225 | **1962** | 24,022 | **1968** | 8,739 |
| **1957** | 9,076 | **1963** | 13,340 | **1969** | 11,595 |
| **1958** | 8,004 | **1964** | 19,657 | **1970** | 8,463 |
| **1959** | 5,147 | **1965** | 11,714 | **1971** | 4,384 |
| **1960** | 7,887 | **1966** | 19,055 | **1972** | 12,518 |
| * mbf = thousand board feet | | | | | |

The following table shows percent species composition of the volume removed indicating the changes in vegetation that have occurred.

**Table G-2**. *Percent Volume Harvested by Species*

| SPECIES | FISCAL YEARS | | | |
|---|---|---|---|---|
| | 1951 – 55 | 1963 – 69 | 1970 - 75 | Average |
| Western Larch | 26% | 43% | 35% | 35% |
| Douglas-fir | 29% | 19% | 18% | 22% |
| Spruce | 42% | 7% | 10% | 20% |
| Ponderosa Pine | 1% | 25% | 12% | 13% |
| Lodgepole Pine | 0% | 4% | 17% | 17% |
| White Pine | 2% | 0.4% | 1% | 0.9% |
| Western Red Cedar | 0.17% | - | 2% | 2% |
| Alpine Fir | 0.38% | 1% | 2% | 2% |
| Hemlock | - | - | 3% | 3% |

*:*

The major species, western larch, Douglas-fir and ponderosa pine, were harvested because their higher values helped with road construction and other development costs and accelerated and increased emphasis on spruce removal, especially during fiscal years 1951-55. Clearcutting of Engelmann spruce and lodgepole pine stands as well as western larch/ Douglas-fir types was commonly used to convert these stands to young, vigorous even-aged stands of a single species, preferably ponderosa pine or western larch. Size of cutting units varied but tended to be large until 1972-73 when the regulations called for approval by the regional forester for units over 40 acres. Other harvesting methods, such as selective, shelterwood or seedtree, were used sparingly.

## Industrial Ownership

During the 1950s, major entries on industrial forestland owned by the Northern Pacific Railway (Plum Creek) occurred. Following the lead provided by seven national forests in the northern Rocky Mountain region, accelerated access and harvest of Engelmann spruce killed by the bark beetle was started. “The widespread outbreak of the spruce bark beetle now present …originated from many thousands of spruce trees that were uprooted by severe windstorms during 1949 and 1950. These windfalls provided ideal breeding places for the epidemic beetle population that became evident in June 1952.” A 1953 survey found 880

million board feet of Engelmann spruce infested on forests in Montana, Idaho and Washington. Within the Flathead National Forest area nearly 100 million board feet on all ownerships were infested, with 17 million board feet found in the Swan Valley. A massive program was begun to control the outbreak. On the Lolo and Flathead National Forests, 155 miles of road were constructed or contracted for construction between July 1, 1952 and December 31, 1953. Approximately 20 miles of road were constructed on all lands in the Swan Valley in 1952 for the control of spruce bark beetle.

Forest management within Northern Pacific's Swan-Placid Management Unit began intensively with the attempt to control spruce bark beetle. Roading into company lands was begun in conjunction with federal and state land management agencies. Between 1952 and 1957, 48 million board feet of timber were removed.

In 1968, Northern Pacific purchased Plum Creek Timber Company based in Columbia Falls, Montana. Northern Pacific became the Burlington Northern in 1970 when the three railroad companies in Montana merged. Plum Creek was set up as a subsidiary of Burlington Northern and became a separate, privately-owned, and then a publicly-held company in 1989.

Since the early 1950s until now, continuous forest management has been ongoing. The management of Plum Creek forests is primarily for timber production. Plum Creek has taken the lead on developing practices that protect and enhance environmental values. Plum Creek has been responsive to public expectations for water and air quality, wildlife and ecological diversity and is committed to using sound scientific and economic principals to promote and insure growth, productivity, and health of its forests. The following table summarizes timber volume production from 1946 through 1999.

**Table G-3.** *Plum Creek Timber Harvest, 1946 - 1999*

| Period | Volume Harvested (mbf*) | Average Per Year |
|---|---|---|
| **1946-59** | **87,800** | **6,300** |
| **1960-69** | **290,200** | **29,000** |
| **1970-79** | **93,400** | **9,300** |
| **1980-89** | **205,000** | **20,500** |
| **1990-99** | **219,600** | **22,000** |
| **Totals** | **896,000** | **16,600** |

* mbf = thousand board feet

## Non-Industrial Private Ownership

Timber harvesting on private land has occurred since the first homesteaders arrived. They cleared land to make good on their deed agreements. As the lumber market shifted or as the need within the family required, individuals have harvested their timber. Timber harvest activity on private lands experienced a steady increase after WWII in the Upper Swan Valley, similar to events throughout western Montana. Landowners still manage their lands for agriculture, economics, aesthetics, fire protection and forestland stewardship. Some owners maintain timber cover to insure a more private, secluded dwelling.

Prior to 1985, records for timber harvest activity filed in Missoula, Montana, at the Forestry Division office of the Department of Natural Resources and Conservation, gave little indication of timber volume by area harvested, only by logging contractor, hence is not relevant here. The following lists the volume records since 1985 in five-year periods.

**Table G-4**. *Volumes Harvest from Non-Industrial Lands, 1985 - 2000*

| Harvest Period | Volume (mbf*) | Acres |
|---|---|---|
| **1985 – 1989** | 8,686.5 | 2,288 |
| **1990 – 1994** | 14,912.0 | 3,046 |
| **1995 – 1999** | 14,090.5 | 6,543 |
| **2000** | 987.5 | 1,538 |

* mbf = thousand board feet

*:*

From 1985 to 1989, most of the harvesting (7,607 mbf) occurred in the Rumble Creek area, T20N R16W. The bulk of that volume was taken from land being cleared for pasture. In 1990 to 1994, at least half of the year's total volume was removed from the same area. In 1995 to 1999 most of the volume harvested came out of the Lindbergh Lake and Kraft Creek areas that were then being developed. More partial cutting occurred over a much larger acreage than the land clearing practices of the 1980s. The average cut per year for the fifteen-year period is about 2.5 million board feet. During 2000 there was a slow down of the timber market.

## Forest Habitat Types

Forest Habitat Types are a means of classifying forest communities. On the landscape they indicate potential patterns of plant succession, fire regimes and wildlife habitats. They are based upon the relationships between the potential late-seral and/or climax forest tree types and its understory vegetation. The climax plant community, being the end result of plant succession, reflects a meaningful integration of the environmental factors affecting vegetation on that site; reflecting environmental variations and delineating potentials for vegetative development. On the landscape they will indicate potential patterns of plant succession, fire regimes and wildlife habitats.

Habitat types describe the forest in terms of the mature forest community as well as the potential climax associations characteristic of that type. It is a very important tool used to present information on successional development, timber productivity potential, and many other biological potentials, within the forest. In short, habitat types describe those land areas capable of producing similar plant communities at climax. Certainly many plant communities may never reach the climax stage due to one disturbance or another, but the habitat type can still be recognized, and treatments along with management strategies for those sites can be identified.

Each habitat type represents a relatively narrow segment of environmental variation, and a variety of biological manipulation can be determined from that representation. Each type may support a variety of disturbance-induced (seral) plant communities, but vegetative succession will ultimately produce similar plant communities at climax across the type. The main advantage of habitat types in forest management is that they provide a permanent and ecologically-based system of land stratification. Habitat types are an excellent tool used to examine the existing and desired conditions of plant communities and to determine methods to get from one to the other.