

Timber Management

Goal: Maintain and protect multiple use values and resources in harvest areas.

Objective: Determine whether Timber Management Standards and Guidelines in the 1997 Tongass Land and Resource Management Plan (Forest Plan) are being followed in harvest areas.

Timber Management Question 1: Are timber harvest activities adhering to applicable Timber Management Standards and Guidelines?

Timber Management Question 1 addresses the limitation of created openings greater than 100 acres and the 1,000-foot beach and estuary buffer requirement. All harvest unit locations are entered in the Forest's geographic information system (GIS). These units are compared to the 1,000-foot beach and estuary buffers to determine if they infringe on the buffer zones. In addition, unit size is tracked (see Timber Management Question 6).

Refer to the Fish Habitat, Karst and Caves, Soil and Water, Wetlands, and Transportation sections in this report for a discussion of harvest as related to standards and guidelines for those resources.

Monitoring Results

There were 3735 acres fully or partially harvested during FY 2006. Of the 3735 acres, 2863 acres were sold under the 1979 TLMP (category 1 and 2 timber sales). 866 acres resulted in the creation of an opening. Of the 866 acres of openings, 305 acres were sold under the 1979 TLMP (category 1 and 2 timber sales). The remaining acres were harvested under category 3 and 4 sales. The 100-acre size limitation applies to all harvest units that create an opening. No openings exceeded 100 acres in size.

Of the total 2006 harvest, there were 2 units that may have been harvested within the 100 ft. TTRA stream buffer. These units are on the Hoonah and Thorne Bay Ranger Districts. The GIS covers indicate an overlap between the harvest and the stream buffers. We expect this is due to poor vertical integration between the streams and harvest GIS map covers and not an actual incursion into the buffer by the harvest unit. However, these units will be field verified during fiscal year 2007. The status will be reported in the 2007 Monitoring and Evaluation Report, timber question 1. One of the units was harvested under category 3 timber sales and the other under category 4.

We reported last year that four units on the Thorne Bay Ranger District were to be field verified for possible harvest in TTRA buffers. Thorne Bay staff did not field verify these units during 2006 and are subsequently scheduled for 2007. We will report on these four units in next years (2007) report, Timber Management question 1.

The following table displays the location of the units with possible TTRA timber harvest occurring during 2005 and 2006.

Table TM-1. Possible TTRA timber harvest locations during 2005 and 2006

District	Stand ID Number	Sale Name	Unit Number	Unit Size (Acres)	Possible Acres in Buffer	Fiscal Year Unit was Harvested
Thorne Bay	594020089	Kogish Shinaku II	594-419	45	2	2005
Thorne Bay	594030081	Kogish Shinaku II	594-416	30	2	2005
Thorne Bay	595050012	Fusion	595-420	23	2	2005
Thorne Bay	597230174	Fusion	5972-437	41	1	2005
Hoonah	209000908	Beaver Pond	1	20	5	2006
Thorne Bay	594020097	Kogish Shinaku II	594-410	68	6	2006

Of the total harvest acres that created openings in the fiscal year 1998-2006 period, five units exceeded the 100-acre limit. All five were analyzed and approved in project-level Records of Decision. As mentioned above, there were no units harvested in fiscal year 2006 that created an opening in excess of 100 acres.

In fiscal year 1999, there were 17 category 1 and 2¹ units partially or completely within the 1,000 ft. zone, 18 category 1 units in fiscal year 2000, 3 units in fiscal year 2002 one unit in 2004. There were no units within the 1,000 ft. zone in fiscal years 1998, 2001, 2003, 2005 or 2006.

Evaluation of Results

No action, other than completion of the pending field visits to these units is currently needed. As mentioned above, we expect that the GIS covers are inaccurate as the source for stream locations and harvest units are different remote sensing products and perhaps have not been vertically integrated. If we do have an incursion into TTRA buffers, additional procedural safeguards may be necessary. The specifics will depend on the results of the 2007 field visits to the units listed in the table found above.

¹ Category 1 and 2 timber sales were sales that were just or nearly completed when the Forest Plan ROD was signed and so did not include all of the Forest Plan Standards and Guidelines. Category 3 and 4 timber sales had environmental documents not as complete and were required to incorporate the Forest Plan Standards and Guidelines.

Timber Management Question 2: Are harvested forested lands restocked within five years following harvest?

Goal: Forest productivity is to be maintained in all harvest areas. Monitor the restocking of all lands that have received a regeneration harvest and determine if restocking has occurred within five years of final harvest.

Objective: Areas not adequately restocked with desirable tree cover within a five-year time frame are to be identified and action taken to see that failed areas are reforested. Changes in silvicultural practices may be necessary in these areas.

Background: Obtaining regeneration that meets the stocking guidelines and certification standards identified in the Silvicultural Practices Handbook (FSH 2409.17) is rarely a problem on stands receiving a regeneration harvest on the Tongass National Forest. Unpublished research and field observations indicate there are specific site conditions and opportunities that may indicate a need for artificial regeneration (this is usually planting and only rarely artificial seeding). Some situations to be particularly aware of are as follows:

- alluvial sites;
- cutover, open canopy, or sparsely stocked sites with an established ground cover of dense vegetation such as salmonberry, devils club, or grass;
- sites lacking a satisfactory seed source within approximately 660 feet from the center of the cutting unit;
- sites with lower productivity that presently have a plurality of cedar and in which there is a desire to retain a cedar component in the stand;
- stand compositions where change is needed, such as stands planned for harvest or already harvested where the adjacent seed source contains a high incidence of fluted hemlock;
- artificial regeneration is rarely needed and is prescribed on less than 5 percent of the harvested acres; and
- stands needing reforestation for other considerations, such as visually sensitive areas in which immediate regeneration through artificial reforestation would lessen the visual impact; or using genetically improved stock to increase the genetic makeup of the treated stand.

All harvested lands are examined following treatment. Artificially seeded or planted areas are examined one and three years after treatment. Examination occurs three growing seasons after treatment in areas where it is anticipated that natural regeneration will be adequate. Stands are certified as stocked if the third growing season survey indicates that the areas meet stocking standards. Artificial regeneration is prescribed if the third-year survey indicates that natural regeneration is highly unlikely. A silviculturist recommends Regeneration Certification for every unit harvested that meets or exceeds the Stocking Guidelines in the Silvicultural Practices Handbook - FSH 2409.17. Certification records are reported through the District Ranger to the Forest Supervisor. Certification records are kept in stand files at the Ranger Districts and in the Forest Service Activity Tracking System (FACTS), an electronic database.

During FY 2006, 1,022 acres were examined to determine the condition of the regeneration in harvest areas. Based on FACTS data, timber harvest that occurred in FY 2001 was

evaluated, and is displayed in Table TM-1. All lands harvested prior to FY 2001 are restocked.

Monitoring Results

2001 Harvests

All stands harvested in 2001 were certified as restocked in fy2006 or an earlier fiscal year.

Table TM-2. Status of Reforestation After Final Harvest FY 2001

Tongass Unit	Final Harvest Reported in FY 2001	Adequately Stocked Acres	% Adequately Stocked Acres	Acres Not Adequately Stocked	% Not Adequately Stocked
Petersburg RD	401	401	100	0	0
Wrangell RD	1187	1187	100	0	0
Craig RD	264	264	100	0	0
Ketchikan-Misty RD	183	183	100	0	0
Thorne Bay RD	325	325	100	0	0
Total	2360	2360	100	0	0

Evaluation of Results

The results show that 100 percent of forestland harvested in 2001 were adequately restocked within five years.

Timber Management Question 3: Is the Allowable Sale Quantity (ASQ) consistent with resource information and programmed harvest?

The Forest Plan developed an allowable sale quantity as part of the purpose and need of the document as required by the Forest and Rangeland Resources Planning Act. There are a little over 5 million acres of productive old growth (POG) trees on the Forest. About 90% of the existing POG is protected and unavailable for timber harvest. About 7% of the POG that existed in 1954 has been harvested. The Forest Plan identified 676,000 acres of available timberlands for harvest over the rotation. The computer model FORPLAN was used in the Forest Plan to determine the volume that could be harvested per decade from the Forest given numerous constraints. The constraints modeled in FORPLAN included (but not limited to) adherence to the Forest Plan standards and guidelines, land use designations, and policy constraints such as sustained yield, non-declining even-flow of wood, culmination of mean annual increment and dispersion of harvest units all of which influences amount, timing and intensity of timber harvest. This monitoring question involves examining the amount of harvest compared to the ASQ level modeled in the Forest Plan.

Other monitoring questions scrutinize the implementation and effectiveness monitoring of the

resource standards and guidelines, this question will assume the effects modeled in the Forest Plan are valid and compare the amount of sold and harvested timber to the output of the FORPLAN model ASQ determination. The Tongass National Forest was managed under the May 1997 Forest Plan ROD during fiscal years 1998 and 1999. The 1997-ROD set the ASQ at 267 million board feet (MMBF) per year. The April 1999 Modified Forest Plan ROD revised the ASQ to 187 MMBF per year. Implementation language contained in the 1999 ROD directed transition to the lower ASQ figure to begin October 1, 1999, the start of FY 2000 (Forest Plan ROD, April 1999, Section VII. Implementation section, pages 63-64).

During continued litigation of the 1997 Forest Plan decision, Judge James K. Singleton of the United States District Court for the District of Alaska issued a ruling on March 30, 2001 that vacated the 1999 Modified Forest Plan Record of Decision (this ruling has been appealed and is pending a decision in the 9th Circuit Court of Appeals). The Alaska Court ruling returned the Tongass National Forest to the 1997 Forest Plan decision and, as stated above, set the Forest ASQ at 267 MMBF per year. The court-issued order was effective immediately. Fiscal year 2000 was the only year the 1999 Forest Plan ROD ASQ of 187 MMBF/year was in effect.

The ASQ is an upper ceiling governing the amount of timber that may be sold over a decade. The amount of sold timber may vary year to year but must not exceed the decadal ceiling. Timber is considered sold when the contract is awarded to the high bidder. Table TM-3 displays the amount of timber sold during fiscal years 1998 through 2006, and compares the total to the average annual amount of the ASQ.

Table TM-3. Tongass National Forest Timber Sold By Fiscal Year

Fiscal Year	Timber Volume Sold (Percent of ASQ)	Average Annual ASQ (1997 and 1999 Forest Plan ROD)
1998	24 MMBF (9% of ASQ)	267 MMBF
1999	61 MMBF* (23% of ASQ)	267 MMBF
2000	170 MMBF** (91% of ASQ)	187 MMBF***
2001	50 MMBF (19% of ASQ)	267 MMBF****
2002	24 MMBF (9% of ASQ)	267 MMBF
2003	37 MMBF (14% of ASQ)	267 MMBF
2004	87 MMBF (33% of ASQ)	267 MMBF
2005	65 MMBF (24% of ASQ)	267 MMBF
2006	85 MMBF (32% of ASQ)	267 MMBF
9 year average (Since 1997 Forest Plan ROD)	67.0 MMBF (25% of ASQ)	267 MMBF

* This figure does not include timber sales that were advertised and had bid openings in FY 1999 but were awarded in FY 2000.

** This figure includes sales advertised and had bid openings in FY 1999 but were awarded in FY 2000. This was due to financial review of a purchaser before timber sale award.

*** Note the change in ASQ due to the transition and implementation of the ROD for the 1999 Modified Forest Plan.

**** Note the change back to the 1997-ROD ASQ level as per the ruling in Sierra Club et al. v. James Lyons et al., March 30, 2001.

The measure of the ASQ is the timber volume sold, not the amount advertised or harvested per year. Timber sales sold during one year are typically harvested over several years. Included in Table TM-4 are harvest totals for the Tongass National Forest for fiscal years 1991 through 2005 for comparison purposes only.

Table TM-4. Tongass National Forest Timber Harvest By Fiscal Year

Fiscal Year	Harvest Total (Million Board Feet)	Forest Plan Allowable Sale Quantity	Percent of ASQ Harvested*
1991	363	450	81
1992	370	450	82
1993	325	450	72
1994	276	450	61
1995	221	450	49
1996	120	450	27
1997	107	267	40
1998	120	267	45
1999	146	267	55
2000	147	187	79
2001	48	267	18
2002	34	267	13
2003	35**	267	13
2004	46	267	17
2005	50	267	19
2006	43	267	16
9 Year Average (since 1997 Forest Plan ROD)	74.3 MMBF	267	28 %

*Shown for illustrative purposes only; the measure of the ASQ is based on timber harvest volume "sold" on a decadal average basis.

**This total does not include 15,700 MMBF from the Swan Lake-Tyee Powerline right of way.

In FY 2006, 24 MMBF was offered from 47 sales and permits. Of this total, 1.3 MMBF was re-offered from previous year's program. Of the 24 MMBF offered, seven sales totaling approximately 1.6 MMBF were offered and received no bids.

There are several factors influencing the amount of timber sold and harvested including the ASQ, appeals, litigation, timber market, and timber sale value. The Forest Service has no control over appeals, litigation and the timber market. The Forest Service estimates demand each year and plans the timber offer level accordingly. The timber market and timber value offered by the Forest Service are significant factors in selling timber sales. The timber tables display that current timber harvest and timber sold levels are not at or near the 1997 Forest Plan ASQ ceilings (Table 2-5 Forest Plan FEIS). The effects of timber harvest are below the amount analyzed in the 1997 Forest Plan FEIS and the 1997 Forest Plan Record of Decisions. Due to litigation and court orders, the Forest is offering timber for sale at a level substantially

below that analyzed and permitted under the Forest Plan ASQ calculation and planned programmed harvest. However, with implementation of land use designation prescriptions, Forest Plan standards and guidelines, and Best Management Practices, the ASQ is consistent with resource information.

Evaluation of Results

No action is necessary at this time. Recommendations follow to continue to monitor.

Timber Management Question 4: Are the Non-Interchangeable Components (NIC) of the allowable sale quantity (ASQ) consistent with actual harvest?

The ASQ consists of two separate non-interchangeable components (NIC), also referred to as economic components. Under the 1997 Forest Plan, the ASQ is divided into NIC I (set at 2.2 billion board feet of timber per decade) and NIC II (set at 0.47 billion board feet per decade). The economic components of the ASQ equate to an average of 220 million board feet (MMBF) NIC I and 47 MMBF NIC II per year for an average annual 267 MMBF/year.

The Forest Plan sets the proportional mix of timber harvest volume for the NIC I and NIC II categories. The proportional mix in the Forest Plan is set at approximately 80 percent NIC I and 20 percent NIC II (Forest Plan ROD, pg 8). This represents a higher reliance on the NIC II component than that found in the 1979 TLMP.

The purpose of partitioning the ASQ into two separate components is to maintain the economic sustainability of the timber resource by preventing over-harvest of the most economic timber stands. The partitioning of the ASQ also serves to identify that portion of the timber supply that is at risk of attainment because of marginal economic conditions. The NIC I component includes land that can be harvested using “normal operability” logging systems (normal operability being defined as standard logging systems such as shovel and short span cable). The NIC II component includes land with high logging costs that are typically economically or technologically marginal. The NIC II component includes difficult and isolated operable timber stands requiring special logging equipment requirements due to yarding distances or topography (such as the use of long-span cable, helicopter or multi-span cable).

Theoretically, the NIC II component of the ASQ would only be offered for sale after the NIC I component had been satisfied. The sale of timber from NIC II lands would most likely be offered when the commodity market for timber is relatively high and the higher operational costs could be covered by the wood fiber value. Realistically, this is not the case and the Forest Service consistently offers some portion of NIC II with the total timber sale package. There are a variety of reasons for the inclusion of NIC II lands in timber sales including silvicultural treatments, economics of mobilization and the development of alternatives in environmental assessments that address public issues.

Unless the offer volume is at or near the 220 MMBF level (that portion of NIC I of the ASQ) the NIC II offer is not an issue since over-harvest of the “normal operability” is not possible.

Monitoring Results

All timber-sale-harvest units that were completed during FY 2006 were categorized into non-interchangeable components (NIC). Total timber volume harvested on the Tongass in FY 2006 was approximately 43 million board feet (Table TM-5).

Table TM-5. Comparison of NIC I and NIC II Harvest By Fiscal Year and Percent of Total Harvest

Fiscal Year	NIC I Percent of Harvest	NIC II Percent of Harvest
1997*	No Data Collected	No Data Collected
1998	95 % (estimated)	5 % (estimated)
1999	88 %	12 %
2000	77 %	23 %
2001	46 %	54 %
2002	90%	10%
2003	91%	9%
2004	84%	16%
2005	91%	9%
2006	78%	22%

*The 1997 Forest Plan Monitoring and Evaluation Report did not analyze the NIC I and NIC II timber harvest categories.

The Forest Plan ROD states that the ratio of the NIC I and NIC II mix is approximately 80 percent NIC I and 20 percent NIC II (Final EIS, Table 3-81, page 3-282; and 1997 ROD page 8). The mix of NIC I and NIC II for FY 2006 as displayed in Table 2-47 is 78 percent NIC I and 22 percent NIC II.

All completed harvest units were analyzed in GIS using the operability layer to obtain the Forest Plan non-interchangeable component data (NIC Forest Plan calls). The operability layers within Forest Plan calls were then tabulated by timber sale, harvest unit and operability factors. The NIC Forest Plan calls were then compared to actual timber-sale-harvest unit map to determine yarding distances. The Forest Plan estimated the NIC I proportion of harvest to be 80% and NIC II to be 20%. In actuality, the NIC I proportion for FY 2006 was 78% and NIC II 22% by acres.

Timber harvest on the Finger Point and Lindenberg Timber Sales located on Kupreanof Island represents 100 percent of all helicopter yarding on the Tongass for FY 2006 and the NIC II component. Although timber market conditions remained low during this period, the timber sale was operated for its high quality and the need to meet the needs of local milling operations. The Forest Plan operability calls were virtually the same as the actual implementation operability. There may be a question of economic operability of these sales since even though the operability calls are very good the fact that a helicopter harvest system was used is very costly. In this case, the high value of the timber offset the high harvest cost

however; it is debatable if the Forest Plan NIC category should be changed when management decisions have a pronounced effect on economics. For example, prescribing helicopter yarding when access roads could have been constructed thus improving economics.

The NIC monitoring results for FY 2006 probably reflect the higher costs of fuel. Timber purchasers may have focused on more conventional-harvest-system timber sales and those sales with more NIC I land due to the high cost of fuel.

NIC data has been monitored for eight years (and estimated one year). An apparent upward trend was occurring in the proportion of the NIC II harvest component from 1999 through 2001. Fiscal year 2002, 2003 and 2005 shows a reverse swing in the NIC trend; however 2006 shows a dramatic increase in the NIC II component. The actual increase in NIC I for 2002,2003 and 2005, thought not certain, may be due to the poor timber market influencing the purchaser focus toward more conventional harvest systems and higher fuel costs experienced in 2005.

Tables TM-6 and TM-7 display the amount and percentage of silvicultural systems post-1997 Forest Plan decision and for FY 2006. Approximately 57 percent of all harvest was even-aged and 43 percent of all harvest for FY 2005 was uneven-aged management silviculture-prescription harvest. The increase in uneven-aged management was due to the increased in the salvage component over previous years.

This information is presented to observe the trend in silviculture systems that may influence timber sale economic conditions. Harvest operation costs increase as the amount of residual trees (for example, uneven-aged and two-aged) is increased. Harvest production costs increase due to increase costs for harvesting equipment and operations (such as helicopter and multi-drum yarders, and increased number of cable corridor changes) that are capable of extracting logs in non-clearcut operations.

Table TM-6. Timber Harvest by Silvicultural System for Fiscal Year 2005

Description	Silvicultural System	2005 Acres	2005 Percent
Clearcut	Even-aged	1228	57
Selection	Uneven-aged	99	05
Two-aged	Two-aged	312	15
Salvage	Intermediate	495	23
Total		2134	100

Table TM-7. Timber Harvest by Silvicultural System Under the 1997 ROD (FY 1997-2005)

Description	Silvicultural System	Acres	Percent
Clearcut	Even-aged	19,001	78
Selection	Uneven-aged	2,889	12
Two-aged	Two-aged	1,481	6
Salvage	Intermediate	1,062	4
Total		24,433	100

The silvicultural systems other than even-aged clearcutting are prescribed for objectives other than timber production, such as meeting visual quality objectives, leaving structure for wildlife and public issues. The tables above are listed to display the trends in silvicultural systems. Several broad categories have been formed to estimate use of different silviculture systems being implemented. Uneven-aged management is a rough indicator of the helicopter logging system category. Cable logging systems are not capable of maintaining randomly distributed trees in the harvest unit unless corridors are used for yarding. Market conditions and high fuel costs appear to be the reasons why the NIC II component could be trending downward.

It is uncertain at this time that the non-interchangeable components of the allowable sale quantity are inconsistent with actual harvest. The uncertainty is due in part to the limited number of years of data and the poor market conditions and high fuel costs of 2006.

Evaluation of Results

No action is necessary at this time. Recommendations follow to continue to monitor the trend of harvest from NIC II lands.

Timber Management Question 5: Is the proportional mix of volume in NIC I and NIC II accurate, as estimated in the Forest Plan?

The 1997 Forest Plan set the ASQ ceiling at 2.67 billion board feet per decade, equivalent to an annual average of 267 million board feet per year. The two separate components were proportioned at 2.2 billion board feet of NIC I and 0.47 billion board feet of NIC II per decade or 220 MMBF NIC I and 47 MMBF of NIC II per year.

The non-interchangeable components (NIC) are based on logging operability. Operability refers to the operating attributes and characteristics of a logging system. Operability is used to determine the logging systems requirements necessary to harvest different areas of suitable timberlands. Logging systems are selected based on resource protection needs, access limitations, and economics. The information used in the Forest Plan to estimate and set the proportional mix of components was derived from the forest logging operability inventory. All normal operability lands provide the NIC I portion of the ASQ, and the difficult and isolated lands make up the NIC II portion. NIC I operability refers to economics of logging systems and suitable timberland geography that have normally been accessed on the Forest

(such as close distances to a road and logging systems such as tractor, cable). NIC II operability refers to those logging systems and that geography that have not been commonly used or harvested (such as areas referred to as difficult, or isolated to harvest and those systems such as long-span cable and helicopter with high economic costs).

Monitoring Results

The non-interchangeable components (NIC I and NIC II) of the timber cutting areas harvested during FY 2006 were compared to the Forest Plan Operability GIS layer for each NIC category. Table TM-8 displays the results of that comparison. The NIC components for the planned and implemented 2001, 2002, 2003, 2004, 2005, and 2006 are displayed for comparison purposes.

Table TM-8. Comparison of the Proportional 2006 Harvest of NIC I and NIC II Using Forest Plan GIS Data to Actual Implemented Harvest Units

	NIC I	NIC II
Forest Planned	94%	6%
Implemented in FY 2006	78%	22%
Forest Plan Planned	94%	6%
Implemented in FY2005	84%	16%
Forest Plan Planned	84%	16%
Implemented in FY2004	69%	31%
Forest Plan Planned	91%	9%
Implemented in FY2003	91%	9%
Forest Plan Planned	66%	34%
Implemented in FY 2002	90%	10%
Forest Plan Planned	48%	52%
Implemented in FY 2001	46%	54%

The information displayed in Table TM-8 indicates that the accuracy of comparison of planned harvest (projected in the Forest Plan) to that implemented on the ground by logging system is variable. A difference of plus or minus five percent is within acceptable limitations of the data and seems to hold true for FY 2001. The data for FY 2002 and FY 2003 indicates that as timber sale economics become limiting, purchasers were concentrating on the more economic sales associated with the NIC I component. The data for FY 2004 and FY 2006 indicates that though timber sale economics was again limiting, purchasers were forced to increase their harvest levels of the NIC II component. This was due to the fact that during FY 2002 and 2003 the purchasers concentrated on the more economic sales associated with the NIC I component, thus reducing there volume available for harvest in that category.

Evaluation of Results

No action is necessary at this time; continue to monitor the proportional mix of harvest from NIC II category lands.

Timber Management Question 6: Should maximum size limits for harvested areas be continued?

Goal: Maintain multiple-use values as effected by opening size.

Objective: Determine whether or not a recommendation to change the maximum harvest opening size should be made. Monitor the multiple-use effects of harvest opening size on the Forest.

Background: The 1976 National Forest Management Act (NFMA) regulations established 100 acres as the maximum size for created openings using the even-aged system (clearcutting, seed tree, and shelterwood) within the western-hemlock, Sitka spruce forest type of coastal Alaska. The Forest Supervisor, under certain conditions, can approve created openings of up to 150 acres. The Regional Forester can approve openings up to 200 acres. Factors to consider, when approving openings greater than 100 acres, are provided in the Forest Plan's Forest-wide standards and guidelines for the timber resource. There appears to be no need to pursue change in the maximum opening size or the factors for approving openings greater than 100 acres.

Monitoring Results

During FY 2006, 46 harvest areas (timber stands) were delineated in the Forest's geographic information system (GIS), with corresponding records created in the Forest Service Tracking Activity System (FACTS) database. Accounting for adjacency (harvested stands that touch one another, which create a larger opening when added together), 27 harvest areas were logged in FY 2006 that created openings using the even-aged silvicultural system. Table TM-8 displays the frequency of openings created through timber harvest during FY 2006.

Table TM-9. Harvest Unit Frequency by Unit Size Fiscal Year 2006

Acreage Range	Number of Openings	Total Number of Acres
1-10	6	50
11-20	8	103
21-30	3	69
31-40	2	78
41-50	1	53
51-60	0	0
61-70	3	197
71-80	3	220
81-90	0	0
91-100	1	96
Totals	27	866

For the nine-year period of fiscal years 1998 through 2006 there were 679 harvest even-aged openings created for a total of 18,670 acres. Table TM-10 displays the frequency of these even-aged openings. There were five units over 100 acres in size. Four of these units were approved in the decision documents and were in category 1 sales. One unit, in fiscal year 2003, was a category 2 sale and was also approved in the decision document.

Table TM-10. Harvest Unit Frequency by Unit Size Fiscal Years 1998 - 2006

Acres Range	Number of Openings	Total Number of Acres
1-10	190	1,084
11-20	131	1,935
21-30	113	2,863
31-40	68	2,386
41-50	70	3,123
51-60	43	2,356
61-70	31	2,024
71-80	14	1,051
81-90	6	503
91-100	8	755
101-110	2	203
111-120	1	112
121-130	1	121
131-140	0	0
141-150	0	0
151-160	1	154
Totals	679	18,670

Evaluation of Results

In fiscal year 2006, there were no units over 100 acres in size. Trends in harvest opening size have been toward smaller openings and less reliance on the even-aged silvicultural system. The 27 openings averaged 32 acres, and ranged in size from 5 acre to 96 acres. Forest Plan standards and guidelines for scenery and sensitive species such as Northern goshawk and American marten, and soil and water BMPs emphasize smaller sizes. Also, emphasis on leaving old-growth structure in harvest areas is resulting in smaller harvest openings. Of the 866 acres managed via the even-aged system, 43 percent retained a portion of the original stand structure, while the remaining 57 percent received a traditional clearcut.

In addition to the harvests discussed above, 12 stands were harvested using uneven-aged management totaling 2,578 acres. There were 5 stands harvested using two-aged systems for a total of 276 acres. There were 2 stands salvaged or sanitation harvested for a total of 15 acres.

The system name is based on the number of age classes present after the initial harvest, such as even-aged, two-aged, and uneven-aged. Even-aged systems produce stands that consist of trees of the same or nearly the same age. Two-aged stands result from treatments which leave behind a substantial portion of the original stand structure in the form of large trees distributed or clumped throughout the stand area. The remnant trees left on the site represent one age class, and the newly established trees represent another age class. Finally, uneven-aged systems create stands that include three or more distinctly different age classes by using individual or group selection methods.