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National Summary

Reforestation and Timber Stand Improvement Report

Fiscal Year 1997

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Message from the Acting Director of Forest Management

Here is the Reforestation and Timber Stand Improvement Report for fiscal year (FY) 1997. We have reformatted the report to facilitate posting the contents of this report on the Forest Service home page on the Internet. The report provides the following types of information:

- First, it summarizes production levels at each Forest Service nursery and seed extractory and displays service-wide production trends at these facilities. This same section also provides information on genetic resource improvement programs.
- Second, it displays reforestation program accomplishment in each region and examines reforestation program trends nationally. This same section also summarizes reforestation success in terms of plantation survival and in terms of the status of our regeneration efforts 5 years after final harvest. We have also included information on reforestation program unit costs by region and national trends over the past few years.
- Third, it shows timber stand improvement (TSI) program accomplishment in each region and displays TSI trends nationally. This same section also includes information on TSI program unit costs by region and national trends over the past few years.
- Finally, it includes a summary of the financial status of Knutson-Vandenberg (K-V) funds in each region and examines some key issues affecting the management of K-V programs nationally.

I hope that you find this report both informative and useful in examining the trends, achievements, and challenges for forest vegetation management on National Forest System lands.

Preface

This report is produced each year to provide a summary of the Forest Service's nursery, genetic resource, improvement, reforestation, and timber stand improvement programs. This report responds to the reporting requirements outlined in FSM 2470, 2490, and FSH 2409.14. Resource data summarized in this report was derived from automated reports extracted from the TRACS-SILVA data base, as well as non-automated information compiled by Forest Service nursery managers, reforestation/TSI specialists, geneticists, and silviculturists. Financial data was derived from National Finance center obligations data for FY 1997 for reforestation and TSI programs, and revenues, obligations, and unobligated cash balance information for the K-V program from National Finance Center Report 53-5. Timber harvest information was taken from the FY 1997 Cut and Sold Report.

Following the Executive Summary, this report is organized in four major sections:

1. SUMMARY OF THE FY 1997 FOREST SERVICE NURSERY AND GENETIC RESOURCE PROGRAMS

This section of the report summarizes FY 1997 production data at FS nurseries and seed extractories and assesses the production trends and outlook for these facilities. This section also contains a summary of Forest Service genetic resource improvement programs.

2. SUMMARY OF THE FY 1997 REFORESTATION PROGRAM

This section of the report displays FY 1997 reforestation accomplishments and program trends. This section also contains information on plantation survival and reforestation success, as well as information on reforestation program costs.

3. SUMMARY OF THE FY 1997 TIMBER STAND IMPROVEMENT (TSI) PROGRAM

This section of the report displays FY 1997 TSI accomplishments and program trends. This section also contains information on TSI program costs.

4. FINANCIAL SUMMARY OF THE KNUTSON-VANDENBERG (K-V) FUND

This section includes a summary of the financial status of K-V accounts in each region and examines some key issues affecting the management of K-V programs nationally.

Included in the appendices at the end of the report are numerous tables providing more detailed information pertaining to Forest Service nurseries and seed extractories, regional reforestation and TSI programs, reforestation success, and financial status of the K-V fund.

Executive Summary

Some of the highlights for FY 1997 include:

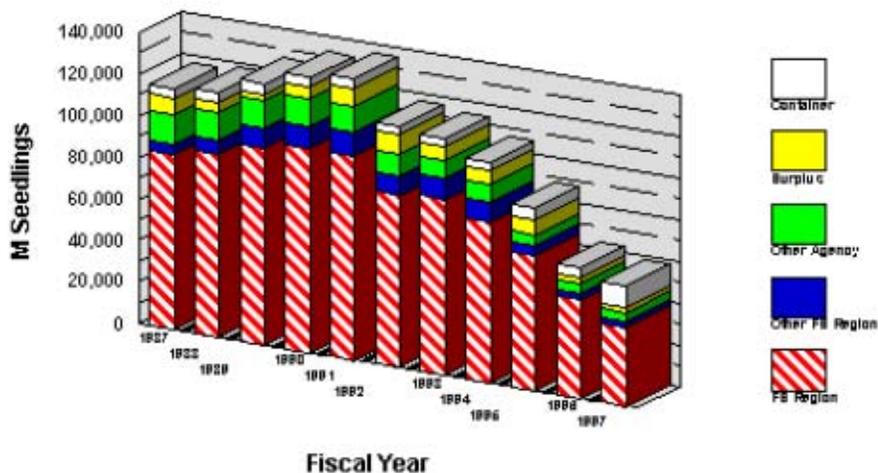
- Forest Service nurseries produced over 56 million seedlings in FY 1997. FS nursery production continues to decline as a result of reduced harvest levels.
- Forest Service seed extractories produced in excess of 11 thousand pounds of seed representing about 130 species of grasses, forbs, shrubs, and trees.
- Silvicultural examinations were done on about 1.2 million acres and silvicultural prescriptions were developed on over 1.2 million acres to achieve management objectives on National Forest System lands.
- Reforestation treatments occurred on more than 328 thousand acres. About 59% of this work was K-V financed, approximately 35% was financed using appropriated funds, and the remainder was accomplished using contributed funding sources.
- Timber stand improvement (TSI) treatments occurred on more than 260 thousand acres. About 60% of the treated acres were precommercially thinned, about 34% were treated to eliminate competing weed species and release trees to maintain or improve stand growth. The remaining acres were roughly evenly split between pruning and fertilization treatments.
- Reforestation needs decreased by about 40 thousand acres while TSI needs increased by about 142 thousand acres nationally. As reported in prior years, appropriated funding levels have been generally sufficient to keep up with reforestation needs to date, these levels have not been adequate to keep pace with a growing inventory of TSI needs.
- First year survival averaged about 70% nationally and third year survival averaged 61%.
- K-V spending outpaced K-V collections in FY 1997. The unrestored balance for K-V firefighting advances was reduced from about -583 million as of the end of FY 1996 to about -415 million as of the end of FY 1997 as reflected in NFC reports.

Summary of the FY 1997 Forest Service Nursery and Genetic Resource Programs

Seedling Production at Forest Service Nurseries

Forest Service (FS) nursery production, including both bareroot and container stock, was down by about -11% from the previous year at about 56 million seedlings Table 1 & Table 2 in Appendix A). As reported in previous years, production levels at these facilities continue to decline as a result of reduced timber harvests, shifting emphasis toward intermediate treatments (commercial thinnings and salvage removals), and increasing reliance on natural regeneration to achieve reforestation objectives. Production trends for the past 10 years are depicted in *Figure 1*.

Figure 1 -- FS Nursery Production Service-wide -- FY 1988 - FY 1997



Seedling production levels have been declining at FS nurseries since FY 1991 and as of the end of FY 1997 were down by -58 % from the production levels reported for FY 1991 (134.9 million). These trends gave rise to a west-wide examination of FS nursery capacity which was conducted in May of 1995 (USFS Western Nursery Review). As a result of this review, the Chief called for the closure of 3 of the 10 FS nurseries by the year 2000. One of these nurseries closed during FY 1997 and closure plans are proceeding for the other two facilities. The nursery review called for additional actions promoting cost-effective nursery operations and additional progress was made on selected actions in FY 1997.

The outlook for future seedling orders and sowing requests are shown in Table 1A and Table 1B in Appendix A. The data presented in these tables show continued declines in anticipated seedling production levels through FY 2000 and beyond. Table 4 is also included in Appendix A, summarizing seedling acquisition in each region from sources other than FS nurseries.

Seed Production at Forest Service Nurseries

Approximately 11.1 thousand pounds of seed was produced during FY 1997, a decline of about 34 percent from FY 1996 levels. Seed production levels are highly variable from year-to-year, reflecting the unique characteristics of individual plant species and the periodicity of good seed crops in each species. These variations can be seen in the trends in seed production at FS facilities for the 10-year period shown in *Figure 2*.

**Figure 2 -- Seed Extractory Production
Service-wide -- FY 1988 - FY 1997**

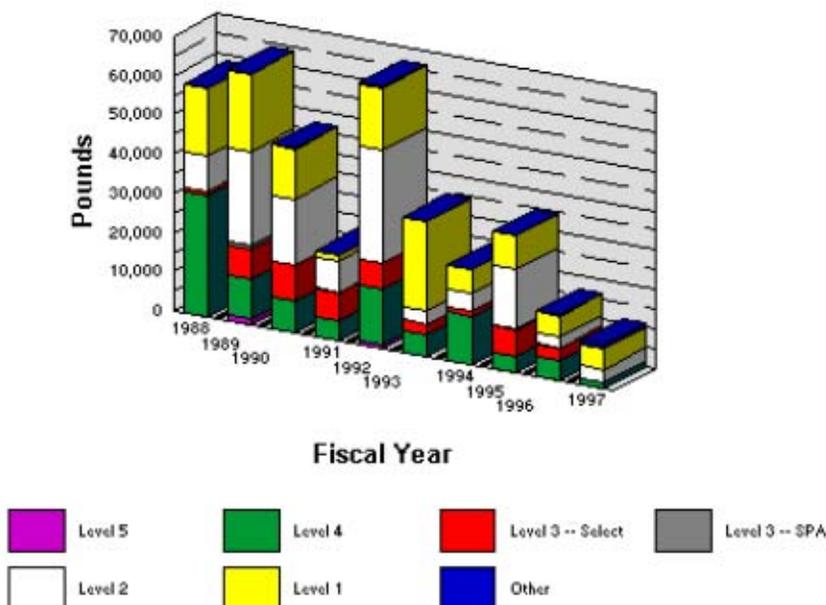


Table 3 in Appendix A summarizes the source of origin for seed processed at FS facilities in FY 1997. About 12% of this seed was collected from seed orchards. The list of plant species being processed at these facilities includes about 130 species of grasses, forbs, shrubs, and woody plants processed at FS seed extractories in FY 1997.

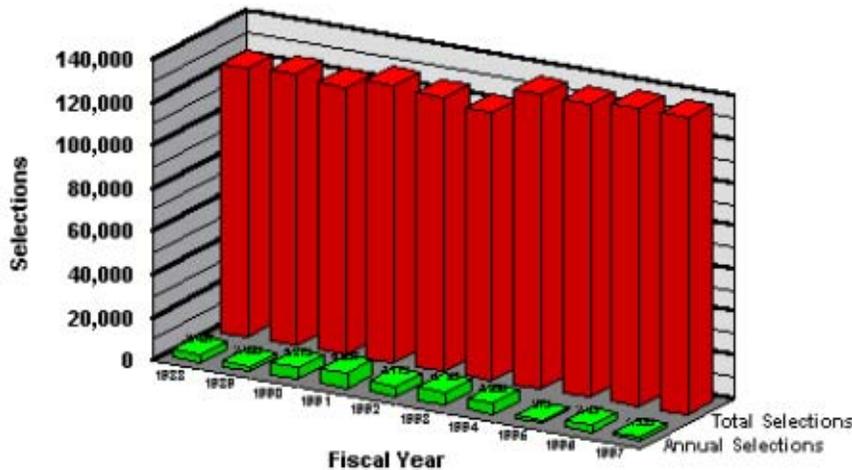
Table 5 in Appendix A summarizes seed production area (SPA) status for FY 1997. No seed production area were established in FY 1997; however, 167 SPAs were eliminated resulting in a total of 6,521 acres in SPA status.

Genetic Resource Programs

Genetic resource improvement work is summarized in Table 6, Table 7, Table 7A, and Table 7B in Appendix A. The status of clone banks and seed orchards is summarized on Table 6. Nationally, 107 clone banks representing in excess of 11,800 clones on 519 acres provide a source of improved genetic material. Seed and hedge orchards representing over 34,400 families in 340 plantations are a further source of improved material. Clone bank and seed orchard totals for FY 1997 both show a net increase over the figures reported for FY 1996, despite a small decrease in acreage totals (5 acres). Table 7 summarizes seedling source for the major tree species planted in each region showing seed orchards were the source for about 13% of all seedlings planted

on National Forest System lands nationally. Superior tree selection status is summarized on Table 7A showing a national total of more than 130 thousand superior trees, up by about 800 trees from the total number of selections reported in FY 1996. Recent trends in superior tree selections are also shown in *Figure 3*. Table 7B reports on the status of evaluation plantations representing more than 84 thousand families on 10,880 acres nationally, again showing a net increase in the totals reported in FY 1996.

**Figure 3 -- Superior Tree Selections
Service-wide -- FY 1988 -- FY 1997**



The National Forest Genetic Electrophoresis Laboratory (NFGEL) is a facility dedicated to providing genetic analyses to resource managers throughout the agency. . Early NFGEL projects focused primarily on conifers, exploring genetic variation patterns to refine seed zones and to resolve questions about clones, populations, and genetic sources. More recently, following the development of the FS Genetic Resources Strategic Plan, NFGEL was given the mandate to begin work examining forest vegetation other than trees.

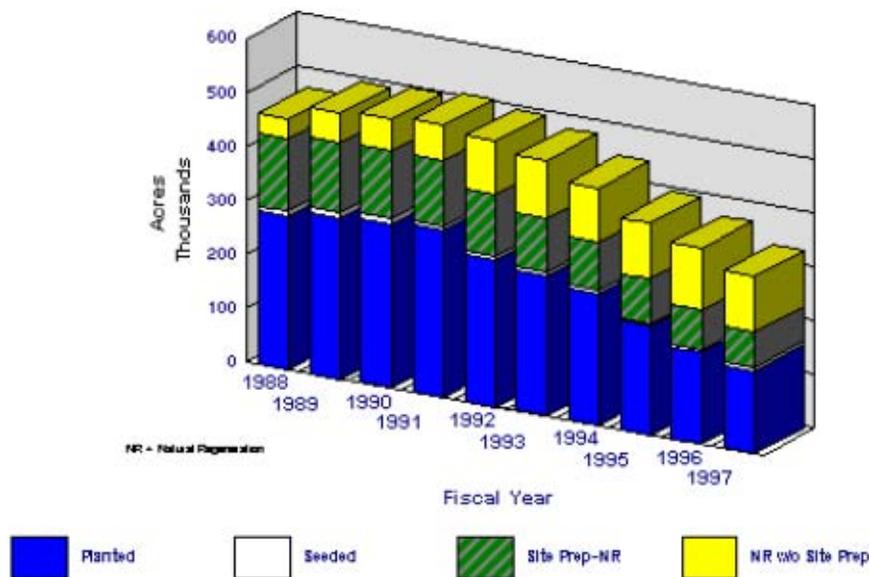
Summary of the FY 1997 Reforestation Program

FY 1997 Reforestation Accomplishment and Program Trends

About 321 thousand acres of National Forest System lands were reforested during FY 1997 using appropriated, reforestation trust (RTF), and Knutson-Vandenberg (K-V) funding sources. Contributed funds reforested an additional 6,611 acres, bringing the grand total for FY 1997 to 328,109 acres. This represents a reduction of about -9.6% from FY 1996 (362,915 acres). The distribution of these acres by the type of reforestation treatment is shown in Tables 9, Table 10, Table 11, and Table 11A in Appendix A. Included in the total for FY 1997 are 102,992 acres which regenerated naturally without site preparation. Reforestation accomplishment by K-V funding occurred on a total of 193,446 acres, representing a -15% reduction from FY 1996

(227,639 acres). K-V reforestation acres continue to decline as a result of reduced harvest levels and reduced amounts of regeneration harvesting. National trends in reforestation accomplishment for the past 10 years are shown in *Figure 4*, which illustrates the steady decline in reforestation accomplishment since FY 1991.

Figure 4 -- National Trends in Reforestation Accomplishment



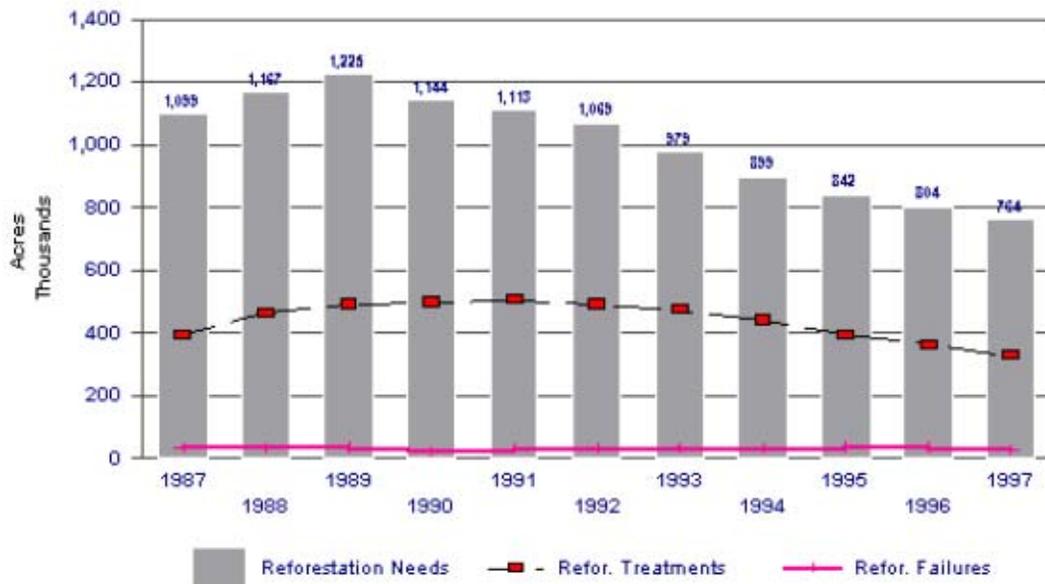
Additional information concerning reforestation accomplishments in FY 1997 is presented in Table 12 (Site Preparation for Planting or Seeding), Table 18 (Animal Control for Reforestation), and Table 21 (Certification of Reforestation treatments), as well as summary of harvest acres by cutting method in Table 20 in Appendix A.

FY 1997 Reforestation Needs and Trends

Current reforestation needs are estimated at 763,932 acres, representing about 2 years of reforestation work at present levels of accomplishment. It generally takes 2-3 years of lead time to prepare the site, grow seedlings adapted to specific sites, and make arrangements for getting the trees planted using either contract or force-account crews. Nationally, reforestation needs were reduced by about 40,247 acres in FY 1997. These needs have arisen as a result of regeneration harvest since the late-1980's and more recently from large wildfires in western regions and other disturbance events elsewhere. Fires added roughly 23,000 acres to national reforestation needs in FY 1997, down sharply from fire additions in FY 1996 (82,000 acres).

National trends in reforestation needs are depicted in relation to reforestation treatments and reforestation failures in *Figure 5*. Reforestation failure rates remain low, with failures declared on about 26 thousand acres nationally in FY 1997 or less than 8% of reforestation treatment acres. More detailed information on reforestation needs is published annually in the Report of the Forest Service.

**Figure 5 -- National Trends
in Reforestation Needs**

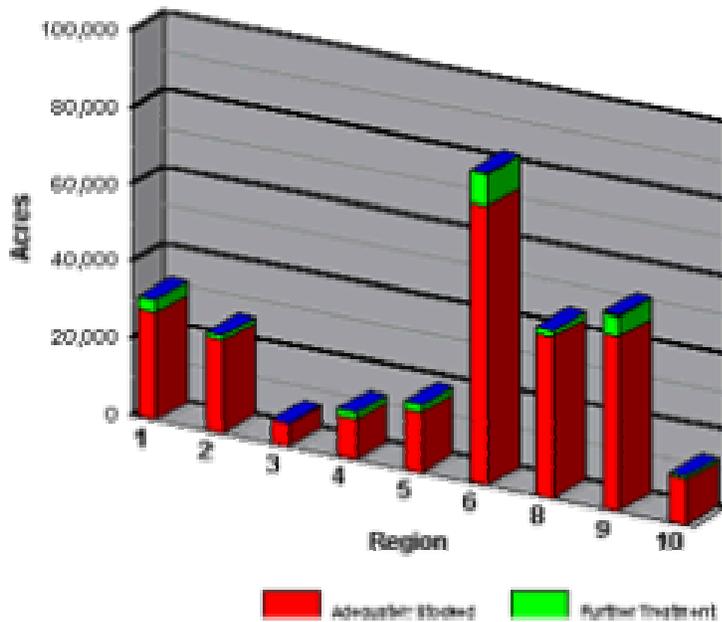


Plantation Survival and Reforestation Success

The results of the plantation surveys made following the 1996 growing season are summarized in Table 25 in Appendix A. First-year survival nationally averaged 70%, down by -7% from the results published in last year's report (77%). The national average for third-year survival was reported at 61%, again down from rates of survival reported in the previous year (67%). Unusually dry weather in the western U.S. contributed to the lower-than-average rates of seedling survival.

Table 22 (Status of Reforestation 5 Years After Final Harvest) is included in Appendix A. On average, about 90% of the acres where final harvest removals occurred in FY 1992 contained adequate stocking levels at the time of the most recent survey. Table 22 displays a summary by region. This information is also presented graphically in Figure 6.

**Figure 6 -- Status of Reforestation
5 Years After Final Harvest by Region**

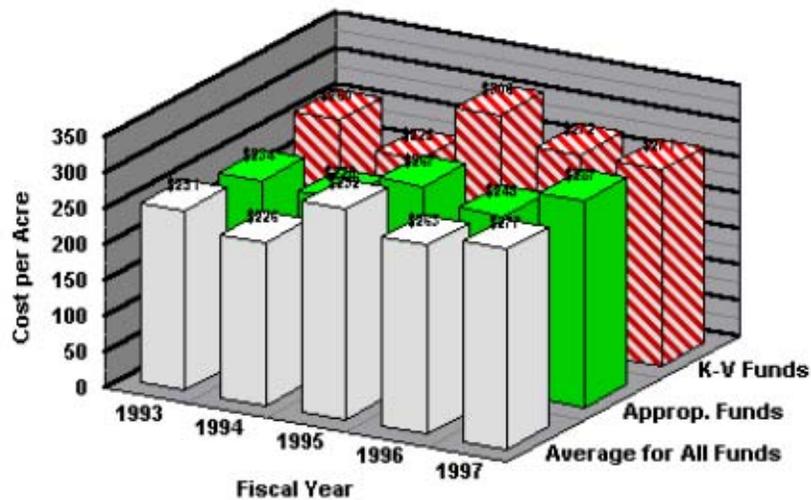


The highest percentage of 1992 final harvest acres which were adequately stocked at the time of the most recent survey was found in R-3 (97.9%). R-4 reports the lowest percentage of 1992 final harvest acres now adequately stocked (84%), improved from the comparable figure reported for R-4 last year (78%).

Reforestation Program Costs

Reforestation cost trends are displayed in *Figure 7* that shows the average cost of each acre of reforestation accomplishment for each of the past five fiscal years. The per acre costs shown in this figure was derived by dividing total obligations by the acres of reforestation work accomplished during each fiscal year. No adjustment for inflation has been made for any of the cost data included in *Figure 7*.

Figure 7 -- Average Costs for Refor. Treatments (FY 1993 through FY 1997)



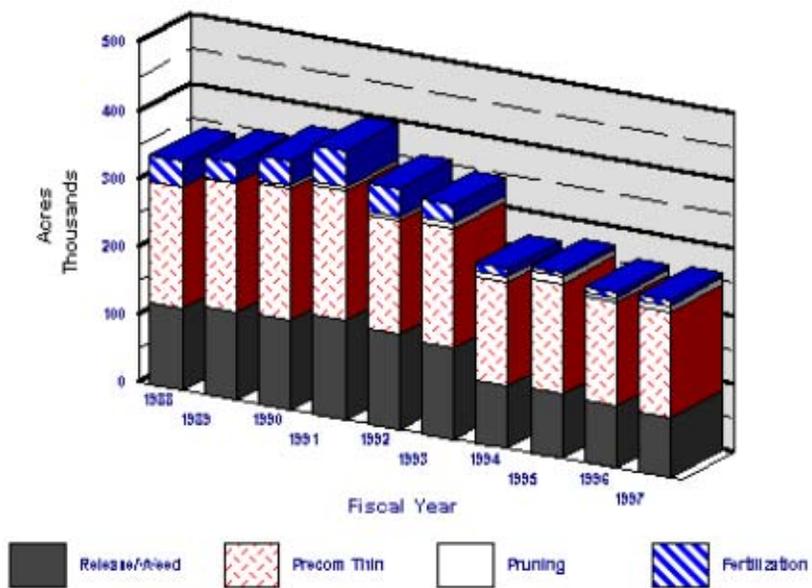
Nationally, reforestation costs increased in FY 1997 in relation to costs reported in the prior year. Reforestation treatments averaged about \$277 per acre in FY 1997, an increase of about \$14 per acre from costs reflected in NFC reports for FY 1996 (\$263 per acre). Higher-than-average reforestation costs are incurred in those regions that rely more heavily on artificial regeneration methods in order to successfully regenerate sites. The need to eliminate unwanted vegetation through site preparation and subsequent release treatments also contributes to an increased total costs in selected regions. By contrast, in regions where regeneration arises predominantly by natural means, average reforestation costs are typically less than \$100 per acre.

Summary of the FY 1997 Timber Stand Improvement (TSI) Program

FY 1997 TSI Accomplishment and Program Trends

About 258,000 acres of National Forest System lands received TSI treatments during FY 1997 using appropriated, reforestation trust (RTF), and Knutson-Vandenberg (K-V) funding sources. Contributed funds treated an additional 2,758 acres, bringing the grand total for FY 1997 to 260,639 acres. This represents a slight increase from FY 1996 (259,653 acres). The distribution of these acres by the type of TSI treatment is shown in Table 13, Table 14, Table 15, and Table 16 in Appendix A. National trends in TSI accomplishment for the past 10 years are shown in *Figure 8*.

Figure 8 -- National Trends in TSI Accomplishment



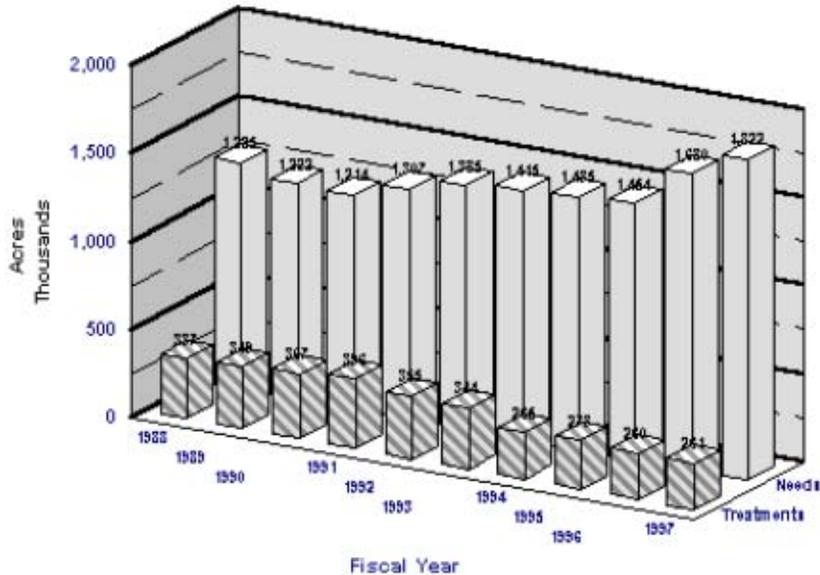
TSI accomplishments have generally been declining since FY 1991 nationally. This decline is a reflection of reduced funding for vegetation management work and also reflects the impact of a series of bad fire years resulting in the need to apply a limited amount of appropriated funding to support reforestation efforts following these events. This shift in emphasis impacted dollars that would otherwise be available to support TSI treatments.

Additional information on TSI accomplishments is provided on Table 17 (Prescribed Burning to Control Understory Species), Table 19 (Animal Control for TSI), and Table 21 (Certification of TSI Treatments) in Appendix A.

FY 1997 TSI Needs and Trends

Current TSI needs are estimated at just over 1.8 million acres nationally, an increase of 141,354 acres over the TSI needs level reported in FY 1996 (1.680 million acres). FY 1997 TSI needs represent about 7 years of work at present levels of accomplishment. The gap between TSI needs and accomplishments continues to. National trends in TSI needs and accomplishments are shown in *Figure 9*.

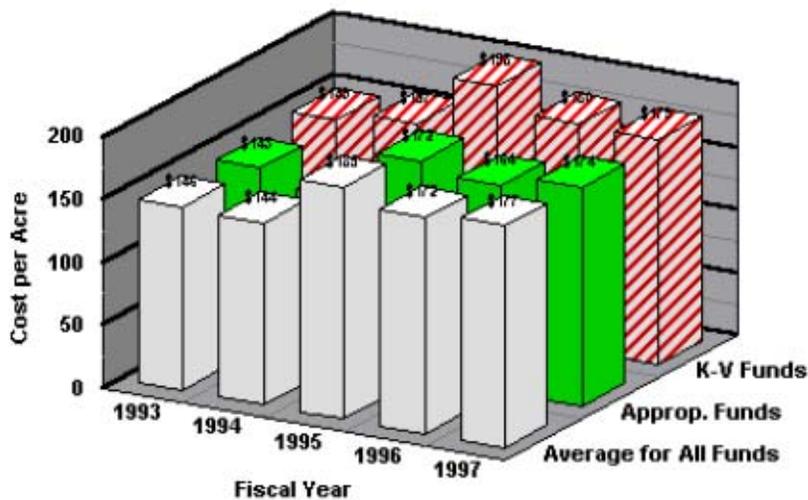
**Figure 9 -- National Trends
in TSI Needs and Treatments**



TSI PROGRAM COSTS

TSI cost trends are displayed in *Figure 10* showing the average cost of each acre of TSI accomplishment for each of the past five fiscal years. The per acre costs shown in this figure was derived by dividing total obligations by the acres of TSI work accomplished during each fiscal year. No adjustment for inflation has been made for any of the cost data included in *Figure 10*.

**Figure 10 -- Average Costs for TSI
Treatments (FY 1993 through FY 1997)**



Nationally, TSI costs increased in FY 1997 in relation to costs reported in the prior year. TSI treatments averaged about \$177 per acre in FY 1997, an increase of about \$5 per acre from costs derived from NFC reports for FY 1996 (\$172 per acre). Higher-than-average TSI costs are incurred in those regions where the TSI program includes a high proportion of release work relative to other types of TSI work. Lower-than-average costs typically reflect an emphasis on precommercial thinning. R-10 represents an exception to this general rule having a program consisting almost exclusively of precommercial thinning; however, this work is conducted in areas with remote access, difficult terrain conditions, and high stand densities which thereby increase costs.

Financial Summary of the Knutson-Vandenberg (K-V) Program

The status of K-V accounts by region is shown in Table 25. FY 1997 K-V collections declined by -18% from FY 1996 collection levels (\$157.9 million). K-V obligations were roughly \$166.2 million in FY 1997, down by less than -1% from FY 1996 spending levels (\$167.6 million). As of the end of FY 1997, a total of roughly \$415 million in EFSFF advances needed repayment in order to maintain the correct K-V balance. Repayment of these advances remains a critical management concern. Trends in K-V collections and obligations from FY 1931 through the end of FY 1997 are shown in Table 24.

The General Accounting Office (GAO) completed an audit of K-V programs during FY 1996. Four major recommendations emerged from this audit; two of which are worthy of discussion here. GAO found inadequate management controls were in place to ensure that overspending did not occur in the K-V amounts collected for support costs. Second, GAO continues to recommend that the FS upgrade its current accounting procedures to provide for improved tracking of expenditures. We responded to both of these recommendations by appointing a National Task Force to address these issues. A final task force report was issued in November 1997 calling for a series of actions responsive to each of these issues.

APPENDIX A