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## National Summary

# Reforestation and Timber Stand Improvement Report

## Fiscal Year 1998

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Here is the Reforestation and Timber Stand Improvement Report for fiscal year (FY) 1998. As was the case with last year's report, the contents of this report also appears 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 unitcosts 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.

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 1998 for reforestation and TSI programs and for the Knutson-Vandenberg (K-V) fund.

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

- **SUMMARY OF THE FY 1998 FOREST SERVICE NURSERY AND GENETIC RESOURCE PROGRAMS**

This section of the report summarizes FY 1998 production data at FS nurseries and seed extractories and assess the production trends and future outlook for these facilities. This section also contains a summary of Forest Service genetic resource improvement programs.

- **SUMMARY OF THE FY 1998 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.

- **SUMMARY OF THE FY 1998 TIMBER STAND IMPROVEMENT (TSI) PROGRAM**

This section of the report displays FY 1998 TSI accomplishments and program trends. This section also contains information on TSI program costs.

- **FINANCIAL SUMMARY OF THE KNUTSON-VANDEMBERG (K-V) FUND**

This section includes a summary of the financial status of K-V accounts in each region and 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 K-V finances.

## Executive Summary

Some of the highlights for FY 1998 include:

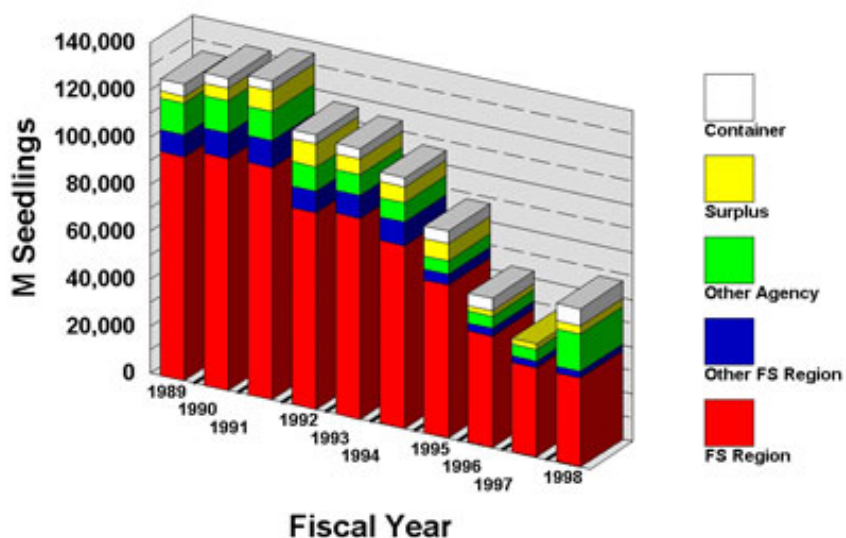
- Forest Service nurseries produced over 65 million seedlings in FY 1998 an increase of about 17% from FY 1997 production levels.
- Forest Service seed extractories produced in excess of 12 thousand pounds of seed representing about 200 species of grasses, forbs, shrubs, and trees.
- Silvicultural examinations were done on about 1.1 million acres and silvicultural prescriptions were developed on over 880 thousand acres to achieve management objectives on National Forest System lands.
- Reforestation treatments occurred on more than 292 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 300 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 85 thousand acres while TSI needs increased by about 55 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 76% nationally and third year survival averaged 64%.
- K-V spending outpaced K-V collections in FY 1998. The unrestored balance for firefighting advances remained at about \$-417 million as of the end of FY 1998.

## SUMMARY OF THE FY 1998 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 up by about 19% from the previous year at about 66 million seedlings (Tables 1 & 2 in Appendix A). This is a modest departure from sharp declines experienced in prior years resulting from 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 1989 - FY 1998**



### Maintaining Cost-Effective FS Nursery Operations

Seedling production levels have generally been declining at FS nurseries since FY 1991 and as of the end of FY 1998 were down by -52 % from the production levels reported for FY 1991 (134.9 million). These trends gave rise to a west-wide examination of FS nursery capacity 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 underway and on track for the cessation of Forest Service operation of the other two facilities for purposes of commercial tree seedling production.

The outlook for future seedling orders and sowing requests are shown in Tables 1A and 1B in Appendix A. The data presented in these tables show continued declines in anticipated seedling production levels through FY 2001 and FY2002. 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 12.0 thousand pounds of seed was produced during FY 1998, up slightly from FY 1997 extraction levels (11.1 M pounds). Seed production levels can be 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 1989 - FY 1998**

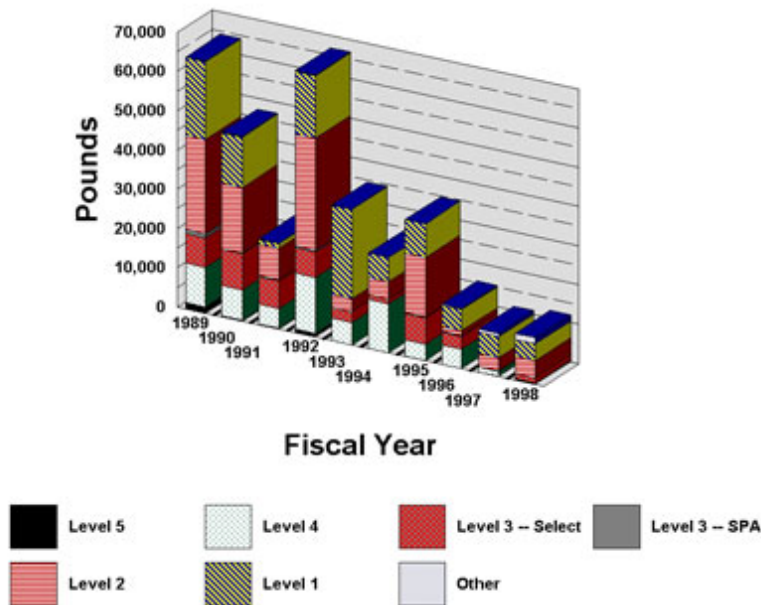


Table 3 in Appendix A summarizes the source of origin for seed processed at FS facilities in FY 1998. About 3% of this seed was collected from seed orchards. The list of plant species being processed at these facilities includes over 150 species of grasses, forbs, shrubs, and woody plants processed at FS seed extractories in FY 1998.

Table 5 in Appendix A summarizes seed production area (SPA) status for FY 1998. No seed production area was established in FY 1998; however, 44 acres were eliminated resulting in a total of 6,477 acres in SPA status.

## **Genetic Resource Programs**

Genetic resource improvement work is summarized in Tables 6, 7, 7A, and 7B in Appendix A. These programs make valuable contributions to improved forest health by identifying and conserving important genetic traits that control resistance to major pests, providing baseline genetic information for forest management activities using genetic test plantations and lab studies, producing adequate quantities of improved seed to meet demand, and by incorporating genetic principles into silvicultural treatment prescriptions and planning efforts.

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 1998 REFORESTATION PROGRAM**

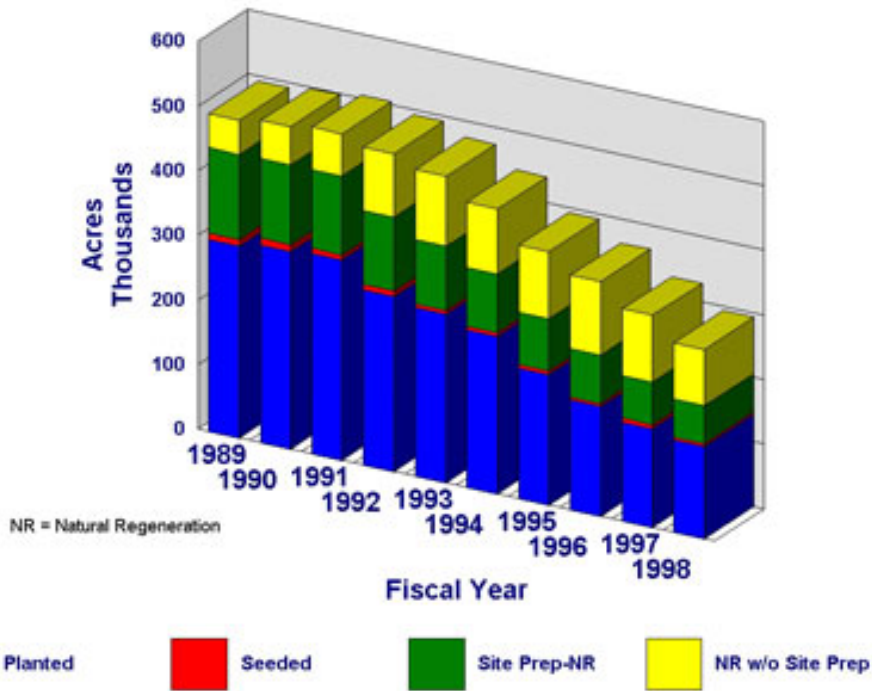
### **FY 1998 Reforestation Accomplishment and Program Trends**

About 288 thousand acres of National Forest System lands were reforested during FY 1998 using appropriated, reforestation trust (RTF), and Knutson-Vandenberg (K-V) funding sources. Contributed funds reforested an additional 4,997 acres, bringing the grand total for FY 1998 to 292,902 acres. This represents a reduction of about -10.7% from FY 1997 (328,109 acres). The distribution of these acres by the type of reforestation treatment is shown in Tables 9, 10, 11, and 11A in Appendix A. Included in the total for FY 1998 are 87,622 acres which regenerated naturally without site preparation. Reforestation accomplishment by K-V funding occurred on a total of 170,596 acres, representing a -11.8% reduction from FY 1997 (193,446 acres). K-V reforestation acres continue to decline as a result of reduced harvest levels and a reduced amount of regeneration harvesting. National trends in reforestation accomplishment for the past 10 years are shown in Figure 3, illustrating the steady decline in reforestation accomplishment since FY 1991.

Additional information concerning reforestation accomplishments in FY 1998 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.



### Figure 3 -- National Trends in Reforestation Accomplishment



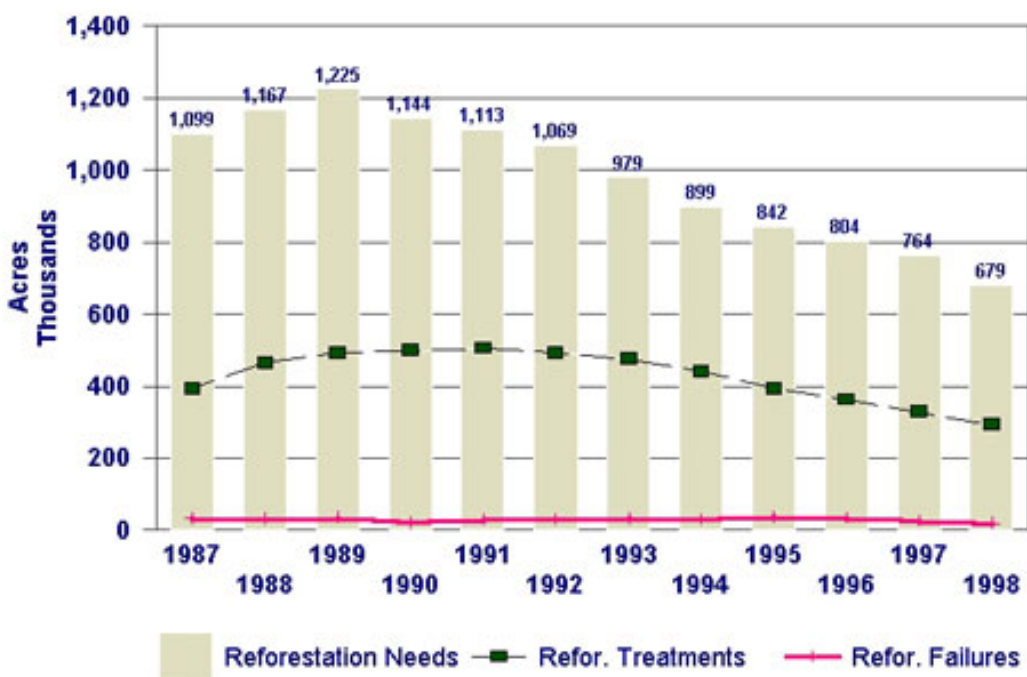
#### FY 1998 Reforestation Needs and Trends

Current reforestation needs are estimated at 678,769 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 85,163 acres in FY 1998. These needs have arisen as a result of regeneration harvest since the late-1980s and more recently from large wildfires in western regions and other disturbance events elsewhere. Fires added roughly 15,000 acres to national reforestation needs in FY 1998, down from fire additions reported in FY 1997 (23,000 acres).

National trends in reforestation needs are depicted in relation to reforestation treatments and reforestation failures in Figure 4. Reforestation failure rates remain low, with failures declared on about 19 thousand acres nationally in FY 1998 representing about 7% of reforestation treatment acres. More detailed information on reforestation needs is published annually in the Report of the Forest Service.

**Figure 4 -- National Trends in Reforestation Needs**

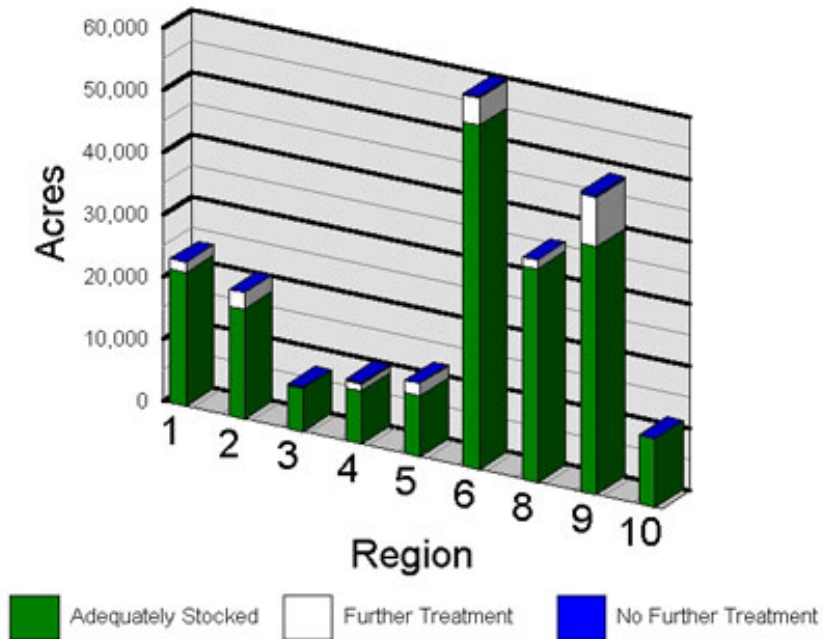


**Plantation Survival and Reforestation Success**

The results of the plantation surveys made following the 1997 growing season are summarized in Table 23 in Appendix B. First-year survival nationally averaged 76%, up by 6% from the results published in last year’s report (70%). The national average for third-year survival was reported at 64%, a slight increase from rates of survival reported in the previous year (61%). More favorable growing conditions during the 1997 growing season throughout much of the country was a primary reason accounting for increased 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 1993 contained adequate stocking levels at the time of the most recent survey. Table 22 displays a summary by region and is presented graphically in Figure 5 on the next page.

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

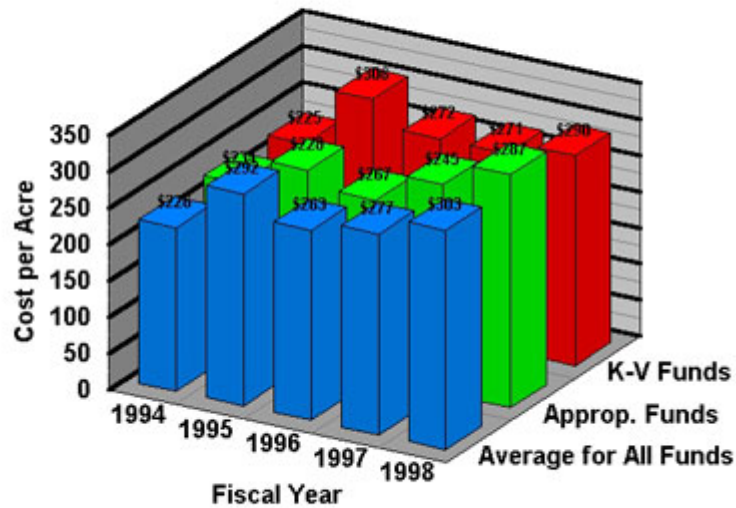


### Reforestation Program Costs

Reforestation cost trends are displayed in Figure 6 which 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 6.

Nationally, reforestation costs increased in FY 1998 in relation to costs reported in the prior year. Reforestation treatments averaged about \$303 per acre for all fund types in FY 1998, an increase of \$26 per acre from costs reflected in NFC reports for FY 1997 (\$277 per acre). Average costs for appropriated reforestation work increased more, on a relative basis, than average costs for K-V work from FY 1997 to FY 1998. Higher-than-average reforestation costs are incurred in those regions which 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 cost in selected regions. By contrast, in regions where regeneration arises predominantly by natural means, average reforestation costs are typically less than \$100 per acre.

**Figure 6 -- Average Costs for Refor. Treatments (FY 1994 through FY 1998)**



## **SUMMARY OF THE FY 1998 TIMBER STAND IMPROVEMENT (TSI) PROGRAM**

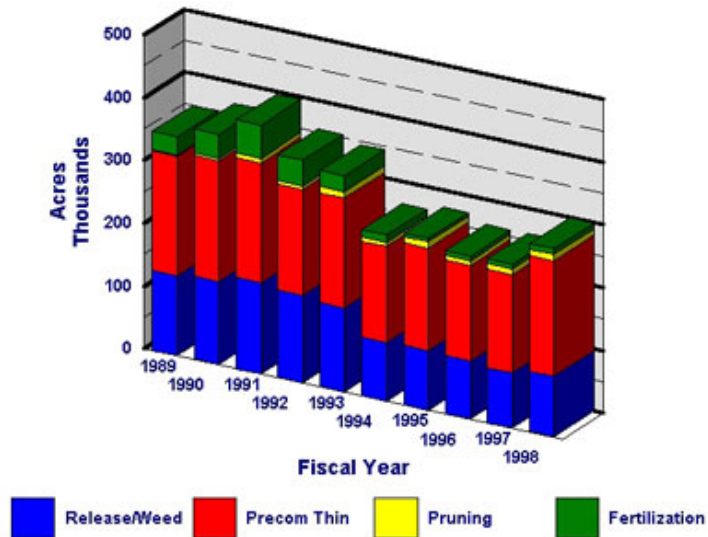
### **FY 1998 TSI Accomplishment and Program Trends**

About 297 thousand acres of National Forest System lands received TSI treatments during FY 1998 using appropriated, reforestation trust (RTF), and Knutson-Vandenberg (K-V) funding sources. Contributed funds treated an additional 3,392 acres, bringing the grand total for FY 1998 to 300,202 acres. This represents a modest increase from FY 1997 (260,639 acres). The distribution of these acres by the type of TSI treatment is shown in Tables 13, 14, 15, and 16 in Appendix A. National trends in TSI accomplishment for the past 10 years are shown in Figure 7.

In contrast to the trends over the past year, 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.

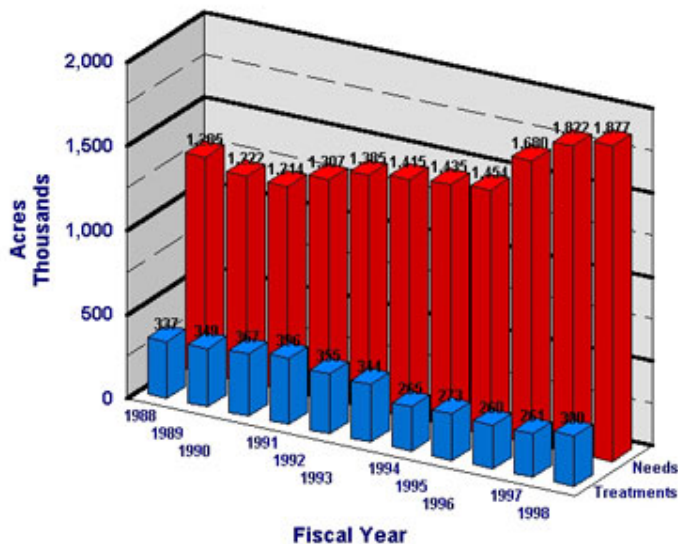
**Figure 7 -- National Trends in TSI Accomplishment**



**FY 1998 TSI Needs and Trends**

Current TSI needs are estimated at nearly 1.9 million acres nationally, an increase of 55,237 acres over the TSI needs level reported in FY 1997 (1.822 million acres). FY 1998 TSI needs represent about 6 years of work at FY 1998 levels of accomplishment. The gap between TSI needs and accomplishments continues to widen, though the rate of increase declined from the one year increase reported in FY 1997 (141,354 acres). National trends in TSI needs and accomplishments are shown in Figure 8.

**Figure 8 -- National Trends in TSI Needs and Treatments**



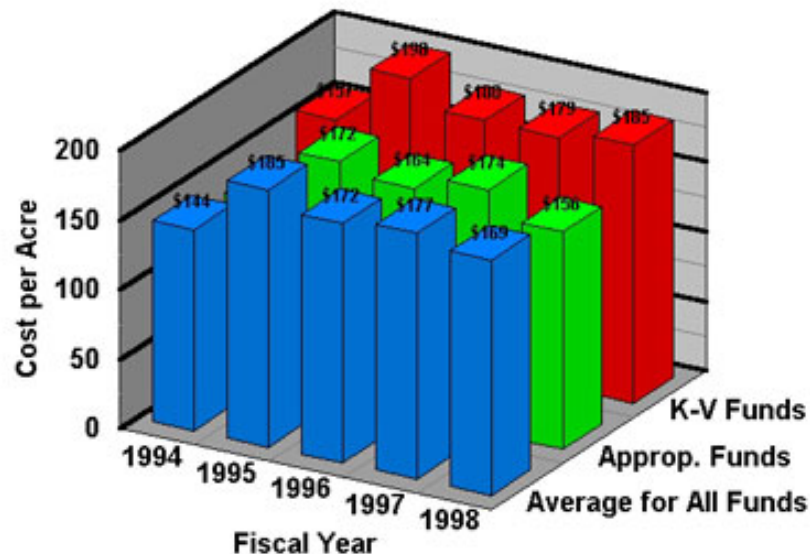
## TSI Program Costs

TSI cost trends are displayed below in Figure 9 show the average cost of each acre of TSI accomplishment for each of the past five fiscal years. The annual per acre cost shown in this figure was derived by dividing total obligations by the acres of TSI work accomplished during each of the fiscal years shown. No adjustment for inflation has been made for any of the cost data included in Figure 9.

Nationally, TSI costs decreased in FY 1998 in relation to costs tabulated in the prior year. TSI treatments averaged about \$169 per acre in FY 1998, an decrease of about \$8 per acre from costs derived from NFC reports for FY 1997 (\$177 per acre). Appropriated TSI obligations fell by \$-18 per acre from FY 1997 to FY 1998, while K-V TSI obligations increased by \$6 per acre on average during this same period.

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.

**Figure 9 -- Average Costs for TSI Treatments (FY 1994 through FY 1998)**



## **FINANCIAL SUMMARY OF THE KNUTSON-VANDENBERG (K-V) PROGRAM**

The status of K-V accounts by region is shown in Table 24. FY 1998 K-V collections declined by about -11% from FY 1997 collection levels (\$130,055). K-V obligations were roughly \$145.6 million in FY 1998, down by about -12% from FY 1997 spending levels. As of the end of FY 1998, a total of about \$417 million in Emergency Forest Service Firefighting (EFSFF) advances needed repayment in order to carry out the work as authorized on Sale Area Improvement plans. Repayment of these advances remains a critical management concern. Trends in K-V collections and obligations from FY 1931 through the end of FY 1998 are shown on Table 25.

## APPENDIX A