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## **National Summary**

# Reforestation and Timber Stand Improvement Report

## **Fiscal Year 2000**

<b>Table of Contents</b>	<b>Page</b>
<b>Message from the Director of Forests and Rangelands</b>	3
<b>Preface</b>	4
<b>Executive Summary</b>	5
<b>SUMMARY OF THE FY 2000 FOREST SERVICE NURSERY AND GENETIC RESOURCE PROGRAMS</b>	
Production at FS Nurseries	6
Production at FS Seed Extractories	7
Genetic Resource Program Summary	8
<b>SUMMARY OF THE FY 2000 REFORESTATION PROGRAM</b>	
FY 2000 Reforestation Accomplishment and Program Trends	9
FY 2000 Reforestation Needs and Trends	10
Plantation Survival	11
<b>SUMMARY OF THE FY 2000 TIMBER STAND IMPROVEMENT (TSI) PROGRAM</b>	
FY 2000 TSI Accomplishment and Program Trends	11
FY 2000 TSI Needs and Trends	12
<b>APPENDICES</b>	
A) Silvicultural Accomplishment Report (Report 2400-D)	13
B) Plantation Survival Report (Report 2400-M)	36
C) Species Codes	39

## **Message from the Director of Forests and Rangelands**

Here is the Reforestation and Timber Stand Improvement Report for fiscal year (FY) 2000. The contents of this report also appear 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 establishment
- Third, it shows timber stand improvement (TSI) program accomplishment in each region and displays TSI trends 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.

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

- **SUMMARY OF THE FY 2000 FOREST SERVICE NURSERY AND GENETIC RESOURCE PROGRAMS**

This section of the report summarizes FY 2000 production data at FS nurseries and seed extractories and assesses 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 2000 REFORESTATION PROGRAM**

This section of the report displays FY 2000 reforestation accomplishments and program trends. This section also contains information on plantation survival and reforestation success.

- **SUMMARY OF THE FY 2000 TIMBER STAND IMPROVEMENT (TSI) PROGRAM**

This section of the report displays FY 2000 TSI accomplishments and program trends.

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, and reforestation success.

## Executive Summary

Some of the highlights for FY2000 include:

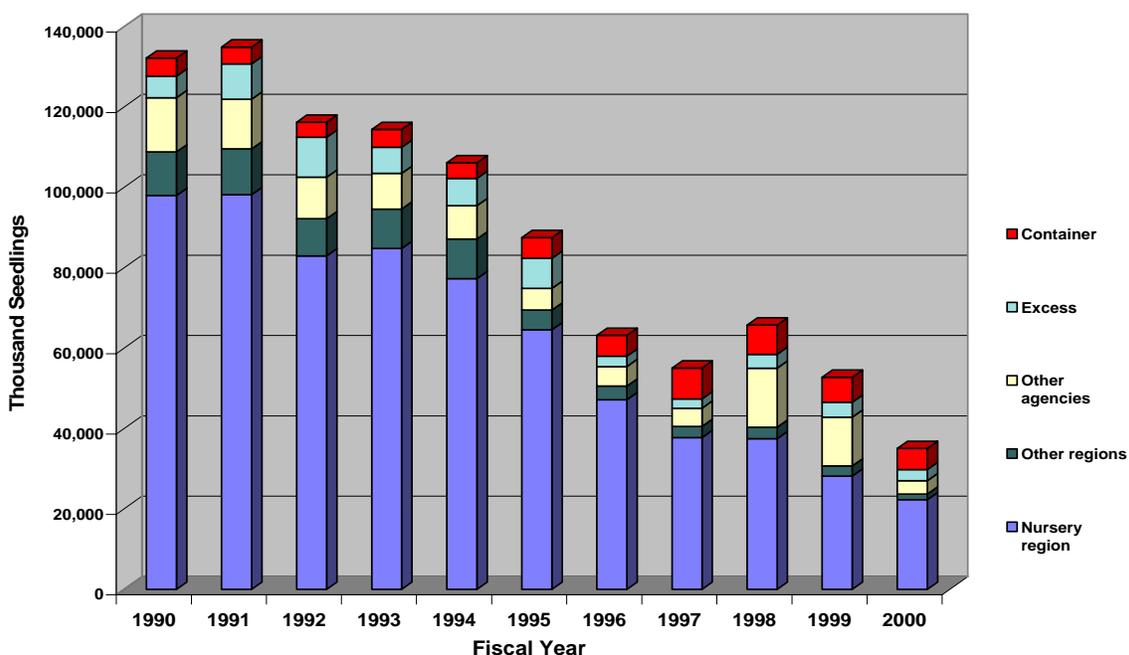
- Forest Service nurseries produced 37 million seedlings in FY 2000, a decline of about -27% from FY 1999 production levels (51 million seedlings).
- Forest Service seed extractories produced roughly 5.6 thousand pounds of seed representing over 175 species of grasses, forbs, shrubs, and trees.
- Silvicultural examinations were done on about 409 thousand acres and silvicultural prescriptions were developed on about 797 thousand acres to achieve a diverse array of management objectives on National Forest System lands.
- Reforestation treatments occurred on more than 217 thousand acres. About 52% of this work was K-V financed, approximately 41% was financed using appropriated funds, and the remainder was accomplished using contributed funding sources.
- Timber stand improvement (TSI) treatments occurred on about 224 thousand acres. About 59% of the treated acres were precommercially thinned, about 36% were treated to eliminate competing weed species and release trees to maintain or improve stand growth. Pruning and fertilization treatments were done on the remaining acres.
- Reforestation needs increased by about 92 thousand acres while TSI needs increased by about 148 thousand acres nationally.
- First-year survival averaged about 70% nationally and third-year survival averaged 68%.

## SUMMARY OF THE FY 2000 FOREST SERVICE NURSERY AND GENETIC RESOURCE PROGRAMS

### Seedling Production at Forest Service Nurseries

Forest Service (FS) nursery production, including both bare-root and container stock, was down by about -27% from the previous year at about 37 million seedlings (Tables 1 & 2 in Appendix A). This is a continuation of marked declines generally 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 decade are depicted in Figure 1.

**Figure 1 -- FS Nursery Seedling Production**



### Seedling Production Trends, Sowing Requests, and Acquisition from Other Sources

Seedling production levels have generally been declining at FS nurseries since FY 1991. As of the end of FY 2000, production levels at these facilities had declined by -74 % from the levels reported for FY 1991 (134.9 million). 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 2004. Table 4 summarizes seedling acquisition from sources other than FS nurseries.

### Seed Production at Forest Service Nurseries

Approximately 5.7 thousand (M) pounds of seed was produced during FY 2000, down about -42% from FY 1999 extraction levels (9.8 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 11-year period shown in Figure 2.

**Figure 2 -- Seed Production at FS Seed Extractories**

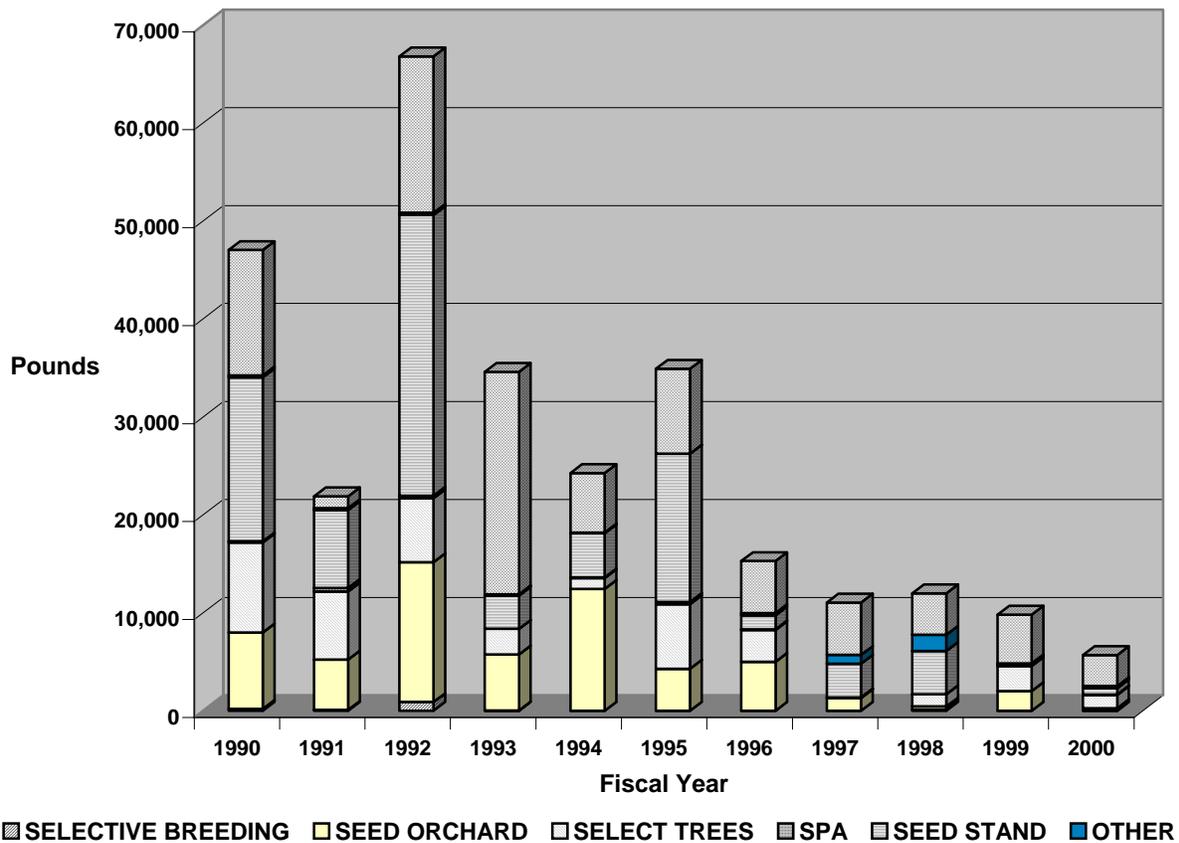


Table 3 in Appendix A summarizes the source of origin for seed processed at FS facilities in FY 2000. About 5% of this seed was collected from seed orchards. The list of plant species being processed at these facilities includes nearly 200 species of grasses, forbs, shrubs, and woody plants processed at FS seed extractories in FY 2000.

Table 5 in Appendix A summarizes seed production area (SPA) status for FY 2000. Seed production areas were established on 25 acres in FY 2000; however, SPA's were eliminated on 77 acres resulting in a total of 5,166 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) was established in 1988 as part of the National Forest System of the USDA-Forest Service. It is a facility dedicated to provide genetic analyses to resource managers throughout the agency and cooperating institutions. The laboratory analyzes molecular genetic markers (proteins and DNA) in plant material submitted by Forest Service employees and those from other cooperating entities. NFGEL provides baseline genetic information, determines the effect of management on the genetic resource, supports the tree improvement program, and contributes information in the support of conservation and restoration programs, especially those involving native and TES (threatened, endangered, and sensitive) species. Initial NFGEL work was primarily focused on conifers, exploring genetic variation patterns to refine seed zones and to resolve questions about clones, populations, and genetic sources. With the approval and implementation in 1992 of the Forest Service Genetic Resources Strategic Plan, the lab was given the mandate to begin work examining forest vegetation other than trees.

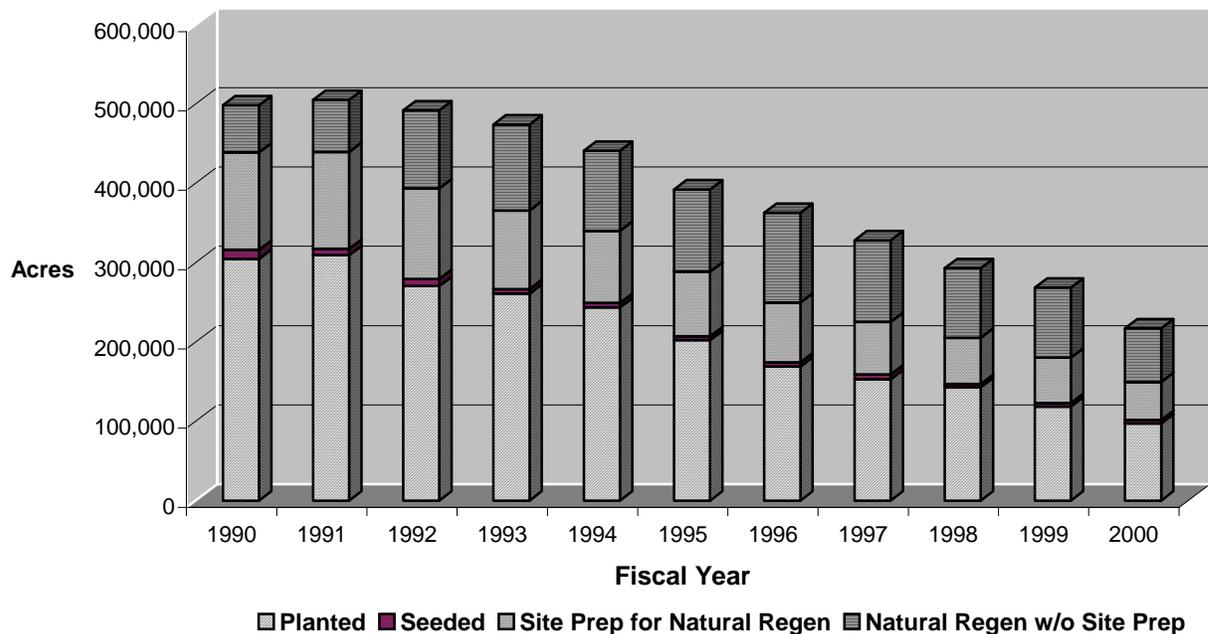
NFGEL projects are processed to meet a variety of management objectives. Projects outcome are used to guide restoration and conservation projects, and assist in silviculture and tree improvement activities. During FY 00, the lab continued to follow its mission to “provide state-of-the-art molecular genetic information to the National Forests and other cooperating agencies for the evaluation and protection of our nation's genetic resource.” NFGEL completed 15 projects using a combination of protein and DNA markers. The lab wrote nine reports, ran 349 starch and isoelectric focusing gels, extracted DNA from 445 plant samples, and performed 859 polymerase chain reactions. Genetic data were used to support silviculture and genetic improvement programs (in Douglas-fir and ponderosa pine), forest health programs (in Port-Orford cedar and Alaska yellow cedar), conservation and restoration programs (slash pine and other southeastern pine species, and lupine), and TES programs working with flaming trumpet and Tahoe yellow cress, (*Collomia rawsoniana* and *Rorippa subumbellata*). The lab continued to expand its role in the area of forensics by performing genetic identity analysis for a National Forest System ponderosa pine fuelwood theft investigation. Educational contacts included technical information provided to Universities, local colleges and high schools, public tours, and international laboratories. Detailed Fiscal Year accomplishment reports can be found at <http://dendrome.ucdavis.edu/NFGEL/>.

## SUMMARY OF THE FY 2000 REFORESTATION PROGRAM

## FY 2000 Reforestation Accomplishment and Program Trends

Over 215 thousand acres of National Forest System lands were reforested during FY 2000 using appropriated, reforestation trust (RTF), and Knutson-Vandenberg (K-V) funding sources. Contributed funds reforested an additional 1,893 acres, bringing the grand total for FY 2000 to 217,215 acres. This represents a reduction of about –19% from FY 1999 (268,520 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 2000 are 67,606 acres of natural regeneration without site preparation. Reforestation accomplishment by K-V funding occurred on a total of 113,960 acres, representing a –28% reduction from FY 1999 (158,618 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.

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



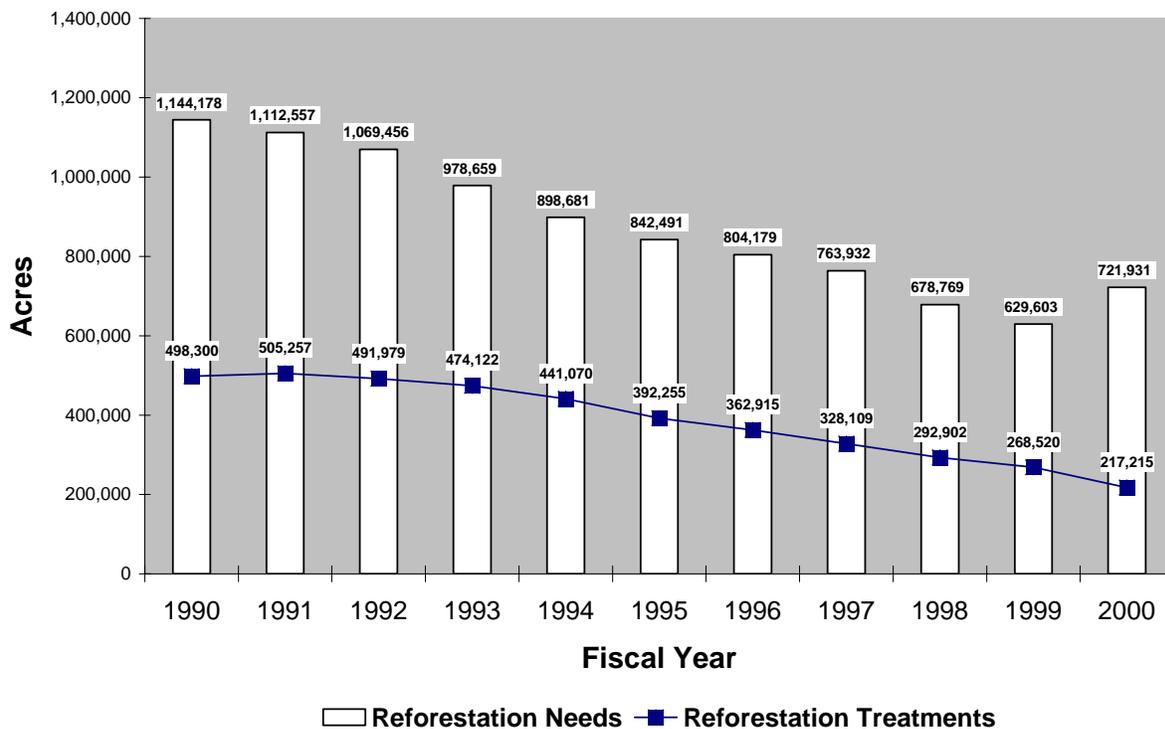
Additional information concerning reforestation accomplishments in FY 2000 is presented in Table 12 (Site Preparation for Planting or Seeding), Table 18 (Animal Control for Reforestation), and Table 21 (Certification of Reforestation treatments), as well as summary of harvest acres by cutting method in Table 20 in Appendix A.

## FY 2000 Reforestation Needs and Trends

Current reforestation needs are estimated at 721,931 acres, representing about 2-3 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, the net increase in reforestation needs was 92,328 acres in FY 2000. This increase is primarily attributable to the wildfires occurring in the western U.S. during the summer of 2000.

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 21 thousand acres nationally in FY 2000 representing about 10% of reforestation treatment acres.

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



## Plantation Survival

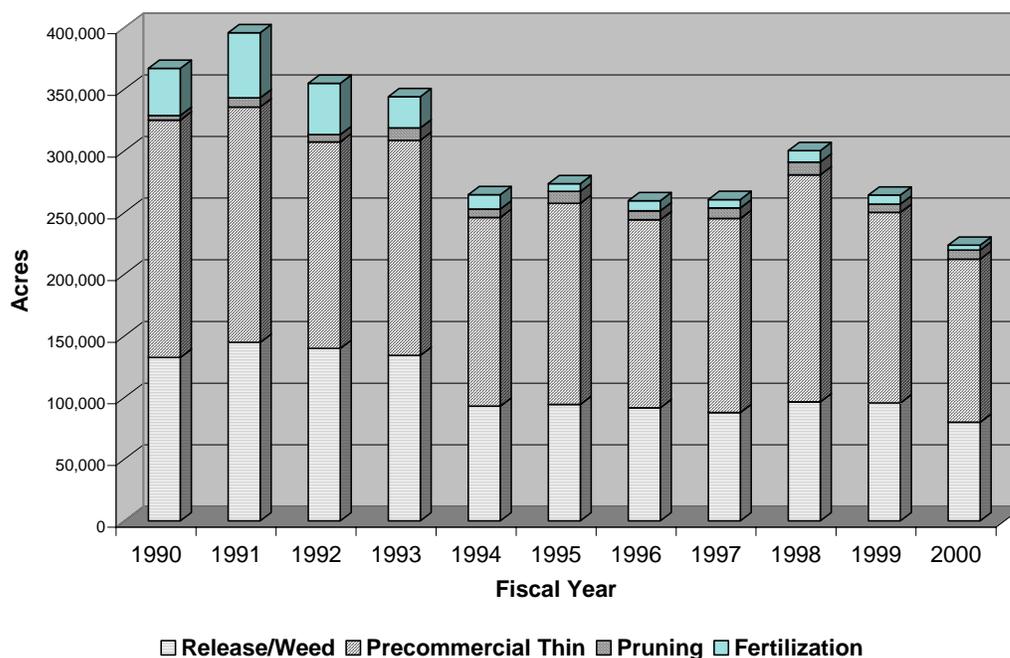
The results of the plantation surveys made following the 1999 growing season are summarized in Table 23 in Appendix B. First-year survival nationally averaged 70%, down by 4% from the prior year (74%). The national average for third-year survival was reported at 68%, increasing from plantation survival reported in the previous year (61%).

## SUMMARY OF THE FY 2000 TIMBER STAND IMPROVEMENT (TSI) PROGRAM

### FY 2000 TSI Accomplishment and Program Trends

About 217 thousand acres of National Forest System lands received TSI treatments during FY 2000 using appropriated, reforestation trust (RTF), and Knutson-Vandenberg (K-V) funding sources. Contributed funds treated an additional 6,431 acres, bringing the grand total for FY 2000 to 223,634 acres. This represents a decrease of about -15% from FY 1999 attainment levels (264,182 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.

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



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 need for this shift in emphasis impacted dollars that would otherwise be used to accomplish TSI work.

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 2000 TSI Needs and Trends

Current TSI needs are estimated at about 2.02 million acres nationally, an increase of 147,938 acres over the TSI needs level reported in FY 1999 (1.873 million acres). FY 2000 TSI needs represent about 9 years of work at FY 2000 levels of accomplishment. The gap between TSI needs and accomplishments increased from FY 1999 to FY 2000, adding the equivalent of about a two year workload to the TSI needs reported in our previous report. National trends in TSI needs and accomplishments are shown in Figure 8.

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

