

Twenty Years of Nursery History— A Forest Service Perspective

Frank Burch

Frank Burch is in Silviculture Practices and Genetics, USDA Forest Service, Sidney R. Yates Federal Building, 201 - 14th Street SW, Washington, DC 20250; telephone: 202.205.0946; e-mail: fburch@fs.fed.us

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I was asked to speak to you concerning 20 years of nursery history from a Forest Service perspective. I hope you will allow me a little leeway here, because while I will focus on events of the past 2 decades, I find it necessary to begin by going a little further back in time.

Early Nursery History

I'd like to start in the waning years of the 19th century and briefly talk about 3 gentlemen who were instrumental in establishing the need for tree nurseries and who helped in defining key roles served by these facilities.

The first of these 3 people is Professor Charles E. Bessey. Dr. Bessey was the Professor of Botany and Horticulture at the University of Nebraska during this period. When he could break away from campus, he traveled widely, gathering tree, shrub, and grass specimens, and took a special interest in the Sandhills region. He discovered that the dry sandy soils in this region held significant moisture just a few inches below the soil surface. He also found that ponderosa pine (*Pinus ponderosa*) and red cedar (*Juniperus virginiana*) were present, but widely scattered in their distribution throughout the region. This led him to believe that it was possible to re-establish a forest in this sea of grass. Professor Bessey thus exemplifies the sort of intellectual curiosity and conviction that was instrumental in engaging others.

One of the people Professor Bessey influenced was Dr. Bernhard Fernow. Dr. Fernow was Head of the Division of Forestry in Washington DC in 1891 and was intrigued by Bessey's ideas; so intrigued that he worked out a deal. Dr. Fernow would provide the tree seedlings if Bessey would provide the land for the experimental plantation and plant the trees.

Now the seedlings that Dr. Fernow provided for this experiment were not exactly what we might call native plant materials. In this initial experimental plantation, Scots pine (*Pinus sylvestris*), Austrian pine (*P. nigra*), jack pine (*P. banksiana*), and Douglas-fir (*Pseudotsuga menziesii*) were planted in 4 quarter-acre plots. There are at least 2 versions to the story of what happened to that acre of land in the ensuing years. However, in either version, none of the seedlings Bessey and Fernow planted on that acre in 1891 survived a sustained drought experienced in the region in the 1930s.

The story of what happened to these seedlings is less important than the fact that this may well be the first example in this country of a jointly sponsored experiment between an academic institution and a Federal agency to apply the principles of forest ecology toward the re-establishment of tree seedlings. The zeal and enthusiasm that these 2 gentlemen applied to testing the hypothesis, and the fact that they worked in a close partnership to do so, are 2 key elements of the Forest Service nursery story.

At the very beginning of the 20th century, several other key players adopted this idea and applied their energies to the establishment of what was to become the Nebraska National Forest. I do not have time to recount who all of those players were, nor to do justice to their story. But their efforts won the support of President Theodore Roosevelt, who issued a proclamation creating 3 Forest Reserves in the Sandhills region. This momentum also led, in 1902, to the establishment of the first Forest Service nursery in the United States, named in honor of Dr. Charles E Bessey. Many in this room visited the Bessey Nursery in conjunction with a prior WFCNA meeting, so you know firsthand of the good work that continues to this day at this facility.

The adoption of Dr. Bessey's idea, and the extension of that idea toward the goal of managing the Forest Reserves, later to become the National Forests, for the "permanent good of the whole people," involved still other heroes of renewable resource management. Key among these is Gifford Pinchot, the first Chief of the USDA Forest Service, who, in 1947, called the Nebraska National Forest one of the great successful tree-planting projects in the world.

Pinchot's support was instrumental in the expansion of Forest Service nurseries. Pinchot helped to define a key role for the Forest Service nurseries in fostering the recovery of forest ecosystems following disturbance events. While the Bessey-Fernow

experiment focused on afforestation, under Pinchot's leadership as the Agency's first Chief additional nurseries were established in those early days. The goals of these nurseries were to facilitate reforestation efforts following disturbance events such as large wildfires, to assure a continuous supply of wood fiber for domestic uses, to protect forest resources, and to protect the quality of water flowing off the National Forests. Pinchot's support also extended itself to conducting research to improve reforestation success on the National Forests. These manifestations of support at the very highest levels of the Agency, since its inception, cannot be underestimated.

Modern Nursery History

The concept of establishing Forest Service nurseries toward these aims was firmly rooted in legislation. This concept is supported in the Organic Act, and subsequent supporting language is contained in the Clark-McNary Act, the Knutson-Vandenberg Act, and other key legislation passed into law during the first half of the 20th century.

The second half of the 20th century saw increasing reliance on the National Forests for timber production. Timber production objectives for the National Forests were expressly provided for in legislation passed into law during this period, such as the Multiple-use Sustained Yield Act of 1966, the Resources Planning Act (RPA) of 1974, and the National Forest Management Act (NFMA) of 1976.

Timber harvest levels on the National Forests increased dramatically throughout much of the second half of the 20th

century (Figure 1). Annual timber harvest levels immediately following WWII were below about 3 billion board feet nationally. During the period from 1950 through the mid-1960s, annual timber harvest rose sharply; by 1965, harvest levels were roughly 12 billion board feet per year nationally. Timber harvest levels in excess of about 10 billion board feet were sustained nationally in the period following the late 1960s through the early 1990s, with some oscillations occurring as a result of market-related factors.

So, as we focus today on the past 20 years, we see that it encompasses a period of precipitous change in terms of timber harvest outputs from National Forests. The first half of this 20-year period, from 1984 through about 1994, was a period of dramatic changes, with timber program levels declining from more than 12 billion board feet of harvest annually in the late 1980s to about 4 billion board feet per year in 1994. In the second half of this 20 year period, annual timber harvest levels have stayed below 4 billion board feet nationally, where they remain to this day.

Developments during the mid 1970s leading to the passage of NFMA of 1976 and the establishment of the Reforestation Trust Fund (RTF) in the mid-1980s also profoundly influenced these facilities. Through this statutory direction, Congress clearly expressed their intent to maintain forest lands in a forested condition by promptly reforesting National Forest System lands following harvest and other disturbance events. This led to accelerated reforestation programs in the late 1970s through the mid to late 1980s to eliminate a reforestation backlog of 3.1 million ac (1.3 million ha) first identified by the Forest Service in the mid 1970s.



Figure 1—Annual timber harvest from National Forest system lands—service-wide totals.

Forest plans emerging following passage of RPA and NFMA also expressly identified the need for reforestation programs in support of planned timber harvest levels under these plans.

Forest Service Nursery System

The Forest Service Nursery System expanded in response to these influences during the second half of the 20th century until about the late 1980s. Table 1 lists the Forest Service nursery facilities in operation at the time of the first Service-wide Nursery Capacity study conducted by the Washington Office in 1979. As you can see, there are a total of 14 facilities listed on this figure.

You will also note that 6 of those 14 facilities remain in operation today. The key causal factors impacting both reforestation programs and Forest Service nurseries can be grouped into 4 general themes.

Policy Shifts

The first of these themes is policy shifts. In the early 1990s, the Agency embraced the concept of ecosystem management. This concept has led to a management framework whereby the National Forests are managed toward outcomes, rather than outputs. You are all familiar with these concepts so I won't dwell on them here. But this policy shift manifested itself in 2 important ways relative to Forest Service nurseries. First, the shift as announced by the Forest Service was explicitly tied to a targeted reduction in the practice of clearcutting on the National Forests, and the Agency has overachieved on the 70% reduction in this practice that was called for when the new policy was announced in June of 1992.

The policy shift also resulted in sharp reductions in timber harvest levels overall and impacted other regeneration harvest methods in addition to the clearcutting method. Timber

harvesting practices on the National Forests shifted to favor intermediate harvest methods, such as thinning and salvage harvest methods.

This shift in harvest methods being applied on the National Forests continues to the present day. More recent initiatives, such as the Healthy Forests Initiative, continue to emphasize practices to reduce stand density and thereby promote health and fire-resiliency. This shift in emphasis has resulted in a decline in regeneration cutting on the National Forests.

Reduction in Land Base

The second major factor influencing reforestation programs and Forest Service nurseries is a sharp reduction in the land base available for vegetation management activities involving tree removals since the first round of forest planning was completed. Again, we are all aware of the changes that have manifested themselves in providing protections under the Endangered Species Act and as a result of the Roadless Rule as just 2 examples. Collectively, the forest plan decisions in recent years have resulted in significant downward adjustments in the land base being managed for purposes of timber production on many National Forests.

Decline in Funding

A third factor that is also highly significant to this story is the sharp decline in funding resources, particularly for tree planting operations on the National Forests. In the days when timber harvest levels were at their zenith, roughly two-thirds of the reforestation work on the National Forests was financed with Knutson-Vandenberg (K-V) deposits derived from the sale of National Forest timber. Today, less than one-half of the reforestation program is financed using these deposits. This has placed increasing pressure on scarce annual appropriations, and reforestation work must compete with other priority work (such as thinning to reduce the risks of catastrophic fires).

Forest Service Controls

In the USDA Forest Service, controls that once existed to accomplish reforestation work, such as line officer performance measures for reforestation success, have been replaced by measures that focus on other key priorities. This, too, has affected these programs. As management-guru Peter Drucker has said, "What gets measured gets done."

Forest Service Nursery Seedling Production

Figure 2 shows how these factors have affected tree seedling production at Forest Service nurseries over the past 20 years. In the first half of this period, these facilities produced in excess of 100 million seedlings annually. A period of steep declines in annual production levels occurred after fiscal year 1995, with production levels falling to about

Table 1—Forest Service Nursery System in 1979 and status in 2004.

Region	Nursery	Status in 2004
R-1	Coeur d'Alene, ID	In operation
R-2	CE Bessey, NE Mt Sopris, CO	In operation Closed
R-3	Albuquerque, NM	Closed
R-4	Lucky Peak, ID	In operation
R-5	Placerville, CA Humboldt, CA	In operation Closed
R-6	Bend, OR JH Stone, OR Wind River, WA	Closed In operation Closed
R-8	WW Ashe, MS	Closed
R-9	JW Toumey, MI Eveleth, MN	In operation Closed
R-10	Petersburg, AK	Closed

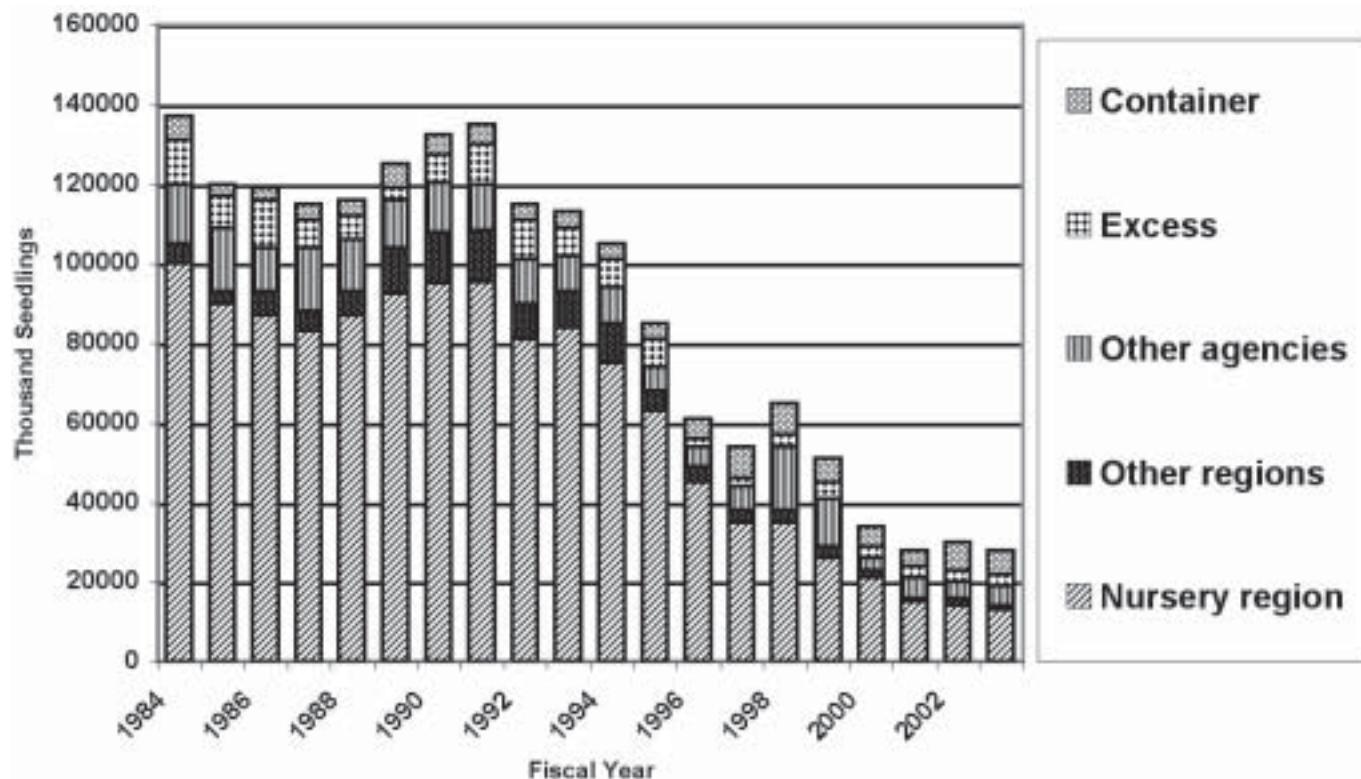


Figure 2—Trends in Forest Service nursery production.

30 million seedlings per year collectively at the 6 remaining Forest Service nurseries.

This decline in production has had a destabilizing effect on these facilities. Forest Service nurseries operate under the Working Capital Fund (WCF) concept. WCF operations must cover their operating costs using the revenues derived from the sale of seeds and seedlings produced at each facility. With declining seedling orders and constant or increasing fixed costs, the only remedy left for these facilities after they have done all they can do to promote the cost efficiency is to increase prices to cover costs.

Forest Service nurseries have been struggling with this dynamic for the past decade. Two national reviews conducted since 1996 have served to validate that the Agency continues to need and value these facilities, but we have struggled to find enduring solutions that can be embraced by Agency decisionmakers to provide for the continued financial health of our nurseries.

We value these facilities because they continue to fulfill key roles that initially led to their establishment. These facilities continue to be a reliable source of locally adapted, high-quality plant materials for use in forest restoration projects. We value these facilities because, consistent with their 100-plus year heritage, our nursery managers continue to apply their expertise to testing and demonstrating plant propagation and production methods and to freely share their results with other growers. They provide technical advice and assistance to their customers, which is made even more important with the attrition in skills resulting from retirements and workforce reductions on most National Forest units. We value these facilities for the

important role they serve in public education and communicating the importance of conserving and renewing forest resources. We value them in their role as partners with the practitioners attending this meeting.

Conclusions

As we near our 100th year as an Agency within the Department of Agriculture, a look to the past might well inform our future. On our present course, the strategic objectives of recent Agency initiatives to promote the health and resiliency of forested ecosystems will provide opportunities. The need to foster recovery following natural disturbance events is prominent in each of these initiatives. There are clear roles for vegetation management, and for Forest Service nurseries in pursuing these goals.

To make good on these goals will require the grass-roots zeal exhibited by people like Dr. Charles E. Bessey when he dreamed of establishing a forest in the Sandhills region. It will require the skill and expertise of people like Dr. Bernard Fernow to champion the cause, marshal resources and support to do make it happen, and oversee the work to ensure that it is done properly. Most importantly, it will involve leadership from line officers throughout the Agency akin to the example set by Gifford Pinchot a century ago.

It is my sincere hope that my successor will be able to report favorably in each of these areas when revisiting this subject at the 2024 Western Forest and Nursery Conservation Association meeting.