

# Nursery Management Information System<sup>1</sup>

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Abstract.--In 1978 a committee was established to prepare a proposal for automating and standardizing current nursery record keeping and report preparation procedures. The system will document the history of seedlings and their treatments from seed to established seedlings. Projected target date for seedling portion of system to become operational for all nurseries desiring to use it is 1/1/80.

The ability of the Forest Service to achieve the reforestation objectives established by congress and to implement the Chief's direction to improve Reforestation and Timber Stand Improvement (1978 study) will depend to a large extent on efficient nursery management. This type of management is contingent on developing an efficient system of managing data, providing historical records and generating required reports.

The desirability of maintaining nursery data in an automated fashion has been recognized for several years. The necessity of automating our systems now is dictated by the increasing amount of data retained for each seed lot, the development of larger nurseries, the introduction of more complex nursery management techniques and the realization of smaller seed lots as tree improvement seed becomes available. A quote taken from the 1978 Nursery Capacity Study states "A systematic record keeping system should be designed to document the history of seedlings and their treatments from seed to established seedlings".

With our existing system at Medford data is entered for each seed lot (we have 3500) on a separate seedling history card and filed. The limitations of this system evolve from the tremendous amount of data that must be recorded, stored and retrieved to prepare

reports, track stock problems or answer inquiries. The following situations can and usually do occur in our present system.

1. Data retrieval is repetitive, tedious, and monotonous and increases the potential for human error.

2. Handwriting may be difficult to decipher and can result in recording or retrieving erroneous information.

3. The magnitude of data to retrieve and record can affect the timeliness of reports and often requires the work of highly paid people doing low priority work.

4. The need to physically search for information often delays responses to field inquiries.

5. Space to store this large volume of information is usually at a minimum.

The present effort to resolve these areas of concern began in December 1977 when R-5 and R-6 nursery personnel met in Portland to discuss alternative methods for handling nursery data. As a result of this meeting representatives from Regions 2, 3, 5, 6, 9 and WO-TM met in February at Fort Collins to prepare a proposal for developing a Servicewide Nursery Management Information System. Our group examined all phases of Nursery management and for each phase determined the type of data normally collected to provide historical records and to generate reports. This information was sent to all regions for content review and compatibility with their operations. On August 19, 1978, after responses from the Regions had been evaluated, the Director of Timber Management, Washington Office, design-

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nated a formal work group to prepare a feasibility study and designated Wind River and Medford Nurseries to participate in a pilot test of the system.

Our feasibility study stated objectives, described the existing system, considered alternatives, proposed an automated system and discussed the anticipated benefits. To address the need for an automated system all Forest Service nurseries were contacted again to determine the total number of seed lots growing, average number of new seed lots sown per year, average number of treatments per lot per year and the average number of shipping transactions per year. The figures presented for 1978 and 1985 illustrate the increased volume of business expected.

Table 1.--Seedlings

Region	Nursery	Total number of seed lots growing		Average number of shipping transactions per year	
		1978	1985	1978	1985
1	Coeur d A'lene	1250	1900	1125	1125
2	Bessey Mt. Sopris	58	60	100	100
		108	150	48	100
3	Albuquerque	15	85	0	300
4	Lucky Peak	260	260	600	600
5	Humboldt Placerville	315	460	185	240
		386	700	171	300
6	Beaver Creek Bend Medford Wind River	80	185	80	185
		194	250	150	200
		115	1840	0	80
		918	850	4000	3500
8	Ashe	860	5000	250	5000
9	Includes: Eveleth, Toumey & Missouri	470	500	200	250
		5029	12240	6909	11980
		$\begin{matrix} \swarrow & \searrow \\ & 250\% \end{matrix}$		$\begin{matrix} \swarrow & \searrow \\ & 173\% \end{matrix}$	

For all nurseries this table reflects a 250% increase in number of seedlots grown, and a 173% increase in the number of shipping transactions per year.

The intent of the new system as shown in Table 2 is to automate the following nursery operations.

Table 2.

1. Seedling History Record
2. Seed Inventory Report
3. Growers Information Sheet
4. Quarterly and Annual Seed Reports
5. Report of Seed Sold
6. Seedling Inventory Reports
7. Report of Stock Shipped or Destroyed
8. Monthly Seedling Reports
9. Nursery Data for Annual Silvicultural Report

The objectives shown in Table 3 will be addressed during the pilot test to evaluate the feasibility of an automated Nursery Management System.

Table 3.

1. Accurately storing and retrieving large amounts of information.
2. Personnel saving (more efficient use of people).
3. Timely response to reporting requirements and special queries.
4. Historical records for evaluation of past practices and to "track" stock problems.
5. Establish more effective communications between nurseries.
6. Tie seed and tree performance to land treatments and nursery practices.
7. Refinement and improvement of nursery sowing factors.

At this time we have not prepared a detailed cost analysis of our proposed system versus the existing system, however, we do have some preliminary estimates. Costs of existing systems vary by nursery depending on volume of business and types of activities. According to one estimate it costs approximately \$42,000 per year to handle seedling information.

The costs presented below are a rough estimate for a large nursery operating on a continuous basis at FCCC. After testing is completed, a range of actual cost of operation for various sized nurseries will be prepared.

Table 4.--Estimated annual costs for a nursery operating on a continuous basis at FCCC

Annual cost of a low speed terminal for nursery use	\$ 2,000
Annual cost of computer time	2,000
Annual cost of personnel for data entry manipulation and report preparation	7,000
Annual cost of program maintenance and training	1,000
<b>Total estimated cost of operating system at FCCC for one year for one nursery</b>	<b>\$12,000</b>

All the above costs are for using FCCC. If a nursery were to purchase its own mini system, they could expect to pay an initial price of approximately \$25,000. This type of system would have an expected life of five (5) years, thus the annual cost of operation would be as shown on the following table.

These cost figures are very rough esti-

Table 5.--Estimated Annual cost of purchasing and operating a mini-system

Annual cost for equipment and maintenance	\$ 7,000
Annual salary for data entry, manipulation and report production	7,000
<b>Annual cost of mini-system for one nursery</b>	<b>\$14,000</b>

mates. After our testing is completed at FCCC and the Departmental standards for minis are finalized, indepth cost analysis will be conducted for the required hardware.

Where do we go from here? Concurrent with our pilot test the following activities will be addressed.

Table 6.--Activities to complete prior to system becoming operational.

1. Continue the pilot test with Medford and Wind River Nurseries.
2. Develop a program to produce seedling reports from limited test data.
3. Initiate the seed portion of the Nursery Management Information System.
4. Develop a standardized coding system for nursery operations.
5. Structure system so it can be used with a terminal to Fort Collins or a unit mini or micro system.
6. Submit to the Washington Office Coordinating Council a complete development plan including an evaluation of the pilot test and detailed cost analysis.

This project, which has been recognized as a need for several years, is now approaching reality due to the efforts of our work group members, the support from the Washington Office and the Forest Service Regions, and the excellent cooperation and guidance from Doyle Turman and Ron Briggs of Fort Collins. Our projected target date is 1/1/80 for having the seedling portion operational for nurseries desiring to use it and 6/1/80 for the seed portion.

On November 6, 1978, the Washington Office Systems Coordinating Council approved our feasibility study and authorized the progression of the system to the Development Phase of the Systems Management Process.