The Impact of Container Nursery Siting on the Availability of High Quality Agricultural Soil in the Willamette Valley

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Table of Contents

Abstract

A strong concern has been expressed with the siting of container nurseries on high quality farmland in the Willamette Valley. There have been claims that the nurseries don't use the on site soil and potentially remove the soil on which they locate permanently from crop production. This study has gathered and presents information that will help evaluate this concern.

Oregon's Planning Goal 3 and other state policies and statutes are examined with regard to container growing. A spatial analysis of container nursery sites within the Willamette Valley with relation to each other, population centers, high quality farm soil, zoning, and surrounding land use is discussed. The results and analysis of a survey of container growers in the Willamette Valley concerning their siting needs and other aspects of their business are also presented. The findings of the study were that the container industry is not having a negative effect on the availability of high quality soil and that the needs of the industry are such that locating on high quality soil is sometimes necessary.

Introduction:

In January of 1992, the concern was raised that container nurseries were siting on high quality agricultural soil, but not using the soil. Furthermore, it was claimed that many container growers grade or contour their container beds, potentially mixing the topsoil and the subsoil, and irreversibly damaging the site for future use as productive cropland should the nursery move or go out of business. A concern was also expressed with the practice of laying gravel or crushed rock over the container beds and roads on the site because the prohibitive cost of removing the gravel or crushed rock and return the land to crops may cause the land to be permanently removed from crop production. These concerns prompted the undertaking of this paper with the intention of contributing to the body of information to be used in the determination of the validity of the concerns.

Container growers are those nurserymen who grow plants in containers rather than directly in the soil on which the nursery is sited. Some general advantages of the container industry weigh in its favor and need to be considered when evaluating the industry's impact on agricultural soil. The container industry has become an increasingly important aspect of the agricultural economy in the Willamette Valley over the past decade. The entire nursery industry, including field

growing and greenhouses, has become the second leading crop in the state in terms of the gross sales (Beaton and Hibbard, 1991). Container nurseries require less land than a field nursery to be profitable and have a greater return per acre in one third to one half the time required for a field nursery to see a profit (Appleton, 1986).

In addition to these advantages, large container growers employ a large labor force on a more permanent basis than field nurseries because the operations are less seasonal (Appleton, 1986). Small operations can be successful on small parcels, especially when combined with other employment (Beaton and Hibbard, 1991). The investigation of the impact of the container industry on the supply of agricultural soil available for crop production must take these facts into account.

Objective:

It is the objective of this paper to determine if the container nursery industry is having a negative impact on the supply of available agricultural land usable as productive cropland. This determination will be made through an investigation of the background given in Oregon's Planning Goal 3, the Oregon Revised Statutes Chapter 215, the Oregon Administrative Rules 660 Division 5, and the relevant Land Use Board of Appeals cases. Further investigation includes a survey of thirty sites to determine the siting needs of container growers, crude growth rates in the industry, the frequency of combination

container/field operations, and the frequency of grading and gravelling on container sites.

Soils data and zoning on each of the thirty sites that answered the survey will be presented and examined with regard to the impact of the industry on the prime agricultural land base. This information will be integrated into a final examination of the industry as a whole within the Willamette Valley.

After this investigation, conclusions concerning the need for improvement, if any, in coordination between Goal 3, the agricultural policy, and the needs of container growers will follow. A determination of the level of impact that container growers have had on the availability of productive cropland will be made.

Methodology and Data:

The study began with a review of existing literature concerning the container industry and their general needs when siting a nursery. Background data were collected with regard to Oregon's Planning Goal 3, the Oregon Revised Statutes (ORS) Chapter 215, the Oregon Administrative Rules (OAR) 660 Division 5, and Land Use Board of Appeals (LUBA) cases that may be relevant to the topic.

After the initial research and with consultation of the Oregon Association of Nurserymen, a survey was formulated (Appendix A) to determine trends concerning the use of grading

and gravelling, size of the container component of nurseries in the Willamette Valley, growth of the industry with regard to number of new establishments and their size, the frequency of combination container/field operations with the sizes and zoning of combination sites, and to assess the siting needs of the container growers in the Willamette Valley as perceived by the growers themselves.

The survey was conducted randomly and the data collected were organized for the examination of detectable trends. The examination of trends ranged from differences between the practices and needs of large operations and small operations to the examination of differences between the needs of container growers and combination container/field growers. The comparisons are clearly identified within the sections of the paper that they are discussed.

After the survey was conducted, an analysis of the soils on each of the thirty sites was conducted to determine the percentage of nurseries located on high quality farmland. The zoning and surrounding zoning, including surrounding lot size, was examined to determine if each site was located in an area valuable for crop production. Areas not zoned Exclusive Farm Use (EFU), or a similar agricultural designation, were determined to be of no use for crop production because of the generally small lot sizes in other zones. These analyses were designed to determine the extent of a container nursery's negative impact on productive cropland.

The data used come from a variety of sources. Soils information was derived from the Soil Conservation Service's soil surveys of each county. Existing work, all listed under references, provided much of the background while interviews and the survey provide all of the new information.

Goal 3, ORS 215, OAR 660 Division 5, and LUBA cases:

Oregon's Statewide Planning Goal 3, the Oregon Revised Statutes (ORS), the Oregon Administrative Rules (OAR), and Land Use Board of Appeals (LUBA) cases are the basic legal framework that regulate the use of agricultural land in the Willamette Valley. The two areas that these four documents and compilations address that are important to this discussion are the definition of agricultural land and the uses allowed on designated agricultural land.

Goal 3's stated objective is to preserve and maintain agricultural lands in order to meet "...existing and future needs for agricultural products, forests and open space" (Land Conservation and Development Commission, 1990). Since the land that is generally best suited to agriculture is also the land that is best suited to urbanization, regulation for the purpose of preservation has been instituted.

Agricultural land has several components to its definition, but the important one to be considered here is soil. Goal 3 and OAR 660-05-005 specifically define agricultural land in terms of the soil. The Soil Conservation Services Capability

Classification system is used and soil classes I through IV are the predominant types designated for agricultural use in the Willamette Valley. In order to comply with Goal 3, all communities in Oregon must provide for the protection of agricultural land. The preservation of soil in classes I through IV that is available for agricultural use (i.e. not necessary for development or in built up areas) is required.

ORS 215.243 is Oregon's agricultural policy and states:

> "The Legislative Assembly finds and declares that:
> ....(2) The preservation of a maximum amount of the limited supply of agricultural land is necessary to the conservation of the state's economic resources and the preservation of such land in large blocks is necessary in maintaining the agricultural economy of the state and for the assurance of adequate, healthful and nutritious food for the people of the state and nation..." (Department of Land Conservation and Development, 1989).

This policy poses some questions concerning the role of food production in the definition of an agricultural use of the land. The policy specifically states that the protection of agricultural land is to maintain the agricultural economy and for food production. The policy is the only place where the inclusion of food production as a reason for protecting agricultural land could be found and does not conform well with the other rules, statutes, and Goal 3 which allow for many agricultural uses other than food production and treat the policy as though it says "or for food production". A clarification of the intended purpose of the statement should be made.

In general, the uses allowed in agricultural zones are farm uses only. "Farm Use" is defined in ORS 215.203 and includes horticultural practices, of which container nurseries are a subgroup.

LUBA cases have not specifically addressed nursery siting. 2 Or LUBA 112, Earl J. Von Volkinburg and Cora M. Cannon v. Marion County Board of Commissioners, found soil to be an important aspect of Goal 3 and the definition of agricultural land, but the case does not elaborate on the point. Several other cases make similar conclusions.

Soils, Surrounding uses, and Zoning:

Interest in how the container industry is affecting the supply of high quality farmland soil was one of the main concerns that prompted this study. Soil fertility is not a critical factor for a container nursery (Appleton, 1986; Patterson, 1969). Unfortunately there is no simple way to determine the fertility of a soil without doing an soil test on each site. The most practical way of assessing the quality of soil on a site for the purposes of this paper is to use the Soil Conservation Service Capability Classifications. The limitation of this method is that many of the characteristics used to classify a soil having a Capability Classification of I to IV are important in siting a container nursery and the Capability Classification system will not differentiate between a site that is of high fertility and therefore high quality for crop

production or is of average fertility yet qualifies as class I through IV because of characteristics other than fertility.

The characteristic of the soil that will be important to a businessman who is strictly a container grower is the rate of percolation (Davidson, Mecklenburg, and Peterson, 1988; Appleton, 1986; Patterson, 1969). This will affect the level of improvements needed to upgrade the site to withstand a high volume of traffic and to keep the containers out of puddling water. Clayey and poorly drained soils will most likely need drainage enhancement generally involving graded container beds and/or a layer of gravel or crushed rock.

The definition of prime farmland offers a slightly more discerning examination and classification than using all soils in classes I to IV and is considered to be most important for crop production.

> "Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and also is available for these uses (the land could [currently] be cropland pastureland, rangeland, forest land, or other land, but not urban built up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding."

(USDA, Marion County Area, Oregon; Important Farmlands map, 1981).

Prime farmland is capable of maintaining crops for the least cost and producing the greatest variety of crops. There are 1,261,866 acres of prime farmland in the Willamette Valley, according to the Soil Surveys and Important Farmland maps of the SCS. This includes all prime farmland in Lane County and therefore may slightly overestimate the prime farmland in the study area.

Two other important soil categories will be treated as one category for the purposes of this paper. Those categories are "unique farmlands" and "additional farmland of statewide importance". These categories include all soils in Classes I to IV, in the Willamette Valley, not considered prime. High quality farmland is defined by this paper as soils in capability classes I to IV in agricultural zones.

The definition of prime farmland above recognizes that land cannot be considered prime farmland or of importance as potentially productive cropland if the area is not available for agricultural use. Oregon has designated specific agricultural zones and other zones in which residential growth is permitted. Some of these residential zones do allow nurseries and other activities, or conditional uses, by special permit. If the soils were designated as class I through IV, but the site was located in a zone other than an Exclusive Farm Use, or similar agriculturally designated zone, then the site was

not considered as being useful for potential crop production and therefore had no negative impact on the availability of important agricultural land for crop production.

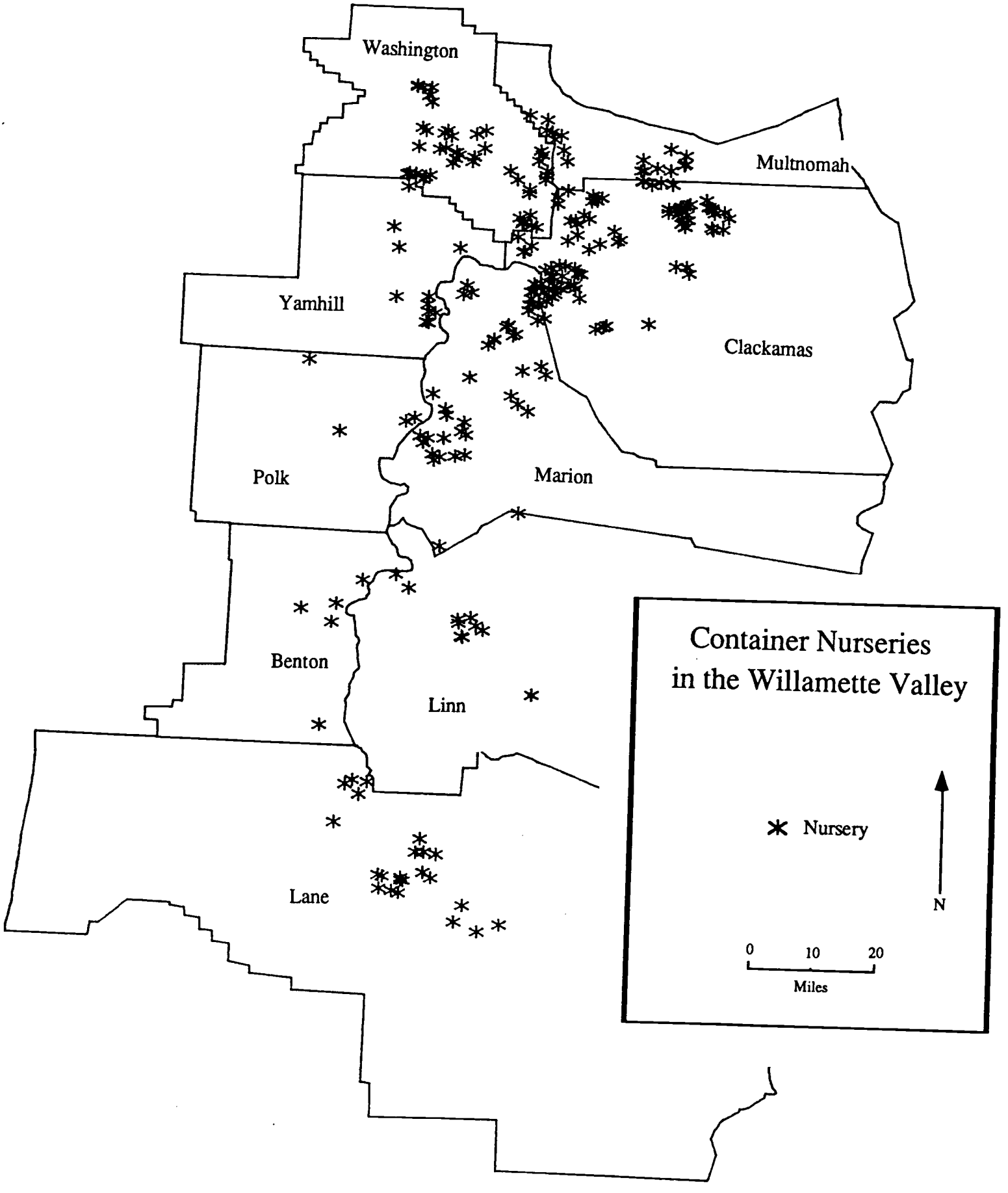
Of the thirty sites examined, seventeen, or 56.5%, met all qualifications for being sites that could potentially be productive cropland. Of these seventeen, fourteen, or 82%, were located on prime farmland soil with the remaining three sites located on farmland of statewide importance. These figures are quite deceptive though. The thirty sites studied had a total of 470.38 acres in container production, (this does not reflect the field growing component that some of the nurseries in the study have) with the seventeen sites that qualified as potential cropland accounting for 454.75 acres, or 96.5% of the total acres under container production on the thirty sites examined. The thirteen sites that were not located on high quality soil were all disqualified as potential cropland because of the zoning in which they located, not because of the soil quality. In fact all thirty sites were located on soil classes I through IV, with 414.75 acres on prime farmland or 91% of all high quality farmland under container production. Extrapolating these figures to the total 2725.45 acres under container production in the Willamette Valley, 2630 acres or 96.5% of the total are in agricultural zones and 2393 acres are on prime farmland, or 0.19% of all prime farmland in the Willamette Valley, including all prime farmland in Lane County.

The magnitude of the problem of prime farmland loss can

perhaps best be put in perspective by examining Washington County's situation. Washington County has 85,581 acres of prime farmland which is a low figure when compared to the other counties in the study (USDA, Washington County, Oregon; Important Farmlands map, 1981). It also has the highest number of acres under container production of the counties in the study, but if all of the container nurseries in Washington county were on prime farmland, which they are not, less than 1% of the available prime farmland in the county would be covered. If all land in the Capability Classes I through IV were taken into account in Washington County, only 0.4% is under container production.

One site in the study was located in an Agriculture and Forest District with a five acre minimum lot size that allows single family dwellings as one of the permitted uses. Such a zone may not prove to be valuable cropland because of the small lot sizes and the greater value of the land as home sites. Since the surrounding lots were all smaller than ten acres and some had houses on them, it was not included as potential cropland even though the zoning title would seem to indicate agricultural uses as appropriate. Three other sites were located in similar zones that allowed for agricultural uses, but also allowed residential sites and had a five acre minimum lot size. These sites were also disqualified as potential cropland.

Zoning for the thirteen sites that were not regarded as having potential as cropland ranged from Rural Residential with


Washington
Multnomah
Yamhill
Clackamas
Polk
Marion
Benton
Linn
Lane
Container Nurseries
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a five acre minimum to sites within city limits and having a residential one acre minimum zone to sites within a forest conservation zone with an eighty acre minimum lot size.

Spatial Distribution:

Where the nurseries are located and why became important questions when considering the possibility of nurseries locating in areas other than prime farmlands. The map provided shows that container nurseries are concentrated around the large population centers in the Willamette Valley, Portland, Salem, and Eugene, with the largest concentration being between Portland and Salem. This is most likely because of the markets, labor availability, and transportation networks necessary, especially for the large nurseries. The importance of these factors will be elaborated on in the discussion of the survey.

Each site in the survey is shown on the map. Sites in the Florence area of Lane County were not considered in the Willamette Valley.

Industry Growth Rate:

The number of acres under container production within the study group expanded by roughly 28%, or 103 acres, over the last decade. If this rate can be extrapolated to the entire industry it would mean that over the past ten years approximately 600 acres have been put under container production within the Willamette Valley and over the next ten years approximately

another 770 acres will be put under production. These calculations assume a linear growth rate of 28% per decade.

The Survey:

The Pool of Candidates:

The survey (Appendix A) was conducted over a four day period, by telephone, during business hours and will be discussed in detail because a determination of the impact on soil availability must take into account the container growers ability to avoid an impact. Question eleven on the survey, which will be referred to frequently, used a rate scale from one to five with one being most important, two being more important, three being important, four being less important, and five being least important.

A list of three hundred and two container nurseries was obtained with the acreage each site had under container production. Sites that had less than 0.1 acres in containers, did not report the number of acres in container production, or were in Lane county but outside the Willamette Valley were eliminated from the total pool. This left two hundred and sixty two sites to be included in the pool of potential candidates to answer the survey. Thirty businesses were chosen randomly to answer the survey. Ratings and percentages can be directly extrapolated to the entire industry in the Willamette Valley because the entire population was available for random selection.

The two hundred and sixty two sites in the Willamette Valley

have a total of 2725.45 acres under container production with an average size of 10.40 acres and a median size of 1 acre. Only twenty eight sites, or 10.6%, are larger than ten acres.

Container/Field Nursery Combination:

An important aspect of the concerns raised was the fact that container nurseries do not use the soil on which they are sited. The growing media for container plants is artificially mixed so the on-site soil is unimportant as a growing medium (Appleton, 1986; Patterson, 1969). Field nurseries grow plants the same way most traditional agricultural crops are grown, in the ground, so soil becomes a very important factor in the siting of a nursery that plans to grow field plants. If a nursery owner plans to grow both field and container plants he must then consider the quality of the soil on which he is siting.

The survey reflects this added emphasis on the quality of the soil when choosing a site that will be used both as a container and field nursery. Seventeen of the thirty sites were both container and field growers; the remaining thirteen sites were strictly container growers. Of these seventeen, ten sites have been combined growers since they began operating, the other seven added container growing at a date sometime after beginning operation as a field nursery. The owners of these seventeen sites gave an average rating of 2.3 and a median rating

of 3 to the importance of soil fertility while the other ten owners who operated strictly container nurseries gave an average rating of 4.2 and a median rating of 5.

The seventeen nurseries that are combined field and container growers account for 418.6 acres of the 470.38 total acres in container production for the study group. Since field grown plants need high quality soil, it can be expected that these 418.6 acres are largely located on prime farmland. In fact, 414.75 acres are located on prime farmland accounting for 91% of the 454.75 acres of land under container production located on soil Capability Classes I through IV that is in an agricultural zone.

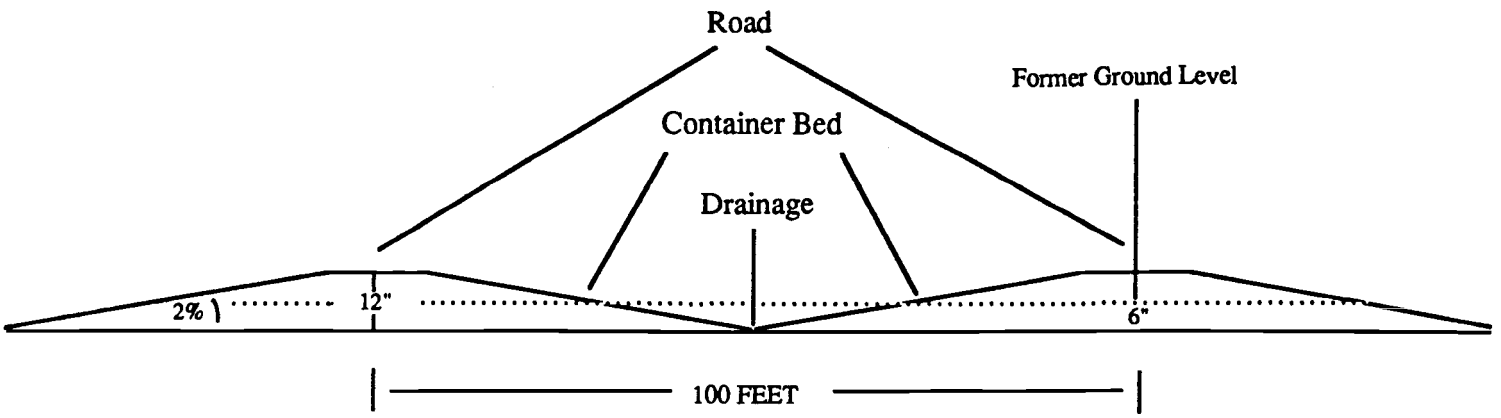
The above figures become important when considering the original concerns in the introduction. One concern was that container growers don't utilize the on site soil and therefore have no need to site on potentially productive farmland. This may be true for the container component of the nursery, but roughly 91% of the nurserymen in agricultural zones also grow field plants and do have a need for productive land.

Gravelling, Bed Shaping, Slope and Drainage:

Gravelling, bed shaping, slope, and drainage are four very closely related topics in container nursery design and siting. Bed shaping and gravelling are generally performed to create slope and improve drainage. These improvements on a site are not always necessary and are not always performed.

The concern that has been expressed with regard to bed shaping is the danger of mixing the fertile topsoil with the less fertile subsoil making the land much less valuable as a resource for crop production should the nursery move or go out of business. While gravelling does not affect the soil quality it does affect the future potential uses for the site. Removal of the gravel and rehabilitation of the soil would be much more costly to a farmer than buying a parcel of land that was not covered with gravel. The future uses of sites in agricultural zones are therefore limited by the zoning to agricultural uses and are limited by the improvements on the site to being a container nursery. The only exception to this may be if the seller were to pick up the cost of returning the site to its original condition.

Figure 1



Not to Scale

Container nurseries can be sited on land with up to a five

percent slope without considerable cost being incurred by erosion prevention techniques (Appleton, 1986). Flat land is undesirable and generally requires grading, or bed shaping, to remove excess water from the growing area thereby avoiding over-watering of plants, through capillary action, damaging the stock. A slope of 1 to 2 percent is recommended for container beds (Davidson, Mecklenburg, and Peterson, 1988; Appleton, 1986). Figure 1 shows the general profile and dimensions of container beds in the Willamette Valley that have been artificially shaped. Figure 2 is a photograph of graded and gravelled container beds.

Figure 2

There are other container bed designs, but grading is common to all designs for flat sites and the figures above show the bed configuration commonly observed in the Willamette Valley.

As can be seen from Figure 1, with beds on 100ft. centers and a 2% slope the elevation change from the drainage tile to the top of the road, 50 feet, is 12 inches. This would mean that soil is removed to a depth of 6 inches and shaped into a road bed to create the proper slope. With careful construction, the shaping of container beds would not mix topsoil and subsoil. With container beds on 50ft. centers, as used by James Patterson, author of Container Growing, soil would only be disturbed to a depth of 3 inches to create a 2% slope.

A diagram similar to Figure 1 was drawn by a farmer in which he showed an elevation change of 30 inches over the 50 feet from the drainage tile to the top of the road. This would create the maximum recommended slope of 5% and would disturb soil to a depth of 15 inches which would, in most cases, mix topsoil and subsoil.

Grading has been performed on sixteen of the surveyed sites and covers 201.3 of the 470.38 total acres in the study of which 192.8 acres are part of the 454.75 acres of potentially productive cropland. This means that 42% of the land under container production in high quality cropland has been graded having topsoil and subsoil potentially mixed.

Gravelling is performed generally for two reasons, to enhance drainage and protect the plants from diseases in the soil (Appleton, 1986). Gravel was found to have been used on twenty three of the thirty sites and covers a total of 464.95 acres of the 470.38 acres in the study and covers 451 of the 454.75

acres on potentially productive cropland. Two sites that had been graded had not been gravelled and nine sites that had not been graded had been gravelled.

The survey reflected the importance of drainage and slope with drainage receiving an average rating of 2.1 and a median rating of 2 while slope received an average rating of 2.5 and a median rating of 2. Slope and drainage features can be engineered, but excessive slope or poor drainage can be expensive to overcome and are therefore important and receive above average attention when a nurseryman is selecting a site. Drainage has become a very important concern for siting in the Willamette Valley because of new policies that don't allow any irrigation water to leave the container nursery site.

Water Availability:

Water availability is the single most important factor in siting a container nursery. Without an large supply of available water a site is unusable as a container nursery site. Water needs for a container nursery generally run from 1,629,200 to 3,258,400 gallons of water per acre in production per year (Appleton, 1986). This tremendous demand must be met to keep plants healthy.

The survey reflected the level of importance this factor has when siting a container operation. It received an average rating 1.3 and a median of 1 on the scale of importance, the highest of any of the factors examined. It was consistently

rated as most important (a rating of 1) by the nursery owners, with only a few anomalies. One such low rating, the single 5, or least important rating, given in this category was explained by a business that was begun as a hobby and had very little forethought placed on its siting needs. In general, though, a nurseryman would consider this factor above all others. There are no engineering methods or substitutions for a lack of water.

Figure 3

Wind:

Wind is a consideration for siting, but is of less importance when deciding the impact of the container industry on the availability of high quality farmland. Excessive winds can

cause plants to dry out and may require extra watering (Davidson, Mecklenburg, Peterson, 1988; Appleton, 1986; Stanley and Toogood, 1981). Larger nurseries may consider this a slightly more important factor than smaller nurseries because there is more area to be protected from wind. Protection can be created at most sites with natural wind break such as a line of trees.

The survey found that wind frequency had an average rating of 3.7 and a median rating of 4 with a range from 1 to 5. This range most likely reflects the individual characteristics of the geographical area each owner was interested in during siting.

Labor:

Figure 4

Labor supply is a factor when considering a site for a nursery, but does not play a major role. While it may be thought that large operations would be more sensitive to the need for a large, available labor supply, there is actually no difference in the level of consideration given to the topic by large as opposed to small container nurseries.

The survey showed a range of responses to the importance of labor supply from 2 to 5 with an average of 3.3 and a median of 3. While it is a factor that needs to be addressed, it will not generally rule out any one place as a possible site (Appleton, 1986).

Susceptibility to Freezing:

Freezing temperatures can be damaging to any agricultural crop, and container growers are careful to locate in an area that does not receive freezing temperature more often than the surrounding land. Valleys, in particular, where cold air may settle should be avoided. This may affect whether a nursery locates on high quality crop land or not. In some cases a nursery may locate on high quality crop land to avoid a freeze prone area.

The survey showed that concern for avoiding freeze prone areas is an average concern when siting a container operation with an average rating of 2.87 and a median rating of 3. There were no detectable differences in the consideration of this factor between large and small operations. All owners treated

it with equal concern.

Access:

Nurseries, especially container nurseries, frequently ship their product via tractor trailer truck. This method of transport requires that good quality road access be available. Being close to a major artery will have advantages in ease of shipping (Appleton, 1986). This factor may also restrict the area, and therefore the soil types, suitable for siting.

The survey showed the factor to be of average importance with no detectable difference between large and small nurseries. There was a full range of answers from 1 to 5, but very few answers were extreme. The average rating was 2.97 and the median rating was 3.

Distance to Supply Outlets:

Since container operations use a great deal of agricultural supplies including containers, fertilizers, herbicides for weeds, and may other products, being fairly close to an agricultural supply outlet was potentially important. If it were an important factor, it could limit the area in which a nursery could be sited.

The survey found that while distance to supply outlets is a factor, it did not play a large role in siting determination. The average rating for this factor was 3.9 with a median rating of 4.

Other Nurseries:

For some nurseries it may be important to be near other nurseries for the purposes of sharing information, help, labor, and shipping costs (Appleton, 1986). Competition may be a potential danger from a nearby nursery if both operations grow the same stock.

The survey showed that, while it may be a bonus to locate near another nursery, it is not generally a factor that will make a difference in selecting a site for a container nursery. The average rating was 3.9 and the median rating was 4. There was no difference between small and large operations.

Other Considerations:

Other considerations not addressed on the survey that were mentioned by nurserymen as being important to them included being close to the market and availability of land. These two aspects of the business were mentioned by 6 and 8 owners respectively.

The issue of market was not written into the survey, as it probably should have been, because information during the formulation of the survey indicated that the vast majority of gross sales totals came from outside of Oregon and in some cases outside the Pacific Northwest. Unfortunately, the fact that the vast majority of these gross sales totals came from the large nurseries was not taken into consideration. Most of the

nurseries are quite small; the median size of container operations is 1 acre, and their market is more likely to be local than the larger nurseries. The owners who mentioned market as a consideration in siting consistently rated it a 1 on the scale of importance.

Cost and availability of land also played an important factor for several nursery owners. A site may meet all the needs of a nurseryman perfectly, but if it is unavailable or priced too high, another site will be chosen. This category also consistently received high ratings with six owners rating it a 2 and two owners rating it a 1.

Conclusions:

Taking into consideration all of the factors above, both positive and negative, a determination of the impact of container nurseries on the supply of available high quality farm soil is to be made. There are some facts about the industry that should be reiterated in making this determination.

The container industry is a very important part of a larger industry, which is currently ranked second in gross sales in Oregon. Container growing takes less land than field growing to be profitable and can be profitable in less time. If every container nursery in the Willamette Valley, 2725.45 acres, were located on the 1,261,866 acres of prime farmland in the Willamette Valley, only 0.2% of the prime farmland would be covered. This percentage greatly decreases with the inclusion

of all soils in SCS Capability Classes I through IV. The large container operations employ a large number of people on a full time basis and an even larger number of people on a part time basis. Many of the needs of container growers may be met only on high quality farmland, including water availability, land availability and cost, slope, lot size, and drainage. Container growers are frequently field growers, especially the large container growers, which requires that the nursery be sited on fertile soil. Expansion rates do not indicate a large amount of cropland being lost, even if the predictions were to double to an added 1500 acres in the next ten years under container production. Further inspection finds that the contribution to the agricultural economy is considerable and the container operations employ people that may not have otherwise had employment.

There are also negative impacts to the container industry, including the loss of high quality agricultural soil for crop production with 88% of that being prime farmland. The loss is most likely permanent and the potential for a container nursery to go out of business, leaving the land uncultivable, is real. But, container plants are an agricultural crop, and have been so designated by the state land use goals and statutes even though a conflict may be present with the state's agricultural policy. Container growing often requires a site because of necessary characteristics of the site. Sites with the necessary characteristics frequently have high quality soil.

And, container growing is frequently coupled with field growing, which requires high quality soil.

Attempting to single out a part of the nursery industry for restrictive legislation would be strongly opposed (Clayton Hannon, 1992). The findings in this research indicate that the impact of the container industry on the availability of high quality agricultural soil is minimal. Encouraging new growers who plan to grow only container plants to locate on lower quality soil is recommended; however, if another site is much better suited to a container nursery and is available, a grower should not be regulated or even discouraged from buying that land because the site has prime soils.

Providing a plan for site restoration for new operations could be a possible solution. An industry initiative to develop such plans on a voluntary could pre-empt possible regulations in the future. Any potential restrictions related to the concerns addressed in this paper could most likely be avoided by industry self-regulation.

Appendix A

Hello, I am conducting a survey of container growers as part of a Master's degree research project at Oregon State University. The purpose of the survey is to help determine the needs of container growers when choosing a site for a nursery and to determine some trends in the container industry. Your business was chosen randomly from a list of all container growers in the Willamette Valley to answer this survey. The final research report will not indicate that your business was one that answered the survey. May I take ten to fifteen minutes of your time to ask a few questions?

Please do not hesitate to ask me to clarify or repeat a question for any reason.

1) The property that some nurseries currently operate on may have been owned by the nurseryman before he or she decided to start a nursery. Did you originally buy the property your nursery currently operates from with the intention of establishing a nursery? ____YES ____NO

2) What year did you purchase or obtain the property that your nursery currently occupies? _____

3) What year did you begin operating a nursery business, either container growing or field growing, at your present site? _____

4) Some nurseries grow field plants and container plants. Does your operation grow field plants? _____YES _____NO

If YES to 4

5) Some nurseries that grow both field and container plants may have begun as field operations and added container growing at a later date. Has container growing been practiced since the business' establishment at its present site? _____YES _____NO

If NO to 5

6) What year did you begin container growing? _____

7) Sometimes container nursery owners expand the number of acres dedicated to growing container plants. Have you expanded the number of acres used for container growing since the time you began container growing?
_____YES _____NO

If YES to 7
8) Approximately, how many **more** acres do you have now than you had when you first began container growing? _____ACRES

9) In the future, do you plan on expanding the number of acres dedicated to container growing? _____YES _____NO

10) Some nurseries have had to enhance the drainage ability of their site by grading or shaping container beds to give them a slight slope then putting crushed rock over the beds to keep the plants out of puddling water. Has grading been performed on your site? _____YES _____NO
Has crushed rock been put over container beds? _____YES _____NO

11) I am going to read some features of a parcel of land that may be considered when determining a site's suitability for a nursery business. After I read each feature, please indicate that feature's importance to you when you chose your present site. (If the business is also a field grower: Please consider these features in regard to your intentions for the site, either container growing, field growing, or both, at the time you were examining the site for your business.) The catagories for your response are:

1) the feature was most important
2) the feature was more important
3) the feature was important
4) the feature was less important
5) the feature was least important

The first feature that may be considered for determining a site's suitibility for a nursery is wind velocity and frequency in the area. Was this feature most important, more important, important, less important, or

least important? _____

The second feature is water availability. _____

labor availability for employment _____

susceptibility of the site to freezing temperatures _____

soil fertility _____

drainage characteristics of the site _____

distance to agricultural supply outlets _____

good quality road access _____

the need to be near other nurseries _____

slope of the site _____

Is there any feature of your present site not mentioned in the list I just read that you considered when you chose the site? _____YES _____NO

What is the feature? _____

How does it rate on the scale of importance used for the other features I just read?

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