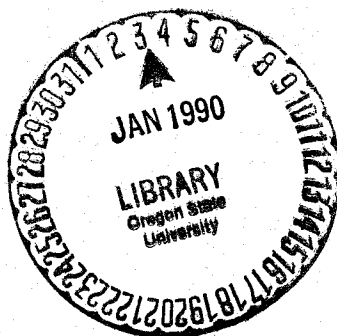




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Farm Labor Demand for Six Oregon Crops



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FARM LABOR DEMAND FOR SIX OREGON CROPS

Introduction

We will not know for some time if Oregon will have a shortage of seasonal farm labor in 1990. Even when the U.S. Department of Labor releases shortage estimates, there is doubt that their estimates will accurately reflect the farm labor needs for Oregon's many specialty crops. DOL shortage estimates are national in scope, and local labor shortfalls are possible without a shortage nationally. Commodity groups in the state will need to develop their own statistics to justify additional supplies of farm workers should shortfalls occur in the state (Appendix A).

The number of workers required to harvest or otherwise help produce agricultural crops is basic to establishing labor demand and estimates of worker shortages. This report summarizes estimates of workers hired throughout 1988 for six Western Oregon crops: strawberries, caneberries, sweet cherries, hops, cucumbers, and wine grapes. The estimates show the distribution of workers -- sorted by alien migrants, U.S. migrants, locals 17 and older, and locals 12 to 16 -- for each month of the year. This not only allows one to separate demand by type of worker but also allows one to compare the overlap among the number of workers required to harvest these crops. For instance, knowing that strawberries, caneberries, and sweet cherries require large numbers of pickers at the same time will increase labor demand greatly, compared to demands at different times. Knowing the demand for farm labor is only one step in estimating labor shortfalls. Comparing demand figures with the best supply estimates will enable the industry to anticipate local shortages.

Data for the study were gathered by self-administered questionnaires mailed to all known growers from each commodity group in the state. Growers were asked about the number of 1988 acres in production, total pounds (or tons) of fruit harvested and left unharvested, total number of days worked, by month, the average number of workers hired per day, and their distribution by worker-type (alien and U.S. migrants, locals 17 and older, and locals 12 to 16). Copies of questionnaires and frequency distributions are reported in Appendix B. Completion rates are discussed in Appendix C. Methods of analysis for estimating the size of the work force are given in Appendix D.

Results

A total of 121,378 workers were employed to produce the six crops in 1988. Figure 1 illustrates the distribution by type of worker. Approximately 80% of the work force was hired during the six harvest months -- from May through October -- for the crops studied. Ninety-three percent of the estimated 66,095 aliens were hired during that period. Yet, they made up only 55% of the total work force. Their primary role in the state is one of harvesting.

The percent of workers employed for harvest work ranges from 80% to 93% for four of the six commodities studied -- strawberries, caneberries, sweet cherries, and cucumbers. Hired labor is used more intensively throughout the year for hops and wine grapes. Only 28% of the work force was employed for harvesting those crops. Aliens still dominate harvesting work for hops and grapes, accounting for 57% of the harvest work for hops and 41% for grapes.

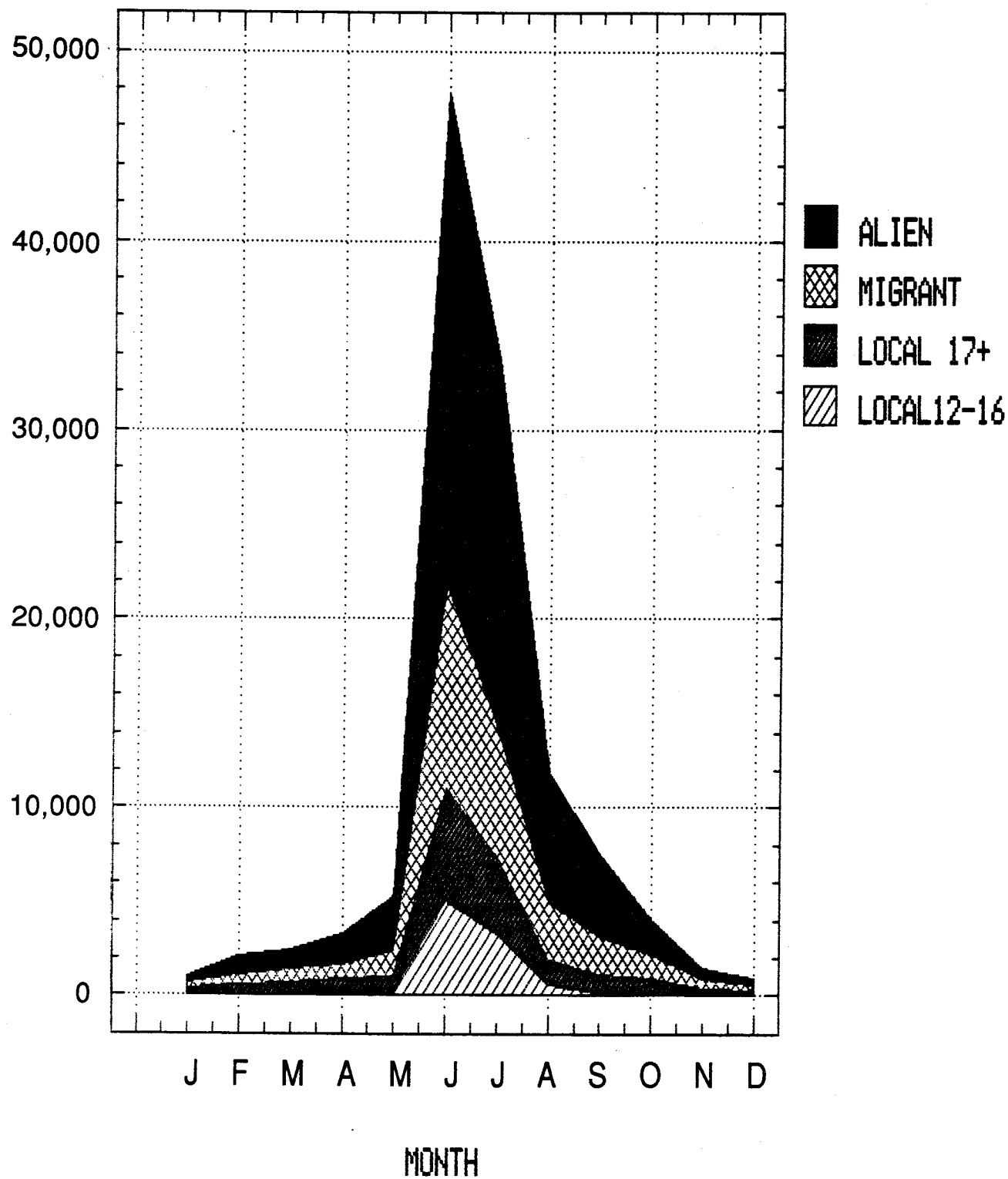
The overlapping demand for workers also is apparent from the analysis. Figure 2 shows the total work force employed by month, sorted by commodity groups. Note that the peak of the distributions (primarily harvesting activity) coincides for the June-July harvesting of strawberries, caneberries, and sweet cherries. The demand for cucumber pickers also overlaps with that for caneberries, hops, and the early grape harvest. Moreover, nonharvest activities play a role in the demand for farm workers. For example, hops require hand cutting and training before young hop plants climb the strings that have been attached to poles. That activity requires more than 3,000 workers in April, May and early June, and coincides with the early days of the strawberry harvest. The figures are based on data presented in Tables 1 and 2.

The strawberry harvest commands the greatest number of pickers. We estimate that 44,266 pickers were hired in 1988 for that purpose. Caneberries required 21,364, sweet cherries 18,256, cucumbers 8,447, hops 2,220, and wine grapes 1,630. Given the overlapping nature of the demand for pickers, one cannot expect that the same workers flow from one crop to another and pick all the fruit. Replacement workers are required for harvest work and shortages are apparent unless they are available.

A level of nearly 100,000 workers seems a reasonable initial estimate to assure an adequate supply of workers for the harvest of the six crops at 1988 production levels. To be sure, this very rough figure includes "double counting"

Fig. 1. WORKER TYPES BY MONTH FOR ALL CROPS COMBINED

No. of Workers



50,000

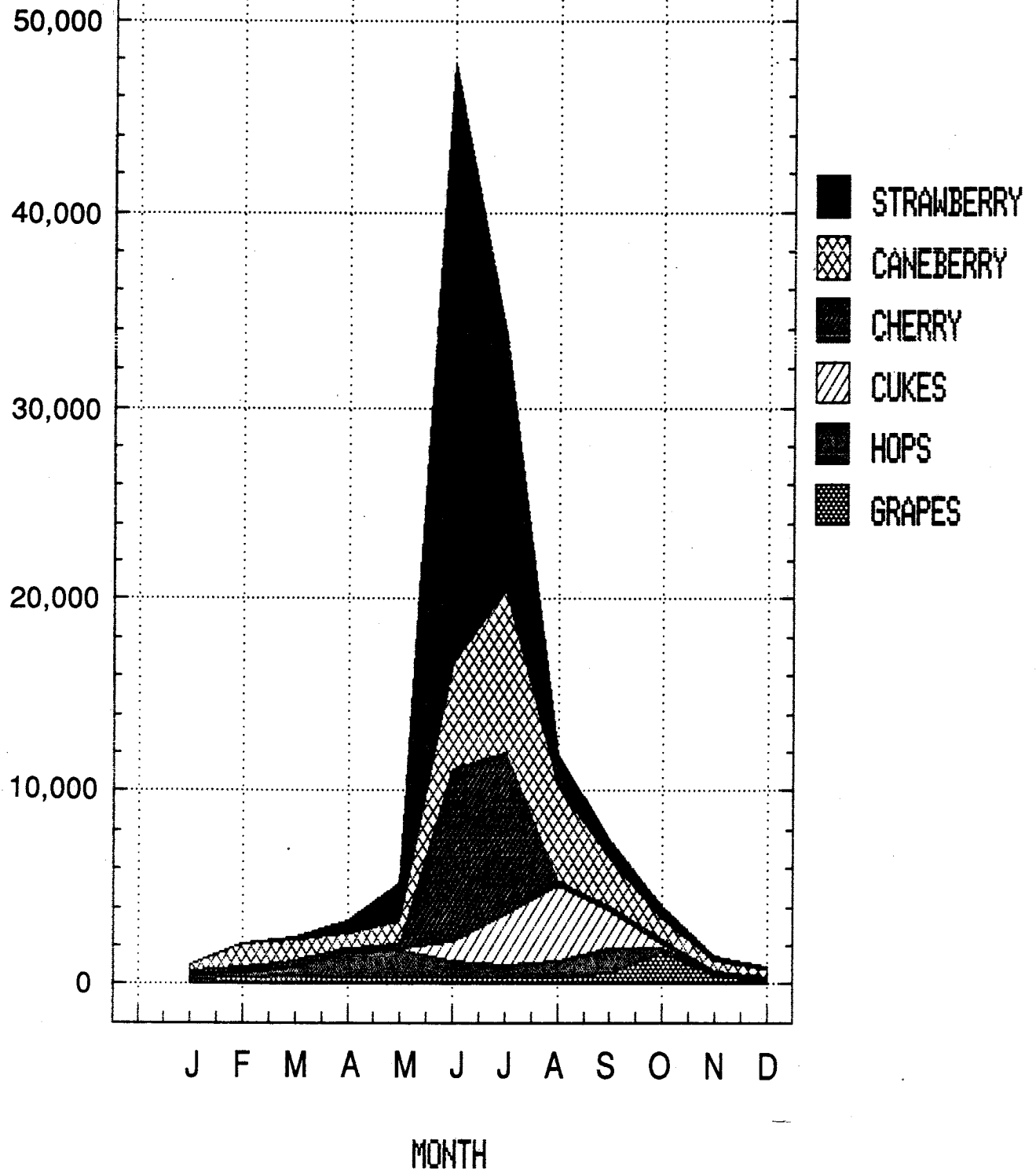


Table 1. Number of workers by worker types for all crops combined

Month	Aliens	U.S. Migrants	Local 17+	Local 12-16	Total
Jan	298	295	404	9	1007
Feb	991	604	524	30	2149
Mar	1031	722	681	37	2471
Apr	1647	834	814	53	3349
May	2820	1398	865	130	5212
Jun	25930	10832	5971	5015	47748
Jul	19457	6906	4071	3278	33712
Aug	6955	3066	1296	593	11911
Sep	4329	2031	1002	142	7504
Oct	1895	1299	829	57	4081
Nov	474	511	403	11	1399
Dec	268	290	293	4	855
Total	66095	28788	17154	9360	121398

Table 2. Number of workers by commodity for all worker types combined

Month	Straw- berry	Cane- berry	Sweet cherry	Cucum- ber	Hops	Wine grapes	Total
Jan	45	323	210	1	130	298	1007
Feb	79	1176	253	15	218	408	2149
Mar	201	1043	302	9	471	445	2471
Apr	656	758	233	5	1351	346	3349
May	1890	1232	221	84	1389	397	5212
Jun	31077	5545	8884	961	873	408	47748
Jul	13189	8495	8371	2652	596	410	33712
Aug	1682	4884	233	3849	943	321	11911
Sep	977	2440	248	1946	1277	615	7504
Oct	667	1055	216	227	285	1630	4081
Nov	172	507	90	1	173	457	1399
Dec	64	393	98	1	135	164	855
Total	50700	27851	19358	9749	7841	5899	121398

of individuals from growers who were reporting the same worker as he or she moved from crop to crop. All workers did not follow the harvest flow of the crops studied. Some left agriculture altogether and worked in canneries or in non-agricultural jobs. Others joined the work force in agricultural commodities not studied or found work out of the state. There obviously is much "leakage" in the nearly 50,000 farm workers who were here to train hop vines or pick strawberries in the Spring months of 1988. How many of the additional 50,000 caneberry, sweet cherry, cucumber, hop, or grape pickers were replacement workers and how many were already counted among the workers for hops and strawberries is difficult to estimate. The 100,000 estimate is viewed as a gross number or an upper limit; a net figure requires additional information before a more accurate estimate can be made.

The new law allows much freedom of movement for alien Special Agricultural (SAW) workers. They are allowed to work where they can find jobs -- in or out of agriculture, and in or out of Oregon. It may be unrealistic policy to assume in the foreseeable future that large numbers of SAW pickers will remain in Oregon to harvest fruit exclusively. Replacement (RAW) workers are required to work 90 days in agriculture before working for another industry. But, nothing requires RAW workers to remain with one grower or with one commodity for the harvest, or to remain in one state for their tenure in agriculture. Spot labor shortages in the state remain a possibility.

Alien workers are only part of the picture. Nearly half the work force is made up of nonaliens. A complete picture of farm labor demand requires a more precise discussion of the total number of workers for each commodity. The remainder of this report summarizes that analysis.

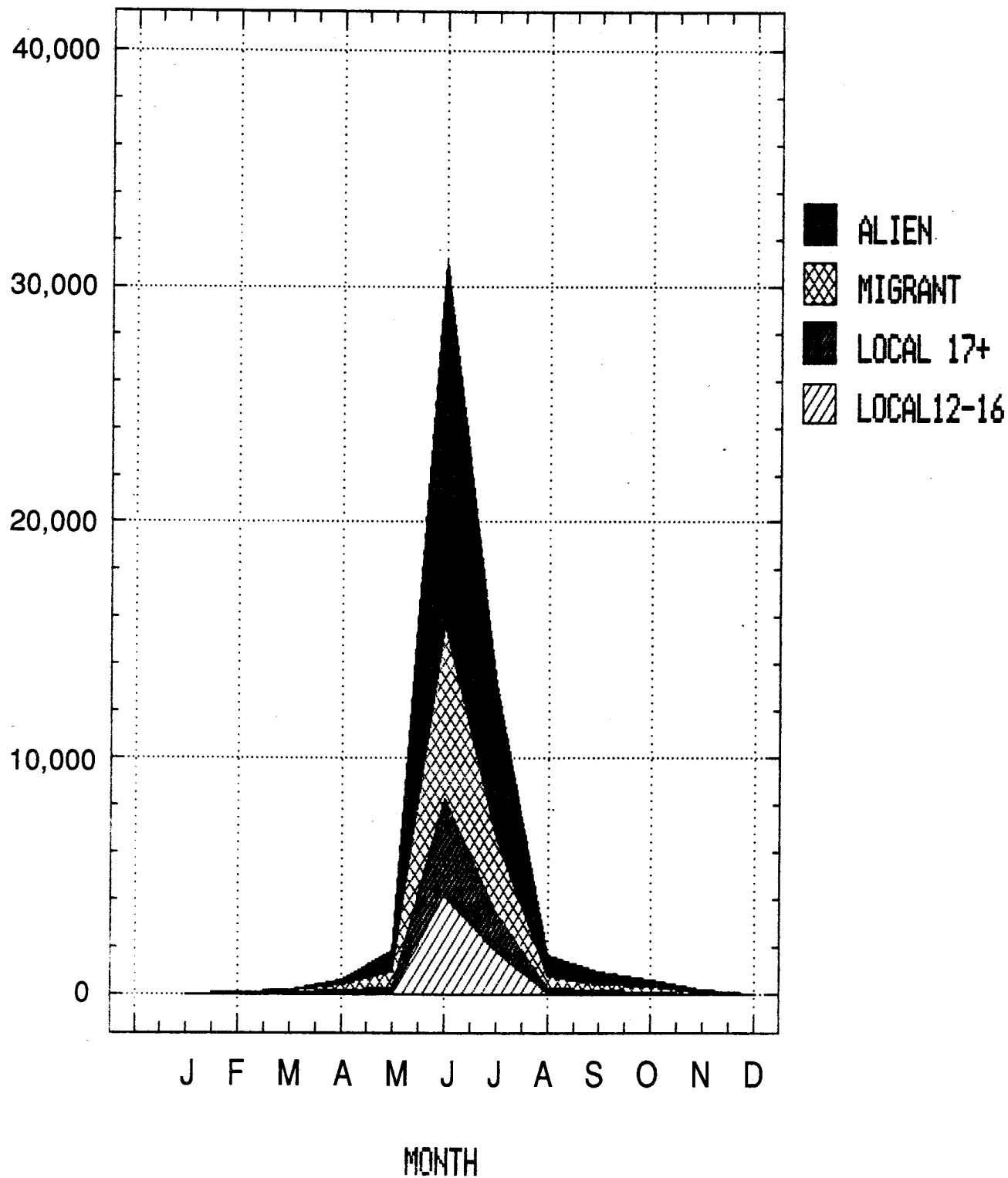
Strawberries.

We estimate that the state's strawberry growers hired 50,700 workers in 1988. A total of 24,799 were aliens, 12,769 were U. S. migrants, 6,840 were local adults, and 6,293 were local teenagers. The distribution of employment, by time of year, is shown in Figure 3. Data supporting the figure are present in Appendix B, page 37. Note that the bulk of the demand, about 91%, picked fruit in late May, June, and early July. The 91% value holds across all labor groups. The other 9% were hired for nonharvest activities.

However, the total number of pickers, about 45,000, may be smaller because of the "double counting" problem discussed earlier. Some pickers do not remain with one

Fig. 3. NUMBER OF STRAWBERRY WORKERS BY MONTH

No. of Workers



grower throughout the harvest season, but jump from field to field looking for better picking. They would be counted again by different growers. This practice is most likely to occur near the end of the season, when the amount of fruit is less plentiful.

"Double counting" can occur at three levels. One level is the individual grower reporting the same person who works more than a month. Second is the worker who "field hops" and is counted by more than one strawberry grower. Third is the worker who picks different kinds of fruit and is counted more than once by growers in different commodities.

We developed a method for adjusting the harvest force for the first and second levels of "double counting." We asked growers to estimate the percent of their laborers who worked three days or less, four days to one week, one to two weeks, and more than two weeks. Then we attempted to adjust the effect of "double counting" on the estimated number of pickers. For example, the picking season averaged about 24 days for strawberries in 1988; therefore, eight 3-day cycles are possible. The number of "cycles" for other work periods can be calculated in the same manner. A panel of experienced industry observers was asked to estimate the number of 3-day strawberry cycles that were completed before pickers left strawberries altogether. (The consensus: about half left after the first cycle; the remainder field-hopped for an average of four additional cycles.) They also were asked to estimate the number of cycles for the other work periods. This information was employed to adjust the total number of workers required to harvest the crop (Appendix D).

The number of estimated workers, adjusted for "double counting," is 41,522, nearly a 6% reduction from the original 44,266 estimate. We have no reliable information to indicate if aliens "cycled" more than other types of workers and therefore are unable to adjust the number for specific types of workers. The best information we have is the unadjusted proportions reported earlier. The 41,522 value is only a preliminary figure. We are assuming that if berries were to be picked, a worker was available to pick them and that labor demand is roughly equal across the picking season. There is some doubt about the first assumption and much doubt about the second. Both may be unrealistic, and the true value probably lies between our net value of 41,522 and gross value of 44,266 pickers.

Growers harvested 7,800 acres of berries in 1988, down slightly from the estimated 7,830 acres in 1987, according to the Oregon Agricultural Statistics Service. The 1989 season will show a severe loss in acres harvested. Growers

said they intended to harvest only 6,212 acres, down about 25% from the 1988 harvest. Our 6,212-acre harvest is close to the 6,200 acres the OASS estimated earlier.

Worries over an adequate supply of farm labor is uppermost in the minds of most growers who responded to the questionnaire. Nearly 64% cited picker availability as their number one concern for the 1989 harvest. Another 54% reported burdensome government regulations and paperwork associated with labor activities as a serious problem for them. Twenty-nine percent said the price for the 1989 crop was of concern, and 19% worried about poor weather for next year's harvest. Fourteen percent cited production costs, and 3% reported the supply of picker housing as a problem. Clearly, the supply of farm labor remains uppermost in the minds of the growers surveyed.

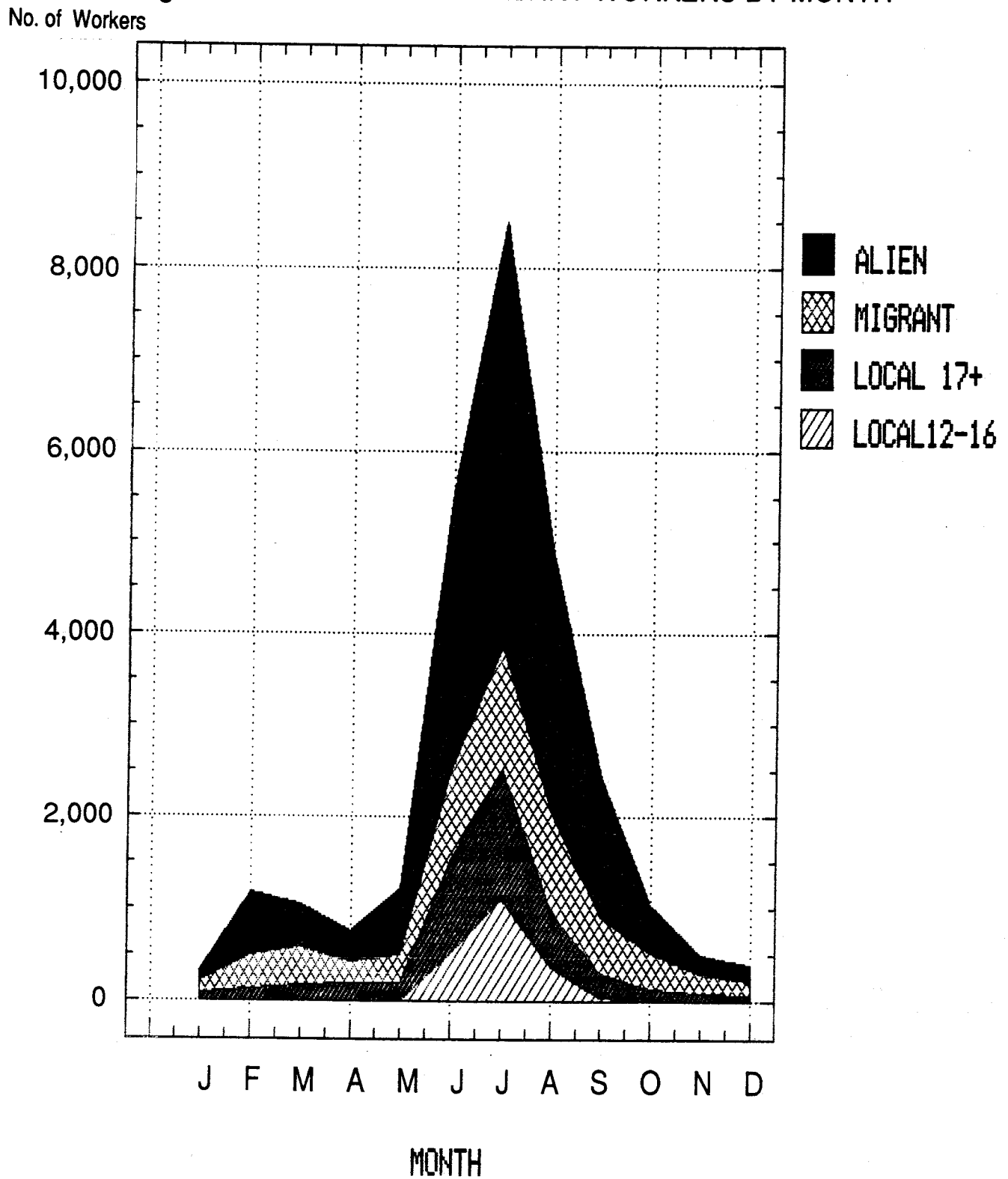
Concerns over the supply of labor are directly related to 1989 planting intentions. About a third of the acreage must be re-planted each year. Plantings for 1989 should be nearly 2,333 acres if 1988 acreage levels are to continue. Growers intend to plant only 1,600 acres in 1989. If these intentions are translated into action in 1989, we can expect a decrease in the state's strawberry acreage to about one-third of the 1988 level.

Caneberries.

The state's caneberry growers hired an estimated 27,851 workers in 1988. A total of 15,180 were aliens, 6,209 were U.S. migrants, 4,369 were local adults, and 2,093 were local teenagers. The distribution of employment, by month, is shown in Figure 4. Most of the demand was during the four harvest months from June through September. About 77% of the work force was employed for harvesting. The 77% value varies by type of worker. For instance, nearly all the local teenagers were employed during the harvest season, compared to only 65% of the U.S. migrants who were hired for harvesting work. About 79% and 75% of the aliens and local adults were harvest workers. The remainder worked in February and March and late in the year on a variety of nonharvesting tasks, such as pruning, trellising, etc. The work force for caneberries is spread more evenly over the year than it is for strawberries, where it is concentrated on harvest work.

We were able to adjust our estimates for "double counting" the same picker who hops from field to field, using the same approach that we used for adjusting the magnitude of the strawberry harvest work force. By plugging

Fig. 4. NUMBER OF CANEBERRY WORKERS BY MONTH



in values we gathered from talking to those familiar with the industry, we estimate that the net number of workers dropped about 22% to 21,775. Again, the net 22,000 figure is only preliminary, since we are assuming that if berries were to be picked, a worker was available to pick them and that labor demand is roughly equal over the four-month harvest period. There are doubts about each assumption and suggest to us that the true value is probably somewhere between 21,000 and 28,000 workers.

Growers harvested 10,790 acres in 1988. About 70% were machine-harvested, according to our analysis, and the machine alternative is reflected in less concern over picker availability than we found with strawberry growers, who must rely totally on hand labor to harvest the crop. When asked to describe their major concerns for the 1988 harvest, only 43% volunteered that picker availability was a concern. The same percentage voiced worries over weather, and 34% were concerned about market price. Seventeen percent said that government regulations were a problem, and 15% complained about paperwork associated with the new immigration law. Fifteen percent also complained about production costs, and 1% voiced worries about migrant housing.

Caneberry acreages are likely to remain about the same in the foreseeable future. Growers said they were planting an additional 1,269 new acres in 1989 and were harvesting about 10,762 acres, nearly the same that they harvested in 1988. The adoption of machine-harvesting, while freeing many from the worries of a labor shortage, also comes at the price of lower production. Our analysis shows that machine-harvested fields averaged 5,495 pounds of berries per acre, compared to 6,278 pounds per acre for hand-picked fruit, about a 14% decrease in production.

Sweet Cherries.

Oregon sweet cherry growers hired an estimated 19,358 workers in 1988. About 89% were employed for harvesting work. Aliens made up 71% of the total work force. The distribution of employment, by time of year, is shown in Figure 5. Note that there is some activity throughout the year, primarily for alien workers. The bulk of the work, however, remains with harvesting the crop in late June and July. When the total figure is adjusted for double counting or "cycling," we estimate that a net number of 16,405 workers were employed in 1988. As with net estimates for strawberries and caneberries, the one for sweet cherries assumes the same conditions. The true value probably lies between 16,000 and 20,000 workers.

Fig. 5. NUMBER OF SWEET CHERRY WORKERS BY MONTH

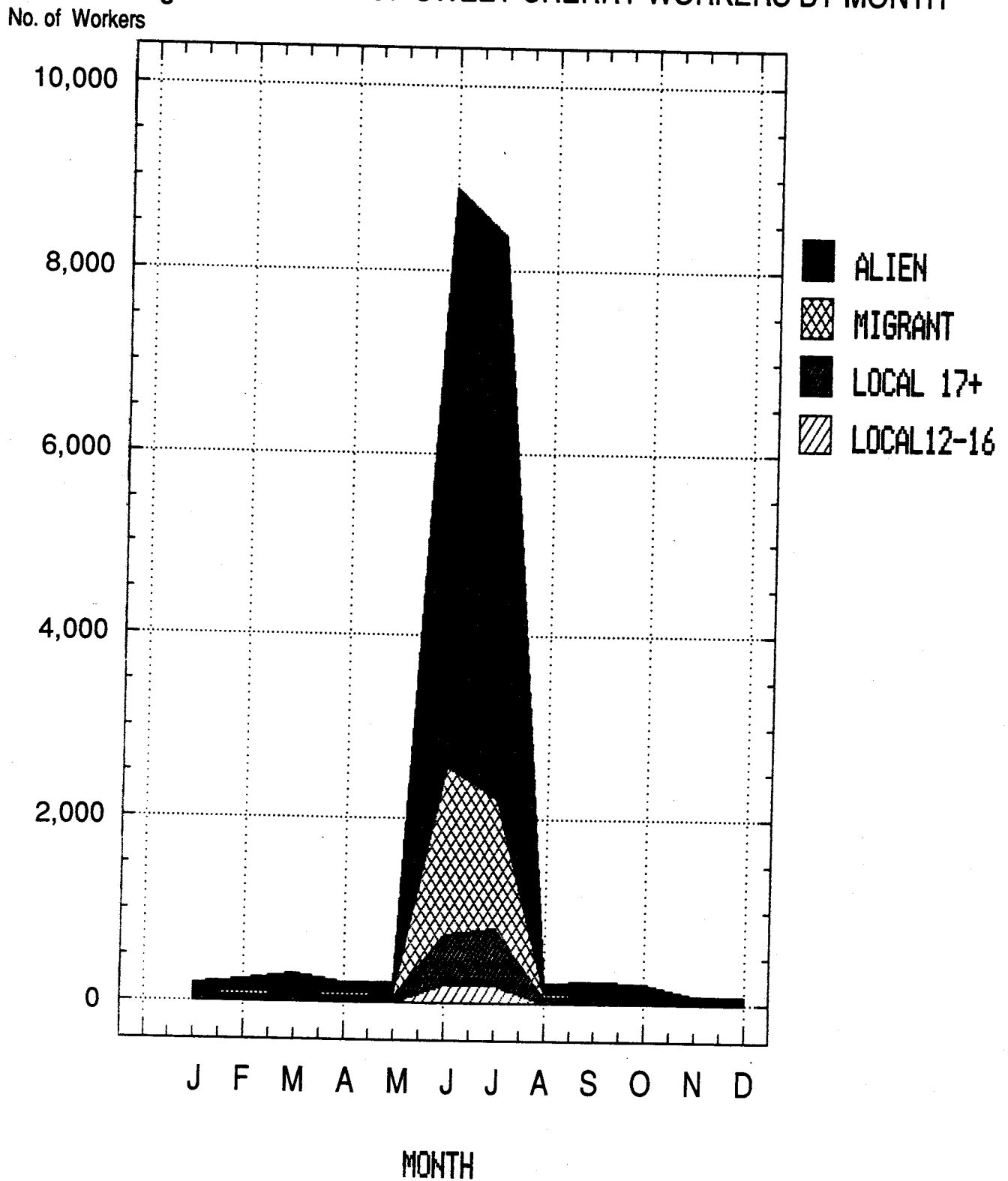


Fig. 6. NUMBER OF WILLAMETTE VALLEY SWEET CHERRY WORKERS BY MONTH

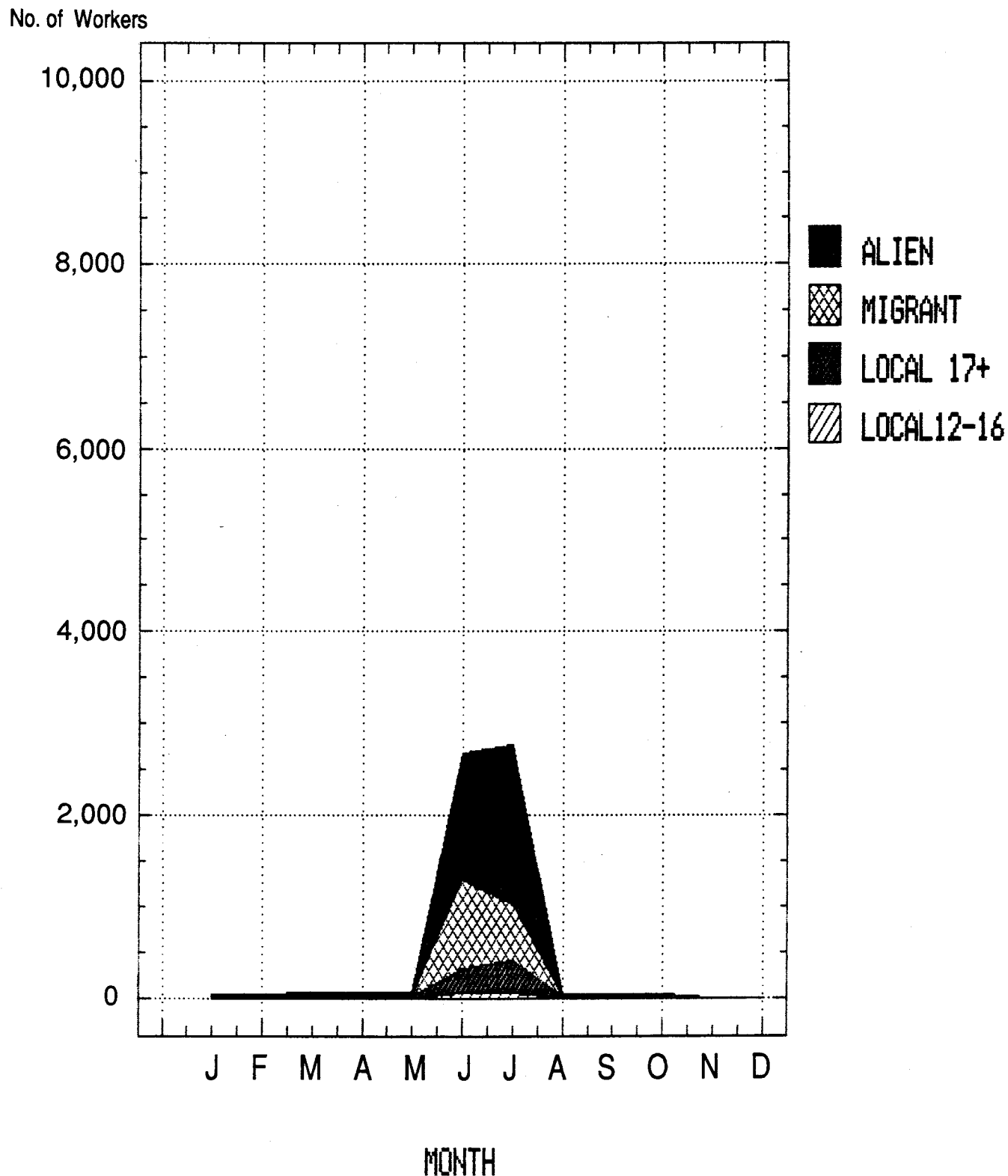
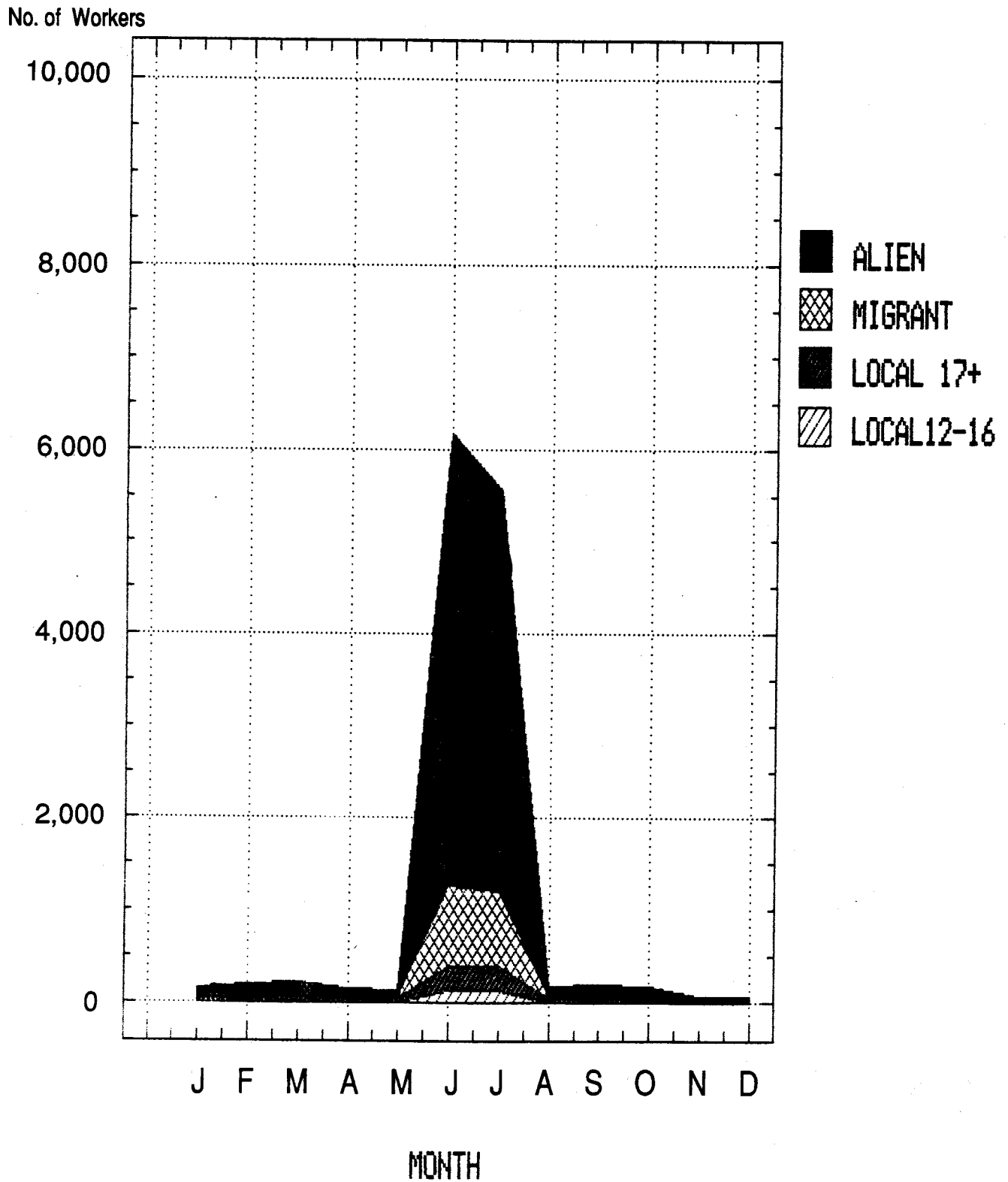


Fig. 7. NUMBER OF COLUMBIA GORGE SWEET CHERRY WORKERS BY MONTH



Two areas in the state produce sweet cherries -- the Willamette Valley and Wasco and Hood River counties along the Columbia Gorge. The employment pattern by type of worker differs for each region, as shown in Figures 6 and 7. First, growers in the Columbia Gorge hire nearly twice as many workers than do growers in the Willamette Valley -- 13,720 compared to 5,936. Nearly all the increase is from alien workers. Wasco County and Hood River County growers hire nearly three times as many aliens as Willamette Valley growers -- 10,594 to 3,336, as the Figures show. The north-central growers employ 84% of their aliens for harvest work, while Willamette Valley growers hire 93% of their alien workers for the same activity. Cherry growers in the Columbia Gorge produce more than twice as much fruit, 38,800 tons, compared to 17,550 tons for growers in the Willamette Valley, according to the Oregon Agricultural Statistical Service. They also harvest more acres of sweet cherries -- 5,611 to 4,134.

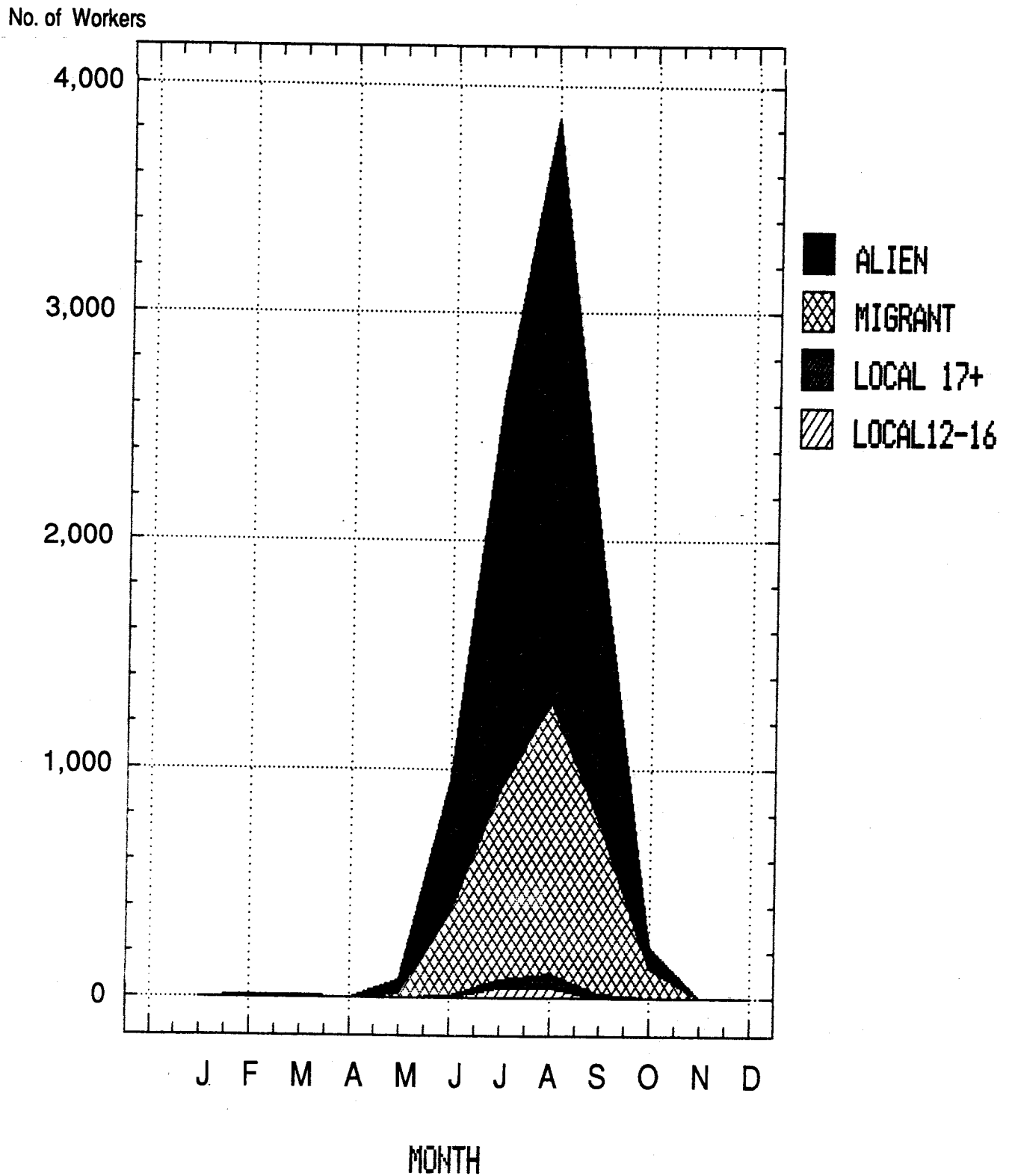
About 9% of the industry's harvest is by machine; the remainder is hand-picked. A total of 9,745 bearing acres were reported harvested, with about 1,740 additional acres in nonbearing trees. Growers plan to plant an additional 700 acres in new trees in 1988 and remove trees on about 192 acres, giving the industry a net increase of 508 acres of new trees for the year.

The reliance on hand-picked harvest labor is related to concerns of labor availability for harvesting the 1989 crop. Sixty-eight percent of the growers who reported concerns for the '89 crop said the supply of labor was uppermost in their minds. Thirty-one percent complained of government regulations and 11% over paperwork associated with complying with the new farm labor law. Twenty-two percent worry about the weather, 16% about market price and 15% about production costs. Eight percent are concerned about migrant housing.

Cucumbers.

Cucumber growers employed 9,749 workers in 1988 to manage and harvest 26,620 tons of vegetables on 2,200 acres. Nearly 87% of the work force was employed for harvesting. Sixty-six percent of all workers were aliens, and another 33% were U.S. migrants. The 1% remaining were local workers. Figure 8 shows the distribution of workers by month. Note that nearly all workers are employed in July, August, and September during the harvest season. When the 9,749 figure is adjusted for double counting or "cycling," a net value of 4,481 is obtained, a drop of nearly 54%. That value is the highest among the commodities studied and indicates that much movement occurs as pickers search for different fields that may have slightly greater harvest

Fig. 8. NUMBER OF CUCUMBER WORKERS BY MONTH



opportunities. Again, the same assumptions hold about the availability of pickers and the equal demand for workers throughout the harvest season. They are equally dubious for the other commodities. Yet, some "cycling" obviously occurred and suggests that the true number of harvest workers lies between 4,500 and 9,800 workers. About a third of the growers had to quit delivering cucumbers when the crop was ready for processing. Seventy percent of those said a lack of pickers was the reason they suspended harvesting. Twenty percent said the company stopped receiving cucumbers, and 10% said they had exceeded their contract. About half the sample reported they could have used more pickers in 1988 and that additional workers would have increased the grade and value of their crop.

Growers intended to plant and harvest 2,240 acres in 1989, a few more than they harvested in 1988. Picker availability remained as their chief concern for the 1989 harvest with 87% of those responding saying they were worried about the supply of farm labor. Twenty-five percent cited government regulations as a problem, and 12% percent mentioned the organizing of farm labor and its impact on the supply of workers as a concern.

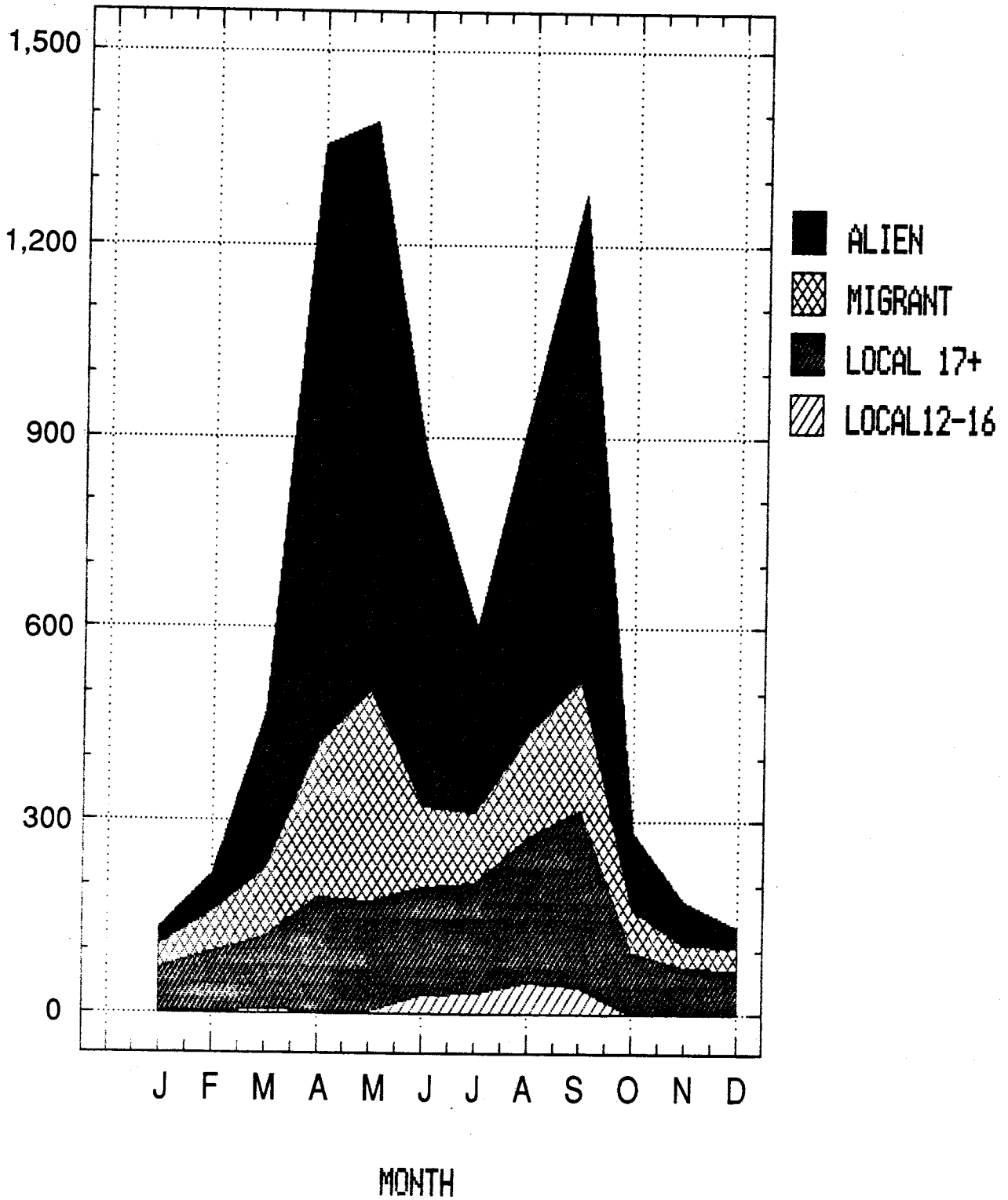
Hops.

Hop growers employed 7,841 workers in 1988, 4,450 of them aliens, about 57% of all workers hired. Only 28% of the total work force is hired for harvesting, making hops one of the few commodities studied that employ the bulk of their workers for nonharvest activities. For instance, nearly a third are employed for stringing and vine training, activities that command about 3,283 people between April and early June. Another 1,035 are employed in late June, July, and mid-August for cultivation and irrigation of the crop. The harvest period in late August and September commands about 2,220 workers. These figures are illustrated in Figure 9. The number of workers drops from October through December to about 594 people. No data are available for estimating the magnitude of "double counting" or "cycling" of the harvest force. The size of the harvest force is not great, compared to other labor activities for the commodity. The "cycling" of the same workers from month to month remains a possibility for nonharvest work, but we lack data to evaluate the level that may have occurred.

Note that migrants are employed heavily for most of the spring work. Local workers are hired primarily to supplement migrants for harvesting in the late summer. Only a handful of local teenagers are hired, 175 in all, and primarily for harvesting. Workers average nearly eight-hour

Fig. 9. NUMBER OF HOP WORKERS BY MONTH

No. of Workers



work days during the spring months but work nearly eleven hours per day in harvesting the crop. Adjusting for hours in the field increases the number of harvest workers slightly from 2,220 to 2,914, still lower than the 3,283 hired for spring work.

Nearly a third of the growers reported they hired a labor contractor to supply all or part of their workers in 1988, and about the same percentage plan to follow that practice in 1989. Picker availability is uppermost among the concerns for the future of the hop industry in the state. Nearly 80% reported worries over the supply of farm workers as an important problem facing the industry. Fifteen percent cited problems with paperwork, government regulations, weather, and production costs. Five percent mentioned adequate housing for hired labor as a problem.

Hops were grown on 7,500 acres in 1988, according to the Oregon Agricultural Statistical Service, and growers produced an estimated 11,025,000 pounds. Growers intend to harvest about the same number of acres in 1989. An estimated 282 acres were planted, suggesting a slight increase in the acreage for the next few years.

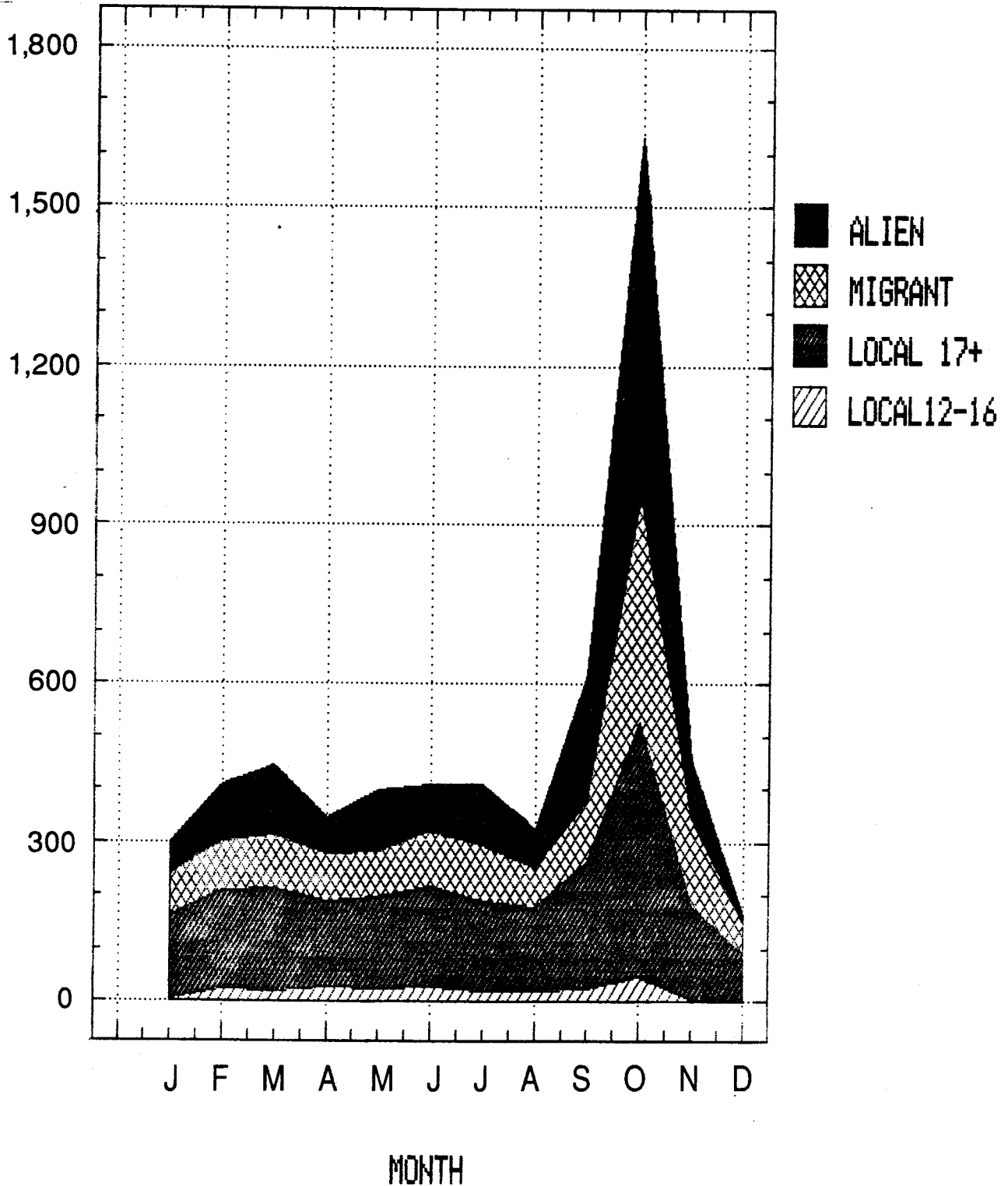
Wine Grapes.

Grape growers employed 5,891 workers in 1988. Forty percent, or 2,368, were local adults, the only instance found in which aliens did not dominate a commodity work force. Aliens represented about 30% of all workers, but made up about 38% of all harvest workers, and were the largest group hired for harvest purposes. Harvesting required only 28% of the total labor force, the remainder working throughout the year on planting, pruning, vine training and leaf pulling. The distribution of workers by month is shown in Figure 10. Note the dominance of local adults in the work force throughout the year, except for the increased employment of migrants in October for the harvest. Again, the number of workers may be inflated from double counting and "cycling" during the year, but we have no information on which to adjust our estimates.

Nearly a third of the growers said they hired contract labor, and contract labor made up about 60% of their workers in 1988. Twenty-nine percent plan to hire part of their work force from labor contractors in 1989, and 8% said they will hire all their labor from that source. Forty-one percent said they will not hire contract labor, and the rest of the sample (22%) is not sure if they will hire contract labor.

Fig. 10. NUMBER OF WINE GRAPE WORKERS BY MONTH

No. of Workers



Nine growers, or 5% of the sample, said they plan to machine-harvest their grapes within the next five years.

Grape growers are not as worried over the supply of hand labor as are growers of other commodities studied. Effects of the weather dominated their interest when asked to describe their major concerns for the 1988 harvest. A total of 56% cited the weather as a problem. Picker availability was mentioned by half the sample, and 19% cited market prices as major concerns. Fifteen percent reported worries over production costs, and 6% mentioned lack of migrant housing as a problem.

Growers harvested 7,719 tons of grapes from 3,413 acres in 1988, according to the Oregon Agricultural Statistics Service. If growers fulfill the intentions they reported in the survey, the acres of fruit-bearing vines will increase 23% to 4,204 acres in 1989, and fruit production will increase commensurately.

Discussion

A comparison of labor demand shows similarities for the four commodities that hire the most farm workers. Peak employment is associated with the harvest. Strawberries, caneberries, sweet cherries, and cucumbers, for example, hired a total of 107,658 people in 1988, 86% of whom worked exclusively as pickers. Aliens made up 56% of the total work force, but 89% of all aliens were employed to harvest fruit. Equally high proportions of nonaliens harvested crops, particularly local teenagers. Ninety-nine percent of them picked fruit. Slight variations were observed among types of workers for caneberry and sweet cherry labor. For instance, only 65% of U.S. migrants picked caneberries, compared to 79% of the aliens. And, cherry growers in the Columbia Gorge relied on a slightly smaller percentage of their work force to pick fruit -- 85% compared to 92% for growers in the Willamette Valley.

The other two commodities -- hops and wine grapes -- were distinguished by the bulk of their hand labor hired for nonharvest work. Only 28% of their work force picked fruit and, like the other crops studied, aliens made up most of their harvest crews. Except for spring work stringing and training hops, aliens played a minor role in nonharvest work.

Workers in all the commodity groups probably are counted more than once, and, since they may work for different growers, the numbers may be inflated. An exploratory effort to adjust the numbers for "double counting" of workers reduced the estimated total of harvest labor only 8% -- from 96,223 to 88,014.

Moreover, peak harvests overlap among the commodities studied. For instance, strawberries, caneberries, and sweet cherries compete for pickers in June and July. Caneberries, sweet cherries, and cucumbers compete for harvest crews in July and August. Cucumbers and hops compete for pickers in August and September. Wine grape growers compete with cucumbers for pickers in late September and early October. Many of these crops compete for harvest crews of commodities not studied. For example, hops growers compete with vegetable growers for pickers in September. Grapes compete with apples and pears in October. The nursery industry commands large crews of workers throughout the year. Planning should begin by recognizing that the recruitment of labor for only one commodity is poor policy; the demand for all the state's hand-picked crops should be estimated and steps organized to supply enough workers so the shortage for one crop does not snowball into a shortage for others.

The overlapping harvest times underscore the devastating effect of labor shortages on the ability of growers to produce fruit. The data in Table 3 compare the estimated work force levels and the average number of days worked in 1988, and harvest months. Strawberry growers, for example, required more than 50,000 workers but employed them no longer than 42 days in 1988. Other commodities hired large numbers of workers for only slightly longer periods.

Table 3. Estimates of the 1988 work force, average number of days worked, and harvest months, by commodity

Commodity	Estimated 1988 work force	Average number of days worked in 1988	Harvest months
Strawberries	50,700	42	June-July
Caneberries	27,851	80	June-Sept.
Sweet cherries	19,358	48	June-July
Cucumbers	9,749	59	July-Sept.
Hops	7,841	183	Aug.-Sept.
Wine grapes	5,899	69	October

Hop growers comprised the only group that hired workers for an extended period, about six months. When demands for large numbers of pickers occur for short periods at the same time, one can appreciate more fully the impact of labor shortages on the economic viability of the state's hand-picked food crops.

The new immigration reform act may contain the seeds for increasing the supply of legally employable farm labor. First, the means for aliens to obtain legal resident status are built into the act. The Special Agricultural Worker (SAW) program offers temporary and eventual permanent resident alien status to illegal aliens who completed at least 90 days of field work in perishable crops between May 1, 1985, and May 1, 1986. The Replenishment Agricultural Worker (RAW) program allows the entry of additional foreign agricultural workers between 1989 and 1993 if research demonstrates that farm labor shortages are likely to occur. Finally, the act streamlines the H-2A contractual temporary worker program, which permits any farm employer to recruit temporary foreign workers after providing evidence that American workers are not available to do the job. The three programs may well enhance the supply of workers for agricultural production.

One cannot tell for certain if the new programs will produce the hand labor the state will need in 1990 and beyond. Farm economists in states that historically employ larger numbers of farm workers than does Oregon are predicting, cautiously, that the new law and improved wages and housing will serve as incentives for enough workers to seek employment in agriculture for their states. Oregon, however, is not comparable to other states, particularly those that attract and hold large numbers of migrant farm workers. The DOL effort to monitor and evaluate the effect of the new law is pitched toward national estimates of labor supply, demand, and shortages. It is doubtful if the estimates they report will reflect the labor needs or will pinpoint labor shortages for states like Oregon.

Summary

The abundance of workers in 1988 signaled the last year growers could count on a sufficient supply of farm labor in the state. Growers were required to document and report all alien workers in 1989, as part of the Immigration Reform and Control Act of 1986 (IRCA). The supply of workers appeared adequate in 1989, but isolated shortages were reported. The 1990 harvest season is the first year the full machinery of the Act will be in place to regulate the supply of alien workers.

The Act requires the U. S. Department of Labor to estimate labor supply, demand, and scarcity. Their estimate, which is now scheduled to be reported in early 1990, is a national estimate. Local or statewide labor shortfalls are possible, regardless of adequate supplies nationally.

Commodity groups in the state will need to rely on their own statistics to justify additional supplies of farm workers should shortages occur in the state.

This study reports the results of a survey of farm labor needs for the 1988 harvest for six commodities. Purpose of the survey is to establish a baseline from which the level of future farm labor supplies can be compared, since 1988 was the last year of plentiful supply. Through a mail survey of all known growers of strawberries, caneberries, sweet cherries, cucumbers, hops, and wine grapes, questions were asked concerning the number of acres in production, total pounds of fruit harvested and left unharvested, estimated days worked per month, estimated number of workers employed per month, the distribution of workers by alien migrants, U.S. migrants, locals over 17 and locals 12 to 16 years old, planting and harvesting intentions for 1989, and major concerns about the 1989 harvest.

The results show that a total of 121,368 workers were employed to produce the six crops in 1988. Strawberry growers hired the largest number, an estimated 50,700 in all. Caneberry growers hired an estimated 27,851; sweet cherry growers hired 19,358; cucumber growers, 9,749; hop growers, 7,841; and wine grape growers, 5,899. Approximately 80% of the work force was hired during the six harvest months -- from late May through October. A total of 96,223 were employed for harvest, about 80% of the total work force. Ninety-three percent of the estimated 66,095 aliens were hired during that period. Yet, they made up only 55% of the total work force. Their primary role in the state is one of harvesting.

The overlapping demand for workers is apparent from the analysis. The peak demand for strawberry, caneberry, and sweet cherry workers coincides with June-July harvest work. The demand for cucumber pickers overlaps with that for caneberries, hops, and the early grape harvest. Moreover, nonharvest activities play a role in the demand for farm workers. For example, hop growers hire approximately 3,000 persons in the spring for hand cutting and training work. That work coincides with the early days of strawberry harvest.

The strawberry harvest commands the greatest number of pickers. A total of 44,266 pickers were hired in 1988 for that purpose. Caneberries required 21,364, sweet cherries 18,256, cucumbers 8,447, hops 2,220, and wine grapes 1,630. Given the overlapping nature of the demand for pickers, one cannot expect that the same workers flow from one crop to

another and pick all the fruit. All workers did not follow the work flow of the crops studied. The overlapping schedule of harvest work is one reason. Some strawberry pickers also joined the work force in agricultural commodities not studied. Others left agriculture altogether and worked in canneries or in non-agricultural jobs. Some left to work in other states. How many of the caneberry, sweet cherry, cucumber, hop or grape pickers had picked strawberries or were replacement workers is difficult to estimate.

A level of nearly 100,000 workers seems a reasonable initial estimate to assure an adequate supply of workers for the harvest of the six crops at 1988 production levels.

This very rough figure includes "double counting" of pickers from growers who reported the same worker as he or she moved from farm to farm or from crop to crop to harvest fruit. An exploratory analysis of the effect of "double counting" on demand reduced estimated demand levels only 8% -- from 96,223 to 87,014 workers. The levels reported refer only to the six commodities studied. Labor demand for the crops not studied are an additional unknown quantity. Labor supplies are unknown as well, so shortfalls in 1990 remain a possibility that continues to worry many growers.

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APPENDIX A: Background Information and Method for Calculation of National Estimates of Farm Labor Demand and Shortages

National estimates of agricultural labor demand and shortages are neither simple nor straightforward. This summary is drawn primarily from a personal communication from Professor Philip Martin, Department of Agricultural Economics at the University of California - Davis. The summary captures the complexity of SAW, RAW and H-2A immigration reform programs. It is printed here to foster an understanding of how the Immigration Reform and Control act of 1986 (IRCA) will be administered for the next few years.

Background and previous work.

Farm production and employment are concentrated on a handful of large farms. There are 2.2 million places in the United States that are considered farms, but most of these farms are small, part-time money-losing operations. The largest 10 percent of these farms produce almost three-fourths of the U.S.-produced food and fiber, and most of them are family-run operations. Thus, it is true that most U.S. farms are small, but it is also true that large farms produce most U.S. food and fiber.

About 40 percent of the nation's farms reported that they hired workers in the 1982 Census of Agriculture, and they reported hiring 4.9 million workers at a cost of \$8.4 billion. Workers hired on two farms are counted twice, so the number of individuals who do farm work for wages is considerably less, perhaps 2.5 million. In addition, farms hire workers indirectly when they contract with agricultural service firms such as farm labor contracts, and in 1982 farmers reported paying \$1.1 billion for contract labor.

Almost 850,000 farms report hiring workers sometime during the year, making farmers about one-seventh of all U.S. employers. However, these farm employers are mostly very small employers who pay less than \$5,000 to one or two seasonal hired workers and they include farmers who "hire" their teenage children to shift farm income into lower tax brackets. In 1985, there were only 45,000 U.S. farm employers who covered their hired workers under state Unemployment Insurance (UI) programs, and over 20,000 of these employers were in California, a state which requires virtually all farm employers to provide UI coverage¹. A relative handful of large U.S. farms produce most food and fiber, and a handful of large farm employers pay most farm wages.

¹ In California, all employers paying \$100 or more in quarterly wages are required to participate in the UI program. In most other states, farm employers are required to participate only if they paid \$20,000 or more in quarterly wages or they hired 10 or more workers in each of 10 different weeks.

Farm labor expenditures are concentrated by commodity, geography, and type of farm (Coltrane, 1984). Farms growing fruits, vegetables, and horticultural specialty crops are most likely to employ hired workers, and these farms are concentrated in the south and west². The largest labor-intensive farms account for most farm labor expenditures.

The hired workers who satisfy the farmworker stereotype--Hispanics and Blacks who migrate from farm to farm harvesting crops—are employed primarily on fruit and vegetable farms (Pollack, 1986; Oliveria and Cox, 1988; Espenshade and Taylor, 1988). The fruit and vegetable labor market is unique because it typically involves crews of "strangers-in-the fields" for only a short time. Instead of one or two year-round hired hands known to the farm operator, as on an Iowa corn and hog farm, a fruit or vegetable farm in California, Florida, and Texas might hire one thousand or more workers over the course of the year to satisfy two or three peak labor needs for several hundred workers. Fruit and vegetable workers are usually deployed in crews of five to 70 workers, and bilingual foremen or labor contractors are often instrumental in assembling and supervising them. In this middle-man system, farm operators and managers do not communicate directly with individual workers.

The same farms that account for most farm labor expenditures are believed to be most dependent on illegal alien workers and thus most affected by immigration reform. In congressional testimony, representatives of affected farm employers argued that farms legally became dependent on illegal workers because it was not illegal for an employer to even knowingly hire an illegal alien worker; that any amnesty will result in large numbers of currently illegal alien workers taking nonfarm jobs; and that American or domestic workers are not and will not be available to do farmwork. Farmworker advocates, on the other hand, argued that farm employers became dependent on illegal aliens because they preferred workers who would work "hard and scared" and that improvements in wages, working conditions, and personnel practices would attract and maintain an adequate farmwork force (Martin, 1987).

These opposing views on the farm labor market were not resolved by IRCA. Instead, Congress enacted a special farmworker amnesty, a replenishment agricultural worker program, and streamlined the separate contract foreign worker program. All three of these provisions may enlarge the supply of legally employable labor. The first two are also means for aliens to obtain legal resident status in the U.S. (Rosenberg, 1988a). The Special Agricultural Worker (SAW) program offers temporary and eventually permanent resident alien status to illegal aliens who did at least 90 days

² Agriculture along the long U.S.-Mexican border is quite heterogeneous. Agriculture in New Mexico and West Texas tends to be range livestock operations and a few small irrigated crop farms. Undocumented labor performs jobs such as irrigating, cleaning livestock pens, and maintenance. Undocumented labor was a rather minor component of most operations such as harvesting. Thus, adjustments caused by IRCA are expected to be less severe in this area than in other areas (Eastman, 1984).

of field work in perishable commodities between May 1, 1985, and May 1, 1986. The Replenishment Agricultural Worker (RAW) program may permit the entry of additional foreign agricultural workers between 1989 and 1993 if a special census survey and other research demonstrate that farm labor shortages are predicted in perishable commodities. Finally, IRCA streamlined the H-2A contractual temporary worker program, which permits any farm employer to recruit temporary foreign workers after obtaining certification that American workers will not be available to do farmwork at pre-determined minimum wages and working conditions and certification that the employment of H-2A foreign workers will not have adverse effects on "similarly employed" American workers.

The SAW, RAW, and H-2A programs are extremely complex: each requires advance planning, paperwork, and a resolution of hypotheticals such as determining the availability of rural unemployed Americans to do farmwork at higher wages, but not wages so high that they affect the viability of U.S. agriculture. Most of these hypothetical calculations are required by IRCA in order to determine whether currently-legalized SAW workers will be followed by replenishment or RAW workers between 1989 and 1993. There is not a body of research to review which offers tentative hypotheses to test in order to determine how SAWs and RAWs may interact; instead, we outline the calculations required to determine whether RAWs will be admitted (Rosenberg, 1988b and 1989), since much of the state-by-state research proposed will also influence this determination.

RAW program calculations.

The most important RAW calculation is determining how many RAWs can be admitted to the United States. IRCA includes nine pages that outline the calculations needed to determine the number of RAWs. The SAW program, by contrast, is covered in six pages.

The RAW program requires two separate calculations. First, an absolute ceiling based on the number of SAWs is established to determine the maximum number of RAWs who can be admitted in after October 1, 1989. Then a second shortage calculation is made to predict whether there will be a shortage of labor in SAS in FY 1990. The smaller of these two numbers controls RAW admissions. For example, if the ceiling calculation yields 160,000 RAWs and the shortage calculation yields 100,000, only 100,000 RAWs will be admitted.

RAW absolute ceiling.

The maximum number of RAWs in FY 1990 is 95 percent of the number of SAWs, minus the number of SAWs who did at least 15 days of work in Seasonal Agricultural Service (SAS) in FY 1989, and plus or minus the change in the number of H-2A workers in SAS crops admitted in FY 1989 versus FY 1988. For example, if the number of approved SAWs is 800,000, then the ceiling on RAW admissions in FY 1990 is 760,000 minus say 600,000 SAWs who did at least 15 days of SAS work in FY 1989, and minus say 10,000 additional H-2A workers if H-2A admissions in SAS crops increase from 20,000 in FY 1988 to 30,000 in FY 1989. The RAW ceiling for FY 1990 would be 150,000 in this example.

Data for this ceiling calculation will come from the Immigration and Naturalization Service (INS) and from farm employers. Beginning December 1, 1988, farmers must complete employment verification or I-9 forms for all newly-hired workers; note which of these workers have INS numbers in the A90 million series; and then report the names, A-numbers, and days worked of all such workers on an ESA-92 form. These data will be analyzed to determine how many SAWs are staying in SAS Agriculture and how many days they are employed.

The ceiling calculation is made in terms of people, while the shortage calculation is made in mandays worked, but expressed in people by dividing by a probable 90-days-per-worker factor (see below). The RAW ceiling and shortage calculations are made independently, and they may conflict because the manday shortage estimate is divided by the average SAS days worked by SAWs in FY 1989. If 600,000 SAWs average 20 days of work as above, then the RAW ceiling calculation is 150,000. However, in the shortage calculation, an assumed 36 million manday shortage translates into 1.8 million RAWs if SAW workers average 20 days, and 400,000 RAWs if they average 90 days. If SAW workers average just over 15 SAS days worked in FY 1989, the ceiling calculation will yield relatively few RAWs while the shortage calculation yields a large number of RAWs.

The shortage calculation.

The RAW ceiling calculation establishes only the maximum number of RAWs to be admitted. No RAWs will enter the United States unless USDA and DOL agree that there will be a labor shortage in SAS agriculture after October 1, 1989. Shortage estimates are based on the SAS mandays worked or likely to be worked by a variety of workers, including SAWs domestic migrant and seasonal workers, unemployed people in rural areas, year-round hired hands on certain farms, and even a paid teenager working on the family's Iowa grain farm. The calculations involved to determine the gap between needed SAS mandays and available mandays are complex, and they will be based on small sample estimates which make heroic assumptions.

To determine whether there will be a labor shortage in SAS agriculture after October 1, 1989, USDA will estimate the demand or need for labor in SAS, DOL will determine the supply or availability of labor to SAS, and farm employers will report how many SAW workers they employed and for how long. If, for example, USDA determines that there were 180 million mandays worked in SAS in FY 1989 and that there are no changes expected in this demand or need number in FY 1990, and if DOL determines that about 20 percent of the SAS mandays are lost annually because of exiting workers and that no new workers will be available to SAS, then the shortage number is 20 percent of 180 million or 36 million mandays.

This manday shortage number must be converted into RAW visas or workers. The Bureau of the Census will analyze employer reports³ of SAWs employed in SAS between October 1, 1988, and September 30, 1989, to determine the average number of SAS days worked (four hours or more) by SAWs and, if this average is the expected 90 days, then the estimated shortage of farmworkers is 36 million mandays divided by 90, or 400,000 RAWs. In this example, only 150,000 RAWs could be admitted even though the shortage was 400,000 because the RAW ceiling calculation yielded only 150,000 RAWs.

The U.S. Department of Agriculture (USDA) begins the RAW shortage calculation process by estimating the manday base or how many mandays were worked in SAS between October 1, 1988, and September 30, 1989. IRCA does not state clearly what is to be measured. For example, no where does IRCA state that base-year SAS mandays are those done by hired workers, although USDA is confining its manday estimates to hired workers. SAS were defined by commodity and activity: Regulations and court decisions have made most crops part of SAS, and qualifying "fieldwork" includes hand-picking SAS crops, irrigating SAS crops, operating equipment in fields with SAS crops, and some packing of SAS crops. Also included is supervising workers engaged in any of these activities.

These broad definitions of SAS commodities and activities have cast a wide net for SAS workers. In California, for example, about 90 percent of all persons employed on farms in 1985 are included, from grape pickers to the presidents of corporate farms who supervise them. There is no completely reliable data on the distribution of hired workers across commodities and states, but if labor expenditures are a rough indicator of days worked, then in 1982 crop farmers accounted for about three-fourths of total labor expenditures (including contract labor expenses) reported in the Census of Agriculture (COA). About 60 percent of these COA crop labor expenditures were made by the fruit, vegetable, and horticultural specialty farms that were associated with immigration reform debates.

However, the ever-widening definition of SAS means that USDA's demand or need calculations might be influenced heavily by what happens in midwestern agriculture. For example, if weather or government farm program changes reduce midwestern grain acreages and employment but workers are still available to work in midwestern SAS agriculture, then there may be a reduced need for SAS workers in U.S. agriculture even if strawberry acreage in California doubles. This example emphasizes that the SAS demand or need number is a single national number that applies to all of SAS agriculture. Since there is no nationwide farm labor market, there could be simultaneous farm labor shortages and surpluses despite the RAW program.

³ SAS employers must report the names and days worked of each person employed by them on or after October 1, 1988, with an INS Alien Registration numbers in the A90,000,000 series on ESA-92 forms. Employers discover which workers have such numbers when they complete I-9 employment eligibility forms. estimates to hired workers. SAS were defined by commodity and activity:

The USDA need estimate.

USDA will use its Quarterly Agricultural Labor Survey (QALS) to estimate how many mandays were worked in SAS in FY 1989, how many additional mandays would have been needed to prevent crop losses caused by labor shortages in FY 1988, and how many more or fewer mandays will be needed in FY 1990 because of planned changes in technology and personnel practices. USDA must also adjust its mandays-needed-in-FY 1990-estimate to account for growth or contraction in acreage or production. Such adjustments will be based on non-QALS data.

The QALS obtains data on hired worker employment and wages for four weeks each year. USDA assumes that the weeks that include the 12th of January, April, July, and October are representative weeks to estimate days worked in SAS, so that the (expanded) number of days worked on sample farms during a week can be multiplied by 13 to represent SAS days worked during the quarter. These quarterly totals will be summed to obtain SAS mandays worked between October 1, 1988, and September 30, 1989.

About two-thirds of the workers reported in the QALS are employed in SAS, so a rough estimate of SAS mandays worked can be obtained as follows from FY 1988 QALS data:

U.S. SAS Mandays in FY 1988

	Hired Workers x 2/3 =	SAS Workers x 5 =	SAS Mandays x 13 =	SAS Mandays for Quarter
Oct. 1987	997,000	665,000	3.32 (mil)	43.22 (mil)
Jan. 1988*	354,000	236,000	1.18	15.35
Apr. 1988	958,000	639,000	3.19	41.53
July 1988	1,200,000	800,000	4.00	53.03
				152.13 (mil)

Source: USDA, Farm Labor, 1987-1988 issues.

*QALS conducted in only 5 of 18 regions until January 1989.

These data indicate that in FY 1988, QALS estimated that about 152 million mandays were worked in SAS. Additional workers were hired to work on SAS farms by agricultural service firms. These days of work are included in the estimate of need for workers in SAS.

The DOL supply of labor estimate.

The U. S. Department of Labor (DOL) must determine the loss of mandays to SAS agriculture caused by retirements and the exit of SAS workers and then estimate the additional mandays of labor available to SAS agriculture if farm employers improve wages, working conditions, and recruitment efforts. This means DOL is interested in the SAS mandays of three groups of workers: exiting workers who did SAS work in FY 1988 but not FY 1989, entrants who did not do SAS work in FY 1988 but did SAS work in FY 1989, and potential SAS workers who would do SAS work in FY 1990 if farm employers improved wages, working conditions, or recruitment methods. Like USDA, DOL will conduct four "Waves" of SAS worker interviews to estimate the exit and entry of SAS mandays in October 1988, January 1989, April 1989, and July 1989.

USDA is using its in-house QALS survey to estimate the need for SAS labor. DOL, by contrast, made an agreement with Aguirre International (AI) to have AI interview a sample of SAS workers to help determine the exit and entry of SAS mandays. Since the AI survey is a new survey, an Advisory Committee that includes employer and employee representatives was assembled to discuss the survey instrument and sampling procedures.

The USDA contacts about 15,000 farm operators each quarter, and these operators are about a 2 percent "probability sample" of the nation's estimated 800,000 farm employers. DOL could not gain access to this QALS list of farm operators, so AI had to develop a sampling frame or list of farm employees independently. AI decided to rank U.S. counties by their total crop labor expenditures in the 1982 COA, group them into crop reporting districts (CRDs), stratify these CRDs by their labor expenditures, and then select sample counties or CRDs from, e.g., high, medium, and low farm labor expenditure strata. The selected CRDs included 160 to 200 counties across the United States, and AI settled on a sample of 60 counties in 34 site areas scattered across 25 states. (Oregon has one site area, Marion County.)

AI intends to compile a list of farm employers for each of these 34 site areas and then interview about 350 employers. All sample farm employers will be asked questions similar to those on the QALS survey, and then they will be asked to cooperate with AI by providing information on all SAS workers so that a sample of these workers can be interviewed during nonworking hours. AI will conduct interviews in all 34 site areas each quarter.

Once 350 cooperating employers have been located, AI will interview about 3,000 new workers in FY 1989, that is, 1250 in October 1988, 250 in January 1989, 500 in April 1989, and 1000 in July 1989. The workers interviewed will be doing SAS work in FY 1989, and they will be asked about their SAS activities in FY 1988. DOL plans to define "new entrants" as people who are interviewed in July 1989 doing SAS work who did no SAS work between July 1987 and June 1988.

DOL will estimate exits for FY 1990 by "tracking" workers interviewed in October 1988 doing SAS work. About 1250 SAS workers will be interviewed in October 1988, and AI will attempt to re-interview these workers between April and July 1989 to determine whether they are still doing SAS work.

DOL must also estimate how many workers (mandays) would be available to SAS agriculture if SAS employers improved wages, working conditions, and recruitment efforts. The procedure for estimating this potential supply of farmworkers includes estimating how many unemployed workers who file claims for unemployment insurance benefits in rural areas would be willing to do farmwork and how many workers who seek jobs at employment service offices would be willing to do farmwork.

APPENDIX B. Marginal frequencies for questionnaire items

Sample values of item responses are given for each commodity. Values for the labor table (Question 6 for the strawberry sample, for example) have been expanded to represent the total number of workers hired for 1988. See Appendix C for the details about the calculation of expanded values. Values for all the other items are raw sample scores and percents.

Frequencies of questionnaire items are reported for the different commodity groups on the following pages:

Strawberries	36
Caneberries.....	40
Sweet cherries.....	44
Cucumbers.....	48
Hops.....	53
Wine grapes.....	57

SURVEY OF 1988 STRAWBERRY GROWERS

1. Did you harvest any strawberries in 1988? (Circle one number)

(N) Percent

(208) 100 YES

(0) 0 NO (Please skip now to Question 14, Page 4)

2. About how many acres of strawberries did you raise in 1988?

MIN = 1

MAX = 450

MEAN = 22.39

SUM = 4,658

(N = 208)

3. Approximately how many of pounds of strawberries did you harvest in 1988?

MIN = 3,200

MAX = 8,166,000

MEAN = 29,415

SUM = 59,844,768

(N = 203)

4. And, approximately how many pounds of strawberries would you estimate were left in the field unharvested?

MIN = 0

MAX = 300,000

MEAN = 24,191

SUM = 4,899,577

(N = 203)

5. Considering all your pickers, about what percent would you estimate worked for each of the time periods listed below during your harvest season? (Fill in the percent for each category. If "none", please write "0")

MEAN (N)

- a. Percent who worked three days or less. . . 32.9% (203)
- b. Percent who worked four days to one week . 19.7% (203)
- c. Percent who worked from one to two weeks . 18.1% (203)
- d. Percent who worked over two weeks . . . 29.3% (203)

6. The table below asks for information about the number of workers you employed for your strawberry operation over the course of the year, 1988. First, for each month, please give the total number of days you had people working.

Then estimate the average number of workers you employed PER DAY. Finally, break this total down into your best estimate of average number of workers per day in each of the following categories:

- a) Local workers aged 12-16;
- b) Local workers 17 and over;
- c) Legal migrant workers; and
- d) Undocumented aliens.

<u>1988</u>	<u>TOTAL DAYS WORKED</u> (mean)	<u>AVERAGE NUMBER PER DAY</u> (mean)	<u>LOCAL 12-16</u> (mean)	<u>LOCAL 17 AND OVER</u> (mean)	<u>LEGAL MIGRANT</u> (mean)	<u>UNDOC. ALIENS</u> (mean)
JAN.	1.01	0.22	0	0.15	0.05	0.02
FEB.	1.19	0.39	0	0.21	0.15	0.03
MAR.	1.66	0.98	0.03	0.51	0.35	0.10
APR.	3.29	3.18	0.08	0.97	1.16	0.99
MAY.	4.37	7.68	0.43	1.19	3.19	4.41
JUN.	15.11	147.57	20.58	19.84	36.22	74.97
JUL.	5.28	63.63	8.96	8.25	15.14	32.01
AUG.	3.30	8.11	0.47	0.86	2.70	4.07
SEPT.	2.61	4.73	0.11	0.68	1.59	2.39
OCT.	1.69	3.13	0.02	0.35	1.29	1.61
NOV.	1.13	0.72	0.02	0.17	0.30	0.35
DEC.	0.87	0.31	0	0.13	0.15	0.03
TOTAL	41.52	240.67	30.70	33.36	62.29	120.97

(N = 205)

7. How certain are you of the estimates you have given concerning the number of workers your employed during harvest and through out the year -- very certain, somewhat certain, not too certain, or not at all certain?

<u>(N)</u>	<u>%</u>	
(93)	45	VERY CERTAIN
(109)	53	SOMEWHAT CERTAIN
(6)	3	NOT TOO CERTAIN
(0)	0	NOT AT ALL CERTAIN
(0)	0	UNABLE TO RATE

8. What was your main source of information for the estimates you made for days worked, number of workers, and type of worker in Question 6 -- was it farm records, consultation or discussion with others (contractors, foreman, family members), or your own memory? (Circle one number)

(N) %

(99)	48	FARM RECORDS
(9)	4	DISCUSSION WITH OTHERS
(69)	33	MY OWN MEMORY
(27)	13	COMBINATION
(4)	2	NO ANSWER

9. Please indicate whether or not you provided each type of housing listed below for your workers in 1988. For any housing you did provide give the number workers housed.

	<u>NOT PROVIDED</u> %	<u>YES PROVIDED</u> %	<u>NUMBER OF WORKERS HOUSED</u> (N)
a. On-farm family housing	89	11	813 (208)
b. Off-farm family housing	97	3	163 (208)
c. On-farm single person housing .	89	11	1,165 (208)
d. Off-farm single person housing.	97	3	1,166 (208)

10. Do you have definite plans to construct housing for your workers any time in the next year or two?

(N) %

(171)	82	NO PLANS TO CONSTRUCT HOUSING
(25)	12	YES, PLAN TO CONSTRUCT HOUSING
(11)	6	NO ANSWER

11. What do you consider to be the major barrier to constructing new housing for your workers?

(N) %

REASON

(69)	33	Lack of money
(68)	33	Government regulations
(26)	13	No need
(25)	12	Zoning
(9)	4	Legal liabilities
(11)	5	Other
(60)	29	No answer

(Base = 208)

12. In the table below, please indicate how many acres of strawberries, if any, you burned by fire after the harvest for 1987 and 1988. If you did not burn any strawberry acres, please write "0".

TOTAL ACRES
BURNED

- | | |
|-------------------------------|-----|
| a. After the 1987 harvest . . | 515 |
| b. After the 1988 harvest . . | 644 |

13. How often do you intend to burn your strawberry fields by fire in the future -- every year, every second year, every third year, or some other schedule? (Circle one number)

<u>(N)</u>	<u>%</u>	
(29)	14	EVERY YEAR
(9)	4	EVERY SECOND YEAR
(5)	2	EVERY THIRD YEAR
(5)	3	OTHER
(75)	36	DON'T KNOW
(84)	40	NEVER BURNED
(1)	1	NO ANSWER

14. How many acres of strawberries, if any, are you planting in the spring of 1989?

941 NUMBER OF ACRES INTENDED TO PLANT IN 1989

15. And, about how many acres of strawberries, if any, do you intend to harvest in the 1989 season?

3,655 NUMBER OF ACRES INTENDED FOR 1989 HARVEST?

17. Finally, what are your major concerns for the 1989 harvest?

<u>%</u>	<u>CONCERN</u>
64	Availability of pickers
54	Burdensome government regulations, paperwork
29	Price of 1989 crop
19	Poor weather
14	Production costs
3	Supply of picker-housing
<hr style="width: 10%; margin-left: 0;"/>	
183	
(208)	

SURVEY OF 1988 CANEBERRY GROWERS

1. Did you harvest any caneberries in 1988? (Circle one number)

(N) %

(196) 100

YES

(0) 0

NO (Please skip now to Question 12)

2. About how many total acres of caneberries, if any, did you harvest by machine?

MIN = 0

MEAN = 23.37

MAX = 293

SUM = 4,526

(N = 194)

3. Did you harvest any of you caneberries by hand labor?

(N) %

(85) 43

NO HAND HARVEST (Skip to Question 4)

(111) 57

YES, HARVESTED BY HAND

- 3a. About how many total acres did you harvest by hand?

MIN = 1

MEAN = 17.42

MAX = 287

SUM = 1,929

(N = 111)

- 3b. Considering all your hand-harvest pickers, about what percent would you estimate worked for each of the time periods listed below during your harvest season? (Fill in the percent for each category. If "none", please write "0")

% (N)

a. Percent who worked three days or less . . . 28.4 (100)

b. Percent who worked four days to one week . . . 20.9 (100)

c. Percent who worked from one to two weeks . . . 20.3 (101)

d. Percent who worked over two weeks 30.5 (101)

4. Approximately how many of pounds of caneberries did you harvest in 1988?

MIN = 2,000

MEAN = 183,266

MAX = 2,700,000

SUM = 34,646,334

(N = 189)

5. And, approximately how many pounds of caneberries would you estimate were left in the field unharvested?

MIN = 0

MAX = 300,000

MEAN = 10,097

SUM = 1,950,875

(N = 193)

6. The table below asks for information about the number of workers you employed for your caneberry operation over the course of the year, 1988. First, for each, month please give the total number of days you had people working.

Then estimate the average number of workers you employed PER DAY. Finally, break this total down into your best estimate of average number of workers per day in each of the following categories:

- a) Local workers aged 12-16;
- b) Local workers 17 and over;
- c) Legal migrant workers; and
- d) Undocumented aliens.

<u>1988</u>	<u>TOTAL DAYS WORKED</u> (mean)	<u>AVERAGE NUMBER PER DAY</u> (mean)	<u>LOCAL 12-16</u> (mean)	<u>LOCAL 17 AND OVER</u> (mean)	<u>LEGAL MIGRANT</u> (mean)	<u>UNDOC. ALIENS</u> (mean)
JAN.	2.55	1.74	0	0.45	0.69	0.58
FEB.	5.51	6.18	0	0.72	2.01	3.54
MAR.	5.74	5.56	0	0.98	2.18	2.40
APR.	4.30	4.02	0.01	1.07	1.24	1.72
MAY.	4.97	6.44	0.03	1.07	1.55	3.90
JUN.	8.51	29.42	2.83	5.38	5.25	16.08
JUL.	17.73	44.48	6.00	7.49	7.16	24.61
AUG.	11.39	26.17	1.99	3.12	5.69	15.22
SEPT.	7.55	12.26	0.27	1.41	3.25	8.08
OCT.	4.79	5.58	0.02	0.73	2.02	2.85
NOV.	3.79	2.67	0	0.46	1.22	1.02
DEC.	2.94	2.07	0.01	0.39	0.82	0.87
TOTAL	79.77	146.57	11.15	23.27	33.08	80.87

(N = 188)

7. How certain are you of the estimates you have given concerning the number of workers you employed during harvest and through out the year -- very certain, somewhat certain, not too certain, or not at all certain?

(N) %

(101)	52	VERY CERTAIN
(89)	45	SOMEWHAT CERTAIN
(6)	3	NOT TOO CERTAIN
(0)	0	NOT AT ALL CERTAIN
(0)	0	UNABLE TO RATE

8. What was your main source of information for the estimates you made for days worked, number of workers, and type of worker in Question 6 -- was it farm records, consultation or discussion with others (contractors, foreman, family members), or your own memory? (Circle one number)

(N) %

(98)	50	FARM RECORDS
(13)	6	DISCUSSION WITH OTHERS
(58)	30	MY OWN MEMORY
(25)	13	COMBINATION
(2)	1	NO ANSWER

9. Please indicate whether or not you provided each type of housing listed below for your workers in 1988. For any housing you did provide give the number workers housed.

	<u>NOT PROVIDED</u> %	<u>YES PROVIDED</u> %	<u>NUMBER OF WORKERS HOUSED</u> (N)
a. On-farm family housing	91	9	155 (174)
b. Off-farm family housing	99	1	11 (174)
c. On-farm single person housing .	93	7	304 (174)
d. Off-farm single person housing.	100	0	0 (174)

10. Do you have definite plans to construct housing for your workers any time in the next year or two?

(N) %

(148)	76	NO PLANS TO CONSTRUCT HOUSING
(7)	4	YES, PLAN TO CONSTRUCT HOUSING
(40)	21	NO ANSWER

11. What do you consider to be the major barrier to constructing new housing for your workers?

<u>(N)</u>	<u>%</u>	<u>REASON</u>
(39)	20	Lack of money
(32)	16	Government regulations
(32)	16	No need
(11)	6	Zoning
(5)	3	Legal liabilities
(2)	1	Other
(98)	50	No answer
(Base = 196)		

12. How many acres of caneberries, if any, are you planting in the spring of 1989?

724 NUMBER OF ACRES TO PLANT, SPRING 1989

13. And, about how many acres of caneberries, if any, do you intend to harvest in the 1989 season?

6,047 NUMBER OF ACRES INTENDED FOR 1989 HARVEST?

14. Finally, what are your major concerns for the 1989 harvest?

<u>%</u>	<u>Concerns</u>
43	Picker availability
43	Weather
34	Market price
32	Government regulations, paperwork
15	Production costs
1	Migrant housing
<hr/>	
168	
(196)	

SURVEY OF 1988 SWEET CHERRY GROWERS

1. Did you harvest any sweet cherries in 1988? (Circle one number)

(N) %

(226) 99 YES

(1) 1 NO (Please skip now to Question 5, Page 2)

2. About how many total tons of sweet cherries, if any, did you harvest by machine?

MIN = 0

MAX = 409

MEAN = 14.63

SUM = 3,268

(N = 223)

3. Did you harvest any of your sweet cherries by hand labor in 1988?

(N) %

(23) 10

NO HAND HARVEST (Skip to Question 4)

(200) 88

YES, HARVESTED BY HAND

(3) 1

YES, SKIRTED

(1) 1

NO ANSWER

- 3a. About how many total acres did you harvest by hand?

MIN = 1

MAX = 700

MEAN = 33.95

SUM = 6,818

(N = 201)

- 3b. Considering all your hand-harvest pickers, about what percent would you estimate worked for each of the time periods listed below during your harvest season? (Fill in the percent for each category. If "none", please write "0")

% (N)

- a. Percent who worked three days or less . . . 21.9 (199)
- b. Percent who worked four days to one week . . . 21.6 (199)
- c. Percent who worked from one to two weeks . . . 32.0 (199)
- d. Percent who worked over two weeks . . . 24.3 (199)

- 3c. Approximately how many of tons of sweet cherries did you harvest by hand in 1988?

MIN = 0.25

MAX = 2,989

MEAN = 168.0

SUM = 33,738

(N = 201)

4. And, approximately how many tons of sweet cherries would you estimate were left unpicked in 1988?

MIN = 0
MEAN = 1.7

MAX = 50
SUM = 394

(N = 223)

5. The table below asks for information about the number of workers you employed for your sweet cherry operation over the course of the year, 1988. Include workers you hired yourself and any brought in by a labor contractor. First, for each month, please give the total number of days you had people working.

Then estimate the average number of workers you employed PER DAY. Finally, break this total down into your best estimate of average number of workers per day in each of the following categories:

- a) Local workers aged 12-16;
- b) Local workers 17 and over;
- c) Migrant workers who are U. S. citizens or permanent aliens;
- and d) Aliens with temporary work documents or aliens without work documentation.

<u>1988</u>	<u>TOTAL DAYS WORKED</u> (mean)	<u>AVERAGE NUMBER PER DAY</u> (mean)	<u>LOCAL 12-16</u> (mean)	<u>LOCAL 17 AND OVER</u> (mean)	<u>U. S. MIGRANTS</u> (mean)	<u>ALIEN MIGRANTS</u> (mean)
JAN.	2.96	0.99	0.01	0.30	0.19	0.52
FEB.	3.09	1.23	0.01	0.32	0.18	0.71
MAR.	3.60	1.44	0.03	0.42	0.14	0.88
APR.	3.65	1.12	0.02	0.36	0.13	0.62
MAY.	4.15	1.06	0.03	0.34	0.11	0.59
JUN.	7.79	42.59	0.98	2.58	8.89	30.52
JUL.	7.99	42.61	1.01	2.93	6.83	29.71
AUG.	3.85	1.09	0.02	0.36	0.13	0.62
SEPT.	3.41	1.14	0.01	0.33	0.16	0.70
OCT.	2.87	1.05	0.01	0.22	0.13	0.69
NOV.	2.29	0.43	0.01	0.17	0.07	0.19
DEC.	2.07	0.46	0.01	0.15	0.05	0.27
TOTAL	47.72	95.21	2.14	8.49	17.00	66.02

(N = 207)

6. How certain are you of the estimates you have given concerning the number of workers your employed during harvest and through out the year -- very certain, somewhat certain, not too certain, or not at all certain?

(N) %

(165) 73 VERY CERTAIN
 (60) 26 SOMEWHAT CERTAIN
 (2) 1 NOT TOO CERTAIN
 (0) 0 NOT AT ALL CERTAIN
 (0) 0 UNABLE TO RATE

7. What was your main source of information for the estimates you made for days worked, number of workers, and type of worker in Question 5 -- was it farm records, consultation or discussion with others (contractors, foreman, family members), or your own memory? (Circle one number)

(N) %

(134) 61 FARM RECORDS
 (8) 3 DISCUSSION WITH OTHERS
 (63) 28 MY OWN MEMORY
 (20) 9 COMBINATION
 (2) 1 NO ANSWER

8. Please indicate whether or not you provided each type of housing listed below for your workers in 1988. For any housing you did provide give the number workers housed.

	<u>NOT PROVIDED</u> %	<u>YES PROVIDED</u> %	<u>NUMBER OF WORKERS HOUSED</u> (N)
a. On-farm family housing	71	29	2,527 (227)
b. Off-farm family housing	97	3	204 (227)
c. On-farm single person housing .	80	20	1,298 (227)
d. Off-farm single person housing.	99	1	201 (227)

9. Do you have definite plans to construct housing for your workers any time in the next year or two?

(N) %

(172) 76 NO PLANS TO CONSTRUCT HOUSING
 (43) 20 YES, PLAN TO CONSTRUCT HOUSING
 (12) 5 NO ANSWER

10. What do you consider to be the major barrier to constructing new housing for your workers?

<u>(N)</u>	<u>%</u>	<u>REASON</u>
(88)	39	Government regulations,
(79)	35	Lack of money
(36)	16	No profit/will lose money
(10)	4	Zoning
(4)	2	No land
(2)	1	Legal liability
(56)	25	No answer
(Base = 227)		

11. How many acres of your sweet cherries bore fruit in 1988?

7,209 TOTAL ACRES IN BEARING TREES

12. How many non-bearing acres of sweet cherries, if any, did you have in 1988?

1,287 TOTAL ACRES OF NON-BEARING TREES

13. And, about how many acres of sweet cherries, if any, do you intend to plant in the 1989?

490 TOTAL ACRES INTENDING TO PLANT IN 1989

14. How many acres of sweet cherries, if any, do you intend to remove in 1989?

134 TOTAL OF ACRES YOU INTEND TO REMOVE

15. Finally, what are your major concerns for the 1989 harvest?

<u>%</u>	<u>CONCERNS</u>
68	Supply of hand labor
42	Government regulations, paperwork
22	Weather
16	Price
15	Production costs
8	Migrant housing
<hr/>	
171	
(227)	

SURVEY OF 1988 CUCUMBER GROWERS

1. Did you harvest any cucumbers in 1988? (Circle one number)

(N) %

(28) 100 YES

(0) 0 NO (Please skip now to Question 16, Page4)

2. About how many acres of cucumbers did you raise in 1988?

MIN = 12

MAX = 150

MEAN = 52.86

SUM = 1,480

(N = 28)

3. Approximately how many of pounds of cucumbers did you harvest in 1988?

MIN = 191,685

MAX = 3,800,000

MEAN = 959,463

SUM = 38,683,928

(N = 28)

4. And, approximately how many pounds of cucumbers would you estimate were left in the field unharvested?

MIN = 0

MAX = 500,000

MEAN = 97,410

SUM = 2,640,889

(N = 27)

5. Did you have to quit delivering cucumbers when they were ready for the processor anytime in 1988? (Circle one number)

(N) %

(17) 62 NO, DID NOT

(9) 33 YES, HAD TO QUIT DELIVERING

(1) 5 NO ANSWER

- 5a. Why did you quit delivering cucumbers?

(N) %

REASON

(7) 71

Labor shortage

(2) 19

Company stopped receiving

(1) 10

Exceeded contract

6. At any point in the season, could you have used more pickers than you had or did you always have enough pickers to harvest the crop? (Circle one number)

(N) %

(15) 52 ALWAYS HAD ENOUGH PICKERS
(13) 48 COULD HAVE USED MORE PICKERS

- 6a. Would more pickers have increased your grade or dollar value for the crop or wouldn't additional pickers have made any difference? (Circle one number)

(N) %

(13) 48 MORE PICKERS WOULD HAVE INCREASED GRADE/VALUE
(0) 0 MORE PICKERS WOULD NOT HAVE MADE ANY DIFFERENCE
(15) 52 NO ANSWER

7. Considering all your pickers, about what percent would you estimate worked for each of the time periods listed below during your harvest season? (Fill in the percent for each category. If "none", please write "0")

% (N)

- a. Percent who worked three days or less . . . 11.6 (28)
b. Percent who worked four days to one week . 11.7 (28)
c. Percent who worked from one to two weeks . 15.1 (28)
d. Percent who worked over two weeks 61.6 (28)

8. Did you use a labor contractor to supply part or all of your labor force in 1988, or did you hire all your workers without using a labor contractor? (Circle one number)

(N) %

(9) 33 DID NOT USE A FARM LABOR CONTRACTOR
(19) 67 USED A FARM LABOR CONTRACTOR

- 8a. About what percent of your work force was contract labor in 1988?

(N) %

(19) 96 PERCENT CONTRACT LABOR

9. Do you plan to use a contractor to supply part or all of your labor force in 1988? (Circle one number)

(N) %

- (4) 14 PLAN TO USE CONTRACTOR FOR PART OF LABOR FORCE
 (13) 46 PLAN TO USE CONTRACTOR FOR ALL OF LABOR FORCE
 (9) 32 DO NOT PLAN TO USE CONTRACTOR AT ALL
 (2) 8 NOT SURE

10. The table below asks for information about the number of workers you employed for your cucumber operation over the course of the year, 1988. Include workers you hired yourself and any brought in by a labor contractor. First, for each month, please give the total number of days you had people working.

Then estimate the average number of workers you employed PER DAY. Finally, break this total down into your best estimate of average number of workers per day in each of the following categories:

- a) Local workers aged 12-16;
- b) Local workers 17 and over;
- c) Legal migrant workers, both alien and domestic;
- and d) Undocumented aliens.

<u>1988</u>	<u>TOTAL DAYS WORKED</u> (mean)	<u>AVERAGE NUMBER PER DAY</u> (mean)	<u>LOCAL 12-16</u> (mean)	<u>LOCAL 17 AND OVER</u> (mean)	<u>LEGAL MIGRANT</u> (mean)	<u>UNDOC. ALIENS</u> (mean)
JAN.	0.33	0.03	0	0.03	0	0
FEB.	0.55	0.55	0	0.03	0.15	0.38
MAR.	0.83	0.33	0	0.03	0.15	0.15
APR.	1.33	0.18	0	0.03	0.15	0
MAY.	2.30	3.09	0	0.20	0.65	2.24
JUN.	7.32	35.81	0.20	0.18	13.10	22.11
JUL.	13.17	98.21	1.86	1.31	30.78	64.25
AUG.	20.28	142.49	1.81	2.06	43.86	94.81
SEPT.	9.55	72.08	0.05	0.68	27.44	43.91
OCT.	2.25	8.42	0	0.08	4.85	3.50
NOV.	0.33	0.05	0	0.05	0	0
DEC.	0.25	0.03	0	0.03	0	0
TOTAL	58.50	361.26	3.92	4.68	121.14	231.34

(N = 27)

11. How certain are you of the estimates you have given concerning the number of workers your employed during harvest and through out the year -- very certain, somewhat certain, not too certain, or not at all certain?

(N) %

(12) 43 VERY CERTAIN
 (15) 54 SOMEWHAT CERTAIN
 (1) 3 NOT TOO CERTAIN
 (0) 0 NOT AT ALL CERTAIN
 (0) 0 UNABLE TO RATE

12. What was your main source of information for the estimates you made for days worked, number of workers, and type of worker in Question 10 -- was it farm records, consultation or discussion with others (contractors, foreman, family members), or your own memory? (Circle one number)

(N) %

(12) 41 FARM RECORDS
 (2) 6 DISCUSSION WITH OTHERS
 (8) 30 MY OWN MEMORY
 (6) 23 COMBINATION

13. Please indicate whether or not you provided each type of housing listed below for your workers in 1988. For any housing you did provide give the number workers housed.

	NOT PROVIDED %	YES PROVIDED %	NUMBER OF WORKERS HOUSED (N)
a. On-farm family housing	95	5	47 (28)
b. Off-farm family housing	95	5	1 (28)
c. On-farm single person housing .	18	82	152 (28)
d. Off-farm single person housing.	97	3	152 (28)

14. Do you have definite plans to construct housing for your workers any time in the next year or two?

(N) %

(27) 95 NO PLANS TO CONSTRUCT HOUSING
 (1) 5 YES, PLAN TO CONSTRUCT HOUSING

15. What do you consider to be the major barrier to constructing new housing for your workers?

<u>(N)</u>	<u>%</u>	<u>REASONS</u>
(6)	21	Lack of money
(5)	18	Government regulations
(1)	4	Zoning
(1)	4	Legal liability
(17)	61	No answer
(Base = 28)		

16. How many acres of cucumbers, if any, are you planting in the spring of 1989?

1,654 TOTAL ACRES TO PLANT, SPRING 1989

17. And, about how many acres of cucumbers, if any, do you intend to harvest in the 1989 season?

1,663 TOTAL ACRES INTENDED FOR 1989 HARVEST?

18. Finally, what are your major concerns for the 1989 harvest?

<u>%</u>	<u>CONCERN</u>
87	Picker availability
25	Government regulations
12	Organizing of farm labor
<hr/>	
124	
(N=28)	

SURVEY OF 1988 HOP GROWERS

1. Did you grow hops in 1988? (Circle one number)

(N) %

(25) 100 YES

(0) 0 NO (Please skip now to Question 14, Page 4)

2. About how many acres of baby hops, if any, did you plant in 1988?

164 TOTAL ACRES PLANTED

3. How many acres of hops did you string in 1988?

MIN = 25

MAX = 720

MEAN = 218.14

SUM = 5,291

(N = 25)

4. Approximately how many of pounds of hops did you harvest in 1988?

MIN = 43,600

MAX = 1,300,650

MEAN = 332,048

SUM = 8,053,396

(N = 24)

5. Did you use a labor contractor to supply part or all of your labor force in 1988 or did you hire all your workers without using a labor contractor? (Circle one number)

(N) %

(18) 70 DID NOT USE A FARM LABOR CONTRACT

(7) 30 USED A FARM LABOR CONTRACTOR

- 5a. About what percent of your work force was contract labor in 1988?

(N) %

6 95 PERCENT CONTRACT LABOR

6. Do you plan to use a contractor to supply part or all of your labor force in 1989? (Circle one number)

(N) %

(7) 27 PLAN TO USE CONTRACTOR FOR PART OF LABOR FORCE

(1) 3 PLAN TO USE CONTRACTOR FOR ALL OF LABOR FORCE

(16) 63 DO NOT PLAN TO USE CONTRACTOR AT ALL

(2) 7 NOT SURE

7. The table below asks for information about the number of workers you employed for your hop operation over the course of the year, 1988. Include workers you hired yourself and any brought in by a labor contractor. First, for each month, please give the total number of days you had people working.

Then estimate the average number of workers you employed PER DAY. Finally, break this total down into your best estimate of average number of workers per day in each of the following categories:

- a) Local workers aged 12-16;
- b) Local workers 17 and over;
- c) Legal migrant workers, both alien and domestic;
- and d) Undocumented aliens, including those hired under the temporary special rule (SAW'S) or hired without a green card.

<u>1988</u>	<u>TOTAL DAYS WORKED</u> (mean)	<u>AVERAGE NUMBER PER DAY</u> (mean)	<u>LOCAL 12-16</u> (mean)	<u>LOCAL 17 AND OVER</u> (mean)	<u>LEGAL MIGRANT</u> (mean)	<u>UNDOC. ALIENS</u> (mean)
JAN.	12.69	5.00	0.12	2.69	1.43	0.95
FEB.	12.45	8.52	0.12	3.76	2.42	2.40
MAR.	16.01	18.53	0.25	4.55	4.24	9.80
APR.	16.61	53.88	0.12	7.03	9.76	37.11
MAY.	17.33	54.94	0.19	6.80	13.15	35.42
JUN.	18.04	34.49	1.16	6.72	5.09	21.96
JUL.	18.39	23.76	1.32	6.78	4.42	11.31
AUG.	17.03	36.72	2.03	9.02	6.45	20.22
SEPT.	17.33	50.74	1.70	11.00	8.21	30.19
OCT.	13.85	11.39	0	3.89	2.67	4.84
NOV.	12.52	6.31	0	2.87	1.51	2.54
DEC.	10.93	5.23	0	2.81	1.36	1.24
TOTAL	183.18	309.51	7.01	67.92	60.71	177.99

(N = 25)

8. How certain are you of the estimates you have given concerning the number of workers your employed during harvest and through out the year -- very certain, somewhat certain, not too certain, or not at all certain?

(N) %

(19) 76 VERY CERTAIN
(6) 24 SOMEWHAT CERTAIN
(0) 0 NOT TOO CERTAIN
(0) 0 NOT AT ALL CERTAIN
(0) 0 UNABLE TO RATE

9. What was your main source of information for the estimates you made for days worked, number of workers, and type of worker in Question 7 -- was it farm records, consultation or discussion with others (contractors, foreman, family members), or your own memory? (Circle one number)

(N) %

(17) 67 FARM RECORDS
(1) 3 DISCUSSION WITH OTHERS
(4) 16 MY OWN MEMORY
(2) 7 COMBINATION
(1) 3 NO ANSWER

10. How would you rate the availability of workers for your hop operation in 1988 --more than was needed, about right or less than needed?

(N) %

(7) 27 MORE THAN NEEDED
(14) 55 ABOUT RIGHT
(4) 18 LESS THAN NEEDED

10a. About how many more hop workers could you have employed in 1988?

90 TOTAL WORKERS COULD HAVE EMPLOYED

11. Please indicate whether or not you provided each type of housing listed below for your workers in 1988. For any housing you did provide give the number workers housed.

	NOT PROVIDED %	YES PROVIDED %	NUMBER OF WORKERS HOUSED (N)
a. On-farm family housing	70	30	96 (25)
b. Off-farm family housing	90	10	97 (25)
c. On-farm single person housing .	87	13	172 (25)
d. Off-farm single person housing.	100	0	0 (25)

12. Do you have definite plans to construct housing for your workers any time in the next year or two?

(N) %

(21) 84 NO PLANS TO CONSTRUCT HOUSING
(1) 5 YES, PLAN TO CONSTRUCT HOUSING
(3) 12 NO ANSWER

13. What do you consider to be the major barrier to constructing new housing for your workers?

(N) %

REASONS

(8) 32 Government regulations
(7) 28 Lack of money
(4) 16 No need
(2) 8 No profit in housing
(1) 4 Zoning
(1) 4 Legal liability
(6) 24 No answer
(Base = 25)

14. How many acres of hops, if any, do you intend to plant in 1989?

123 TOTAL ACRES TO PLANT 1989

15. And, about how many acres of hops, if any, do you intend to string in the 1989 season?

5,420 TOTAL ACRES INTEND TO GROW

16. Finally, what are your major concerns for the 1989 harvest?

%

CONCERN

80 Availability of farm labor
15 Government regulations, paperwork
15 Weather
15 Production costs
5 Housing for hired labor

130
(25)

SURVEY OF 1988 GRAPE GROWERS

1. Did you harvest grapes in 1988? (Circle one number)

(N) %

(156) 91 YES

(16) 9 NO (Please skip now to Question 6, Page 2)

2. About how many acres of fruit-bearing grapevines did you have in 1988?

MIN = 1

MAX = 500

MEAN = 22.47

SUM = 3,500

(N = 156)

3. Approximately how many of tons of grapes did you harvest in 1988?

MIN = 0.33

MAX = 1,600

MEAN = 53.94

SUM = 8,402

(N = 156)

4. Did you use a labor contractor to supply part or all of your labor force in 1988 or did you hire all your workers without using a labor contractor? (Circle one number)

(N) %

(103) 60 DID NOT USE A FARM LABOR CONTRACT

(53) 31 USED A FARM LABOR CONTRACTOR

(16) 9 NO ANSWER

- 4a. About what percent of your work force was contract labor in 1988?

(N) %

(53) 57 PERCENT CONTRACT LABOR

5. Do you plan to use a contractor to supply part or all of your labor force in 1989? (Circle one number)

(N) %

(49) 29 PLAN TO USE CONTRACTOR FOR PART OF LABOR FORCE

(14) 8 PLAN TO USE CONTRACTOR FOR ALL OF LABOR FORCE

(71) 41 DO NOT PLAN TO USE CONTRACTOR AT ALL

(22) 13 NOT SURE

(16) 9 NO ANSWER

6. Please estimate the number of workers you employed for your grape operation over the course of the year, 1988. Include workers you hired yourself and any brought in by a labor contractor. First, for each month, please give the total number of days you had people working.

Then estimate the average number of workers you employed PER DAY. Finally, break this total down into your best estimate of average number of workers per day in each of the following categories:

- a) Local workers aged 12-16;
- b) Local workers 17 and over;
- c) Migrant workers who are U. S. citizens or permanent aliens;
- and d) Aliens with temporary work documents or aliens without work documentation.

<u>1988</u>	<u>TOTAL DAYS WORKED</u> (mean)	<u>AVERAGE NUMBER PER DAY</u> (mean)	<u>LOCAL 12-16</u> (mean)	<u>LOCAL 17 AND OVER</u> (mean)	<u>U. S. MIGRANTS</u> (mean)	<u>ALIEN MIGRANTS</u> (mean)
JAN.	5.41	1.76	0.03	0.93	0.48	0.33
FEB.	7.59	2.37	0.14	1.10	0.57	0.62
MAR.	6.86	2.53	0.11	1.15	0.62	0.77
APR.	5.40	2.01	0.16	0.98	0.53	0.39
MAY.	5.89	2.35	0.15	1.03	0.50	0.68
JUN.	7.32	2.37	0.18	1.11	0.62	0.52
JUL.	6.79	2.43	0.13	1.00	0.62	0.69
AUG.	6.10	1.91	0.11	0.95	0.43	0.42
SEPT.	4.96	3.67	0.14	1.42	0.68	1.42
OCT.	6.96	9.71	0.29	2.84	2.57	4.00
NOV.	2.89	2.52	0.04	1.04	1.00	0.65
DEC.	2.54	0.97	0	0.55	0.36	0.07
TOTAL	68.68	34.60	1.49	14.09	8.97	10.56

(N = 168)

7. How certain are you of the estimates you have given concerning the number of workers your employed during harvest and through out the year -- very certain, somewhat certain, not too certain, or not at all certain?

(N) %

(108)	63	VERY CERTAIN
(60)	35	SOMEWHAT CERTAIN
(4)	2	NOT TOO CERTAIN
(0)	0	NOT AT ALL CERTAIN
(0)	0	UNABLE TO RATE

8. What was your main source of information for the estimates you made for days worked, number of workers, and type of worker in Question 6 -- was it farm records, consultation or discussion with others (contractors, foreman, family members), or your own memory? (Circle one number)

(N) %

(102)	60	FARM RECORDS
(3)	1	DISCUSSION WITH OTHERS
(54)	32	MY OWN MEMORY
(13)	7	COMBINATION

9. Do you think you had more farm workers, as many farm workers, or fewer farm workers than in previous years? (Circle one number)

(N) %

(69)	40	MORE FARM WORKERS
(79)	46	SAME NUMBER OF FARM WORKERS
(18)	11	FEWER FARM WORKERS
(6)	3	NO ANSWER

10. Did you provide housing for any of your farm workers anytime during 1988? (Circle one number)

(N) %

(160)	93	NO, DID NOT PROVIDE HOUSING
(10)	6	YES, PROVIDED HOUSING
(2)	1	NO ANSWER

- 10a. About how many workers did you house at any one time?

(N) %

(10)	95	TOTAL NUMBER OF WORKERS
------	----	-------------------------

11. Do you have definite plans to construct housing for your workers any time in the next year or two?

(N) %

(169)	99	NO PLANS TO CONSTRUCT HOUSING
(2)	1	YES, PLAN TO CONSTRUCT HOUSING
(1)	1	NO ANSWER

12. Do you plan to machine harvest any of your grapes in the next 5 years? (Circle one number)

(N) %

(9)	5	YES, PLAN TO MACHINE HARVEST
(162)	94	NO PLANS TO MACHINE HARVEST
(1)	1	NO ANSWER

13. About how many acres of fruit-bearing vines do you expect to have in 1989?

3,857 TOTAL OF ACRES FRUIT BEARING VINES
(N = 170)

14. And, about how many tons, if any, do you intend to harvest in the 1989 season?

11,393 TOTAL TONS INTEND TO HARVEST
(N = 164)

15. Finally, what are your major concerns for the 1989 harvest?

%

CONCERNS

56	Weather
50	Availability of pickers
19	Market price
15	Production costs
6	Migrant housing

146
(172)

APPENDIX C. Summary of completion rates

Names and addresses of all known growers in the state were provided by the commodity commissions for the crops studied. Names of cucumber growers were supplied by Nalley's and Steinfeld's processors. Questionnaires were mailed to all names on the lists with the exception of caneberry growers. Names of that group were stratified by number of acres harvested. All names of growers with large and medium-size acres and a random half of the growers with small acres were selected for contact. Eligible growers were defined as those who had harvested at least one acre of fruit for sale to processors in 1988. Three waves of mail questionnaires, and, in the case of strawberry growers, one face-to-face contact by industry field representatives were made.

Results of the mailings and contact were:

Result	Straw- berry	Cane- berry	Sweet cherries	Cucum- bers	Hops	Wine grapes
Completed.....	208	196	226	28	25	185
Undeliverable..	15	8	5	-	-	1
Out of business	11	6	8	-	-	6
Duplicate.....	8	-	1	-	5	6
No fruit in '88	65	36	14	-	3	23
Less than 1 acre harvested.....	21	62	26	-	-	-
Refused.....	-	5	-	-	-	3
Not returned ..	<u>79</u>	<u>100</u>	<u>116</u>	<u>10</u>	<u>6</u>	<u>70</u>
Total.....	407	413	396	38	39	294
Adjusted completion rate (%).....	72	65	66	74	81	72

Adjusted completion rates were calculated after non-growers and other ineligibles were subtracted from the sample base.

Expansion of sample values to represent the total acres harvested was achieved by multiplying numerical values (such as pounds or tons of fruit harvested, number of workers hired, or number of housing units supplied) by an expansion factor. That factor is the reciprocal of the percent of total acres reported by the sample. The total acres

harvested for each crop was supplied by the Oregon Agricultural Statistical Service. Expansion values were simple to calculate for each crop.

They were:

<u>Crop</u>	<u>Expansion factor</u>
Strawberries	1.69
Caneberries	1.71
Sweet cherries	1.31
Cucumbers	1.51
Hops	1.39
Wine grapes	0.98

A value of 1.0 represents complete acreage coverage by the sample values. A value between 1.0 and 2.0 represents an acreage coverage between 100 and 50 percent. For example, a total of 4,607 acres were represented by strawberry growers who completed the labor table. That acreage was 59% of the 7,800 total 1988 strawberry acreage. The expansion factor was calculated by taking the reciprocal of 59%, or $7800/4607$.

Note that we apparently achieved complete coverage of the wine grape acreage with our survey, although we did not hear from 28% of the growers who were sampled. Errors in acreage values probably occurred when some growers reported total acres in grapes rather than total fruit-bearing acres. The Oregon Agricultural Statistical Service estimated there were 4,877 acres of grapes in 1988, but only 3,413 were bearing fruit. Use of the 0.98 expansion factor allows us to adjust partially for errors of that type.

APPENDIX D. Measurement of size of the work force

A measure of the work force is straightforward but estimates of "double counting" within a commodity require additional explanation as does weighting of the data for all commodity groups.

Size of the work force

Size of the work force for each commodity is measured by first summing the average number of workers employed each month to estimate a grower's 1988 work force. Yearly values were summed for all growers. The number of each worker types (alien migrants U. S. migrants, locals 17+, and locals 12 to 16) is calculated in the same manner. Growers were asked to distributed their average monthly totals into worker groupings (See Appendix B).

The values for all workers by type and commodity are shown in Figures 1 and 2. The tables on which the figures are based are reported on page 5. The monthly totals for workers separated by type (aliens, migrants, locals) were employed for the construction of both figures. These totals, slightly higher than the average number of workers reported for the month, are employed because we consider them more accurate measures of size of the work force. A few growers, who hired large numbers of alien pickers for only one or two days, did not include them in their estimated monthly average, but reported them when asked to estimate monthly values by type of worker. Averages for reported days worked were adjusted to reflect the hiring of additional workers for only a few days.

Adjustment of work force estimates for "double counting"

Size of the work force may be inflated from "double counting" as workers who pick the same fruit for different growers are counted more than once. We employed a modified Delphi technique to adjust the harvest work force of four commodities -- strawberries, caneberries, sweet cherries, and cucumbers. We asked a total of 20 individuals who were familiar with the work habits of farm laborers to estimate the number of harvest cycles laborers worked in one commodity before leaving for employment in another commodity or in another industry. They were asked to tell us how many three-day work cycles were completed for workers who were hired for only three days. They also were asked the number of cycles for those working four days to one week, those working one to two weeks, and those who worked more than two weeks.

Each grower reported the percent of his or her harvest force that worked three days or less, four to seven days, one to two weeks, and over two weeks. Using the information that growers provided and information from the Delphi panel, we adjusted the total number of workers employed to account for "double counting".

An example for the strawberry harvest illustrates the logic of the adjustment. There was agreement among panel members that half who picked three days or less quit strawberry harvest work altogether. The other half worked an average of four additional 3-day work cycles for other growers before leaving that commodity. Those who worked a week cycled one more week before switching to another industry. Those who quit after working two weeks usually quit picking strawberries altogether, as did those who worked three weeks.

The equation below illustrates the adjustment model for strawberries:

$$ATP = \frac{(JUNDAYS) \times (JUNAVG) + (JULDAYS) \times (JULAVG)}{((.5 \times Q5A \times 2.0) + (.5 \times Q5A \times 3 \times 5) + (Q5B \times 5.5 \times 2) + (Q5C \times 10.5) + ((Q5D) \times (JUNDAYS + JULDAYS + 15) / 2) / 100)}$$

where ATP is the adjusted total pickers for each grower,

Q5A is the percent of a grower's labor force that picked fruit three days or less,

Q5B is the percent that picked fruit four to seven days,

Q5C is the percent that picked fruit one to two weeks, and

Q5D is the percent that picked fruit more than two weeks,

2.0, 5.5, 10.5, and $(\text{June Days} + \text{July Days}) + 15) / 2$ are the midpoint values of days worked for three days or less, four days to one week, one to two weeks, and more than two weeks, respectively, and

5 and 2 are the number of cycles for those who worked three days or less and four to seven days, respectively.

ATP values for each grower were summed to give the net number of workers hired to harvest the 1988 strawberry crop. A similar procedure was employed to estimate the net workers for caneberries, sweet cherries, and cucumbers. The panel

estimated different cycles for each commodity, and the number of workers is reported in the text.

Weighting the data

Responses in any survey can vary by the quality of one's memory, recall ability, and other sources of error. Our data set is likely to range from fairly accurate values that are based on record-keeping to guesses that are subject to a host of biases and recall inaccuracies. For instance, the estimate of the average number of workers hired for a particular month can be an imperfect perception that is subject to error.

The data were adjusted for the certainty in which growers believed they were reporting accurate information. The frequency of responses is reported in the question immediately following the commodity labor tables in Appendix B. Our weights, based on certainty scores, were scaled so the sample size remained unchanged and applied to the data.

Weighted and unweighted estimates were compared to production values of the commodities studied. The comparison was between the values reported for the 1988 production year by the Oregon Agricultural Statistical Service and our sample production estimate. For example, the OASS estimated that strawberry growers produced 101,400,000 pounds of fruit in 1988. Our unweighted survey estimate is 99,984,175 pounds, about a 1.5% underestimate. The weighted estimate is 101,604,279 pounds, less than a 1% overestimate. Given the better agreement with the weighted estimate, weighted data were used throughout the analysis.