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THE MICHIGAN AND U.S. PURPLE PLUM INDUSTRY --
TRENDS AND CHANGING MARKETING PATTERNS

by

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THE MICHIGAN AND U.S. PURPLE PLUM INDUSTRY --

TRENDS AND CHANGING MARKETING PATTERNS*

by

Donald Ricks**

Plums are an important fruit crop in Michigan. Many growers raise plums in combination with the more widely planted orchard crops of apples and tart cherries. Plums are handled by a number of Michigan processors and fresh fruit packing houses.

Michigan experienced a growth period for plums between the mid-1950s and the early 1970s as production and value of the crop tripled during this span of years. After this growth period, the Michigan crop experienced a more stable trend with a downward swing during the most recent years.

Michigan plums are sold both for fresh market and for processing markets. Canned purple plums are the primary processing use, while baby food is also an important processed product. In the past, freezing has been a minor use of plums in Michigan; although there may be some potential for expanding certain market uses for frozen plums.

In both the canning and fresh markets, plums produced in the Pacific-Northwest states provide close competition for Michigan plums. Canned purple plums from the Northwestern states are packed primarily in Oregon. In the

*This report is, in part, a revision and update of a similar earlier report entitled The Michigan and U.S. Purple Plum Industry, by D. Ricks, R. Anderson, and D. Amon, Michigan State University, Agricultural Economics Report No. 293, Dec. 1975.

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fresh market, the most direct competition for Michigan plums has historically been provided by the Northwestern states of Washington, Idaho, and Oregon, because these states produce the same type of plum and market their plums during a similar season.

California produces a large and growing volume of fresh plums. These are substantially different varieties than those from Michigan and are marketed most heavily during an earlier summer season. Expanding supplies of California plums are, on the other hand, providing increasing competition in fresh markets.

Although the word "prunes" is frequently used in reference to Michigan plums, this term is misleading. Most consumers and the general public associate the word "prunes" with the dried product. Michigan plums are not dried into prunes. Dried prunes comprise a product market that is very different from that for Michigan plums. Dried prunes are produced primarily in California, with a smaller percentage of the dried product also coming from Oregon. In order to minimize confusion with dried prunes in this report the words "plums" or "purple plums" will be used for the Michigan crop and its related products.

Economic and marketing conditions of the Michigan plum industry are related closely to production, pricing and marketing of the plum industry in the Pacific-Northwestern states, and for fresh markets related to the California plum industry. Hence, in analyzing the economic and marketing situation of the Michigan plum industry, it is important to consider the Northwestern states along with the fresh plum situation in California.

Economic conditions affecting the plum industry are changing, both in Michigan and in the Pacific-Coast states. Some markets are growing while others are experiencing declining trends. With changing economic conditions

and markets, changes in the competitive position of the various plum-producing regions can be expected.

This report is intended to bring together information on a number of economic and market factors relative to Michigan and Western U.S. plum industries. Another objective is to analyze Michigan's competitive position particularly relative to the Pacific-Northwestern states.

The Michigan Plum Industry

While Michigan has historically sold a high percentage of plums to processing markets, in recent years processing demand has declined and the fresh market share has increased. Fresh market sales now comprise approximately 50% of the state's plum crop. With the decline in the historically predominant processing markets, many growers have become less optimistic about plums and have reduced their acreage and given less emphasis to plums. Others who sell primarily into fresh markets continue with plums as an important component of their farm business.

Plums are grown by many Michigan fruit growers in each of the main commercial fruit-producing regions of the state. For most fruit growers plums are a less important crop than certain others such as apples, tart cherries, asparagus, or in some cases, peaches or sweet cherries. Thus plums are a significant, but secondary, crop for most Michigan fruit growers who raise them.

Michigan has a total of about 900 growers who produce plums according to the latest available tree census.^{1/} These growers had approximately 8,000 acres of plum trees as of the latest tree survey. Plum acreage per farm

^{1/}Michigan Fruit Tree Survey, 1978, Michigan Crop reporting Service, Lansing, MI, Nov. 1979. (The Michigan Crop Reporting Service is in the process of a 1982 tree survey for which the data are not yet available.)

tends to be relatively small compared to the more major fruit crops such as apples and tart cherries. There are, however, some growers with large plum acreages.

Major Michigan Production Areas

Plum orchards are concentrated in four major production areas in Michigan (Figure 1). Marketing patterns, typical crop combinations, and other characteristics differ somewhat from area to area.

The Southwest Michigan area has about 34% of the state's total plum trees (Table 1) according to the most recent available tree census. Plums produced in Southwest Michigan are sold heavily for fresh market. Fresh sales for plums from this area are encouraged because climatic conditions there usually result in a larger size plum than is produced in the more northern areas of the state. Also plums are harvested earlier in the Southwest than in other parts of the state which is sometimes an advantage with a stronger

Table 1. Michigan Plum Tree Numbers by Area, 1978

State Areas ^{a/}	Non Bearing Trees (6 yrs. & younger)	Bearing Trees (7 yrs. & older)	Total Trees	Area's Share ^b of State's Total
				-- Percent --
Northwest (Area 1)	65,300	111,200	176,500	34.6
West Central (Area 2) ^c	11,900	92,800	104,700	20.5
Central (Area 3)	20,000	37,600	57,600	11.3
Southwest (Area 4)	22,100	148,800	170,900	33.5
Michigan Total	120,100	397,400	517,500	100.0

^aSee Figure 1 for the four Michigan area locations.

^bArea's percent of Michigan's trees of all ages.

^cNewaygo County is included in the West Central area.

Source: Michigan Fruit Tree Survey, 1978, Michigan Agricultural Reporting Service, Nov. 1979.

Figure 1. Location of Plum Production in Michigan

NORTHWEST

(Area 1)
240 Growers
177,000 Trees = 35%

WEST
CENTRAL

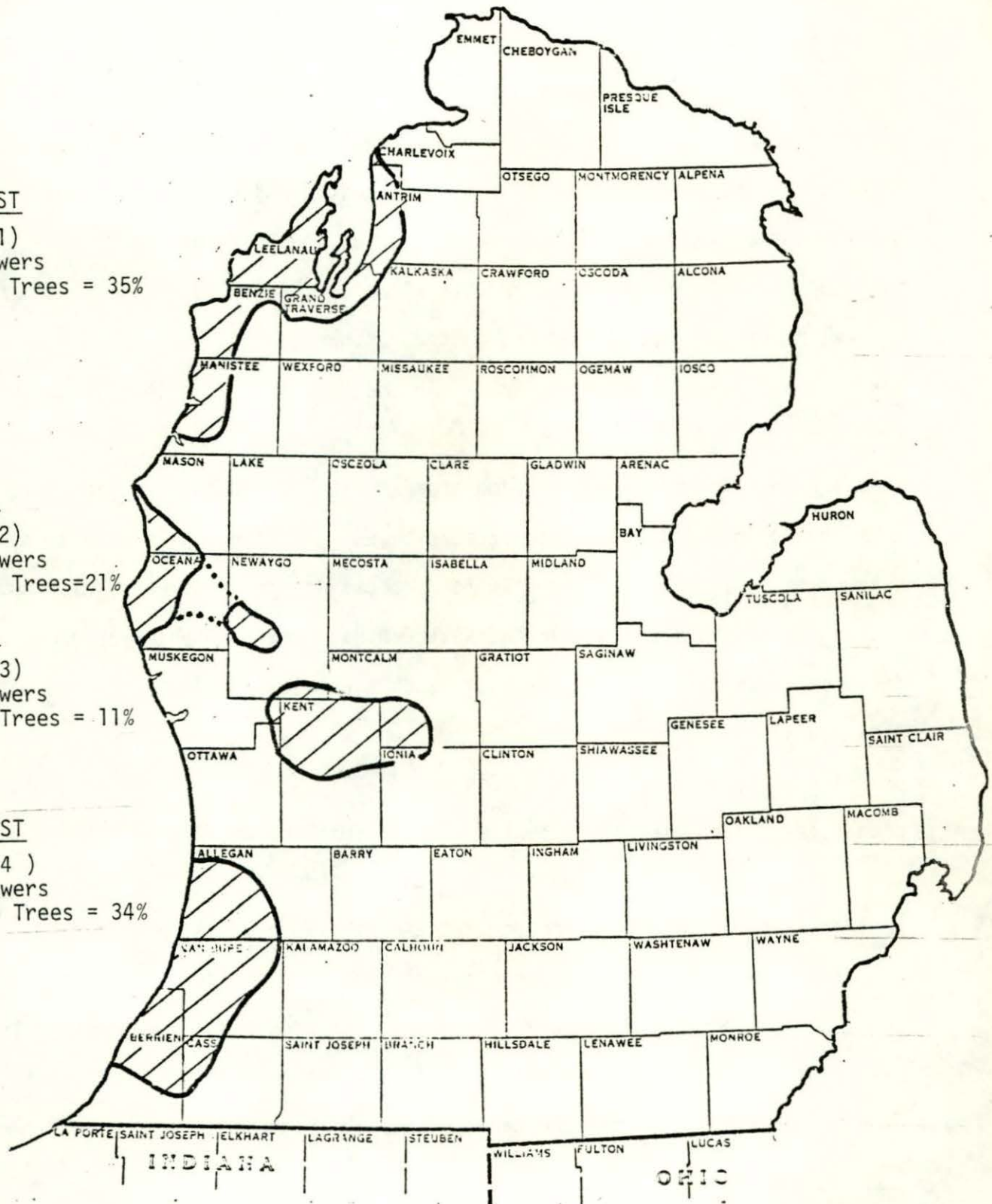
(Area 2)
120 Growers
105,000 Trees = 21%

CENTRAL

(Area 3)
110 Growers
58,000 Trees = 11%

SOUTHWEST

(Area 4)
340 Growers
171,000 Trees = 34%



early season market. Plums are usually grown in combination with a wide diversity of other fruit and vegetable crops in Southwest Michigan. Plum acreages per farm tend to be small in this area. However, there are some large plum growers in the area as well.

The Northwest area is the state's largest region in terms of tree numbers with 35% of the state's total plum trees. Most plums grown in this area have historically been sold for processing, although in some years substantial amounts are also marketed fresh. Plums are typically grown in combination with tart and sweet cherries in the Northwest area.^{1/} Plum acreage per farm is typically somewhat larger in the Northwest area than in Southwest Michigan (Table 2).

The West Central fruit growing area is a third important region for plum production with 21% of the state's trees. Plums grown in this area have historically been sold mostly for processing, while some are also sold into fresh channels. Plums in the West Central area are typically grown in combination with other tree fruits such as apples and cherries, and with asparagus.

The area designated as the "Central Area" has about 11% of the state's plum trees. A significant amount of fresh plums are usually marketed from this area. This is due in part to the existence of a number of large fresh apple packing and marketing firms in the region. In years in which weather conditions result in a high percentage of smaller size fruit, substantial quantities of plums from this area are sold for processing. Apples are the predominant crop of fruit growers in this area with other tree fruits such as plums usually grown as secondary crops.

^{1/} This crop combination is grown in other areas as well, but is especially common in the northwest part of the state.

Table 2. Number and Size of Plum Growers in Michigan by Area, 1973 and 1978

Areas	Farms with Plums		Average Plum Acreage per Farm	
	1973	1978	1973	1978
			----- acres -----	
Southwest	670	340	4.8	5.3
Central	160	100	6.7	6.4
West Central	190	120	8.0	8.8
Northwest	280	240	7.7	7.5
Michigan	1,400	910	5.9	5.9

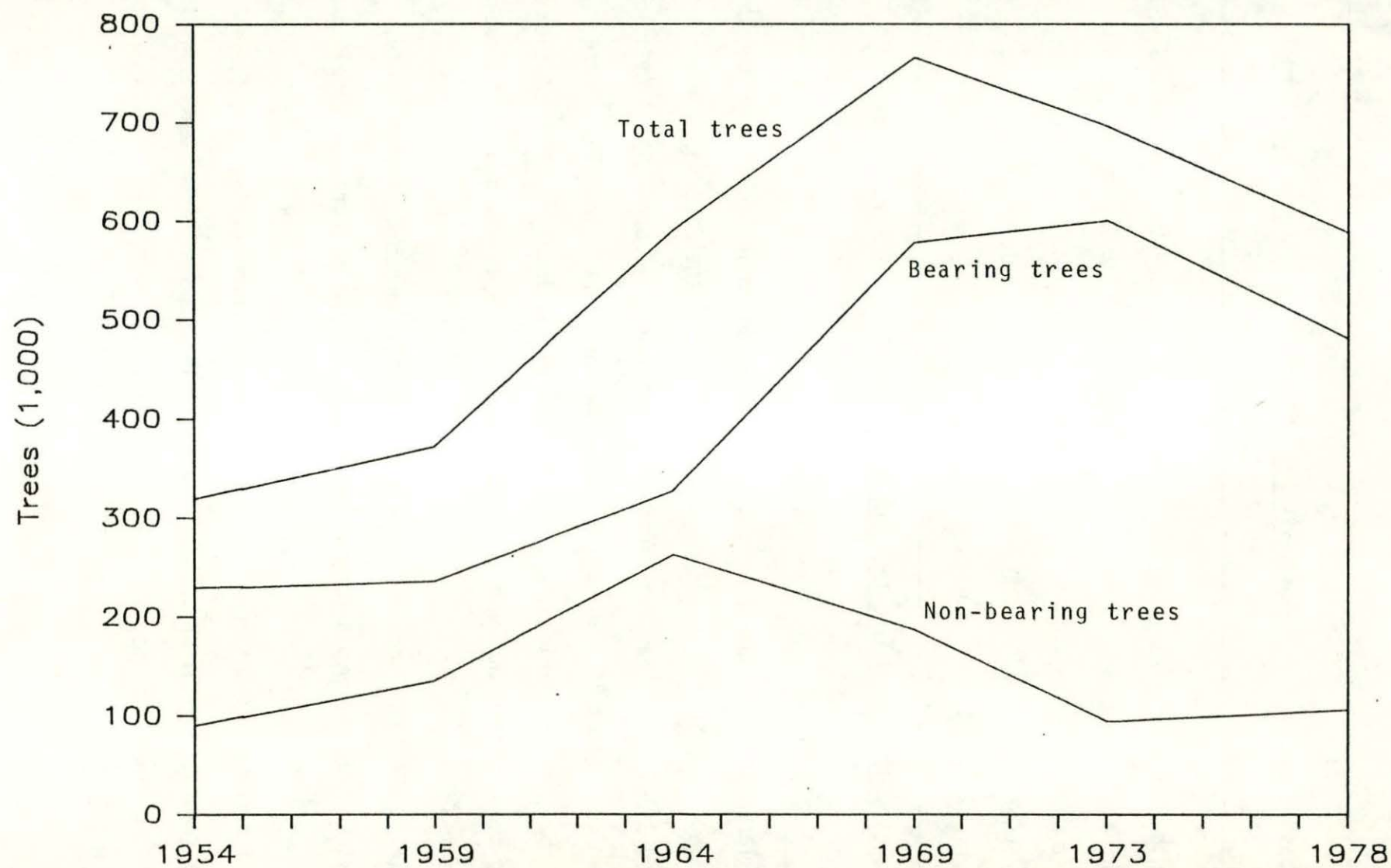
Source: Michigan Fruit Tree Survey, 1978, Michigan Agricultural Reporting Service, Nov. 1979.

Trends in Michigan Tree Numbers and Production

A large number of new plum orchards were planted in Michigan in the early 1960s. Nonbearing trees more than doubled in the five years between 1959 and 1964, while the total number of plum trees increased by 173% during this period (Figure 2). Nonbearing trees reached a peak in 1964. These high numbers of nonbearing trees led to substantial increases in the state's bearing tree numbers during the late 1960s and early 1970s, reaching a peak for bearing trees in 1973.

During the 1970s nonbearing plum tree numbers dropped substantially as growers reduced new plantings. Bearing tree numbers decreased considerably between 1973 and the latest tree census in 1978. This drop in bearing trees occurred both because of fewer young trees coming into bearing and because growers removed many older orchards due to discouragement from weakening markets for canning plums.

Figure 2. Trends in Michigan Plum Trees



Since the last tree survey in 1978, Michigan growers have continued to remove many plum orchards with relatively few new plantings. Although data are not currently available on the extent of these changes, the 1982 tree survey will show the magnitude of changes in plum plantings when it becomes available.

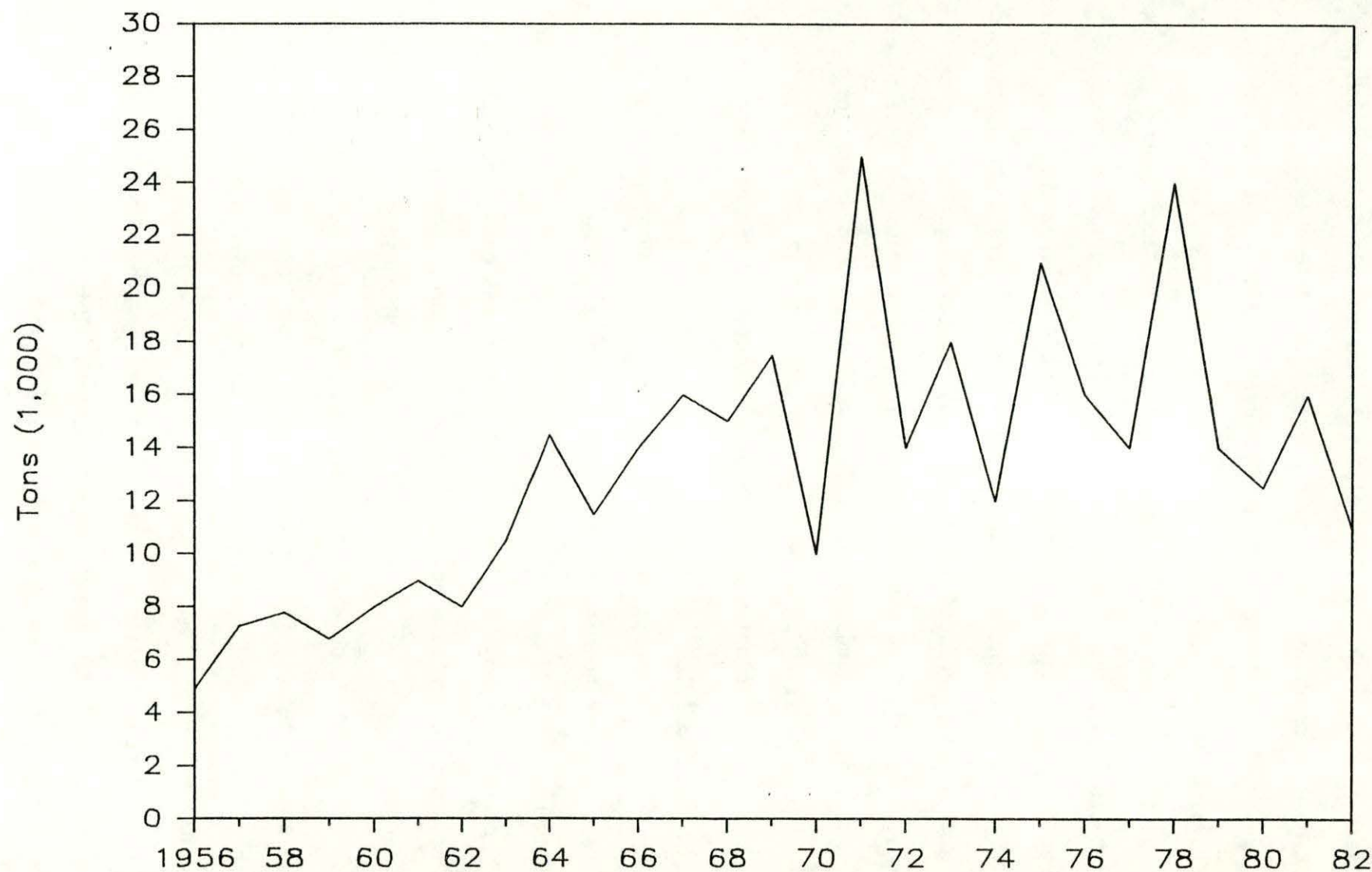
Production from Michigan's expanding bearing plum acreage trended upward during the 1960s and into the early 1970s. Then during much of the 1970s plum production fluctuated on a plateau without a distinct upward or downward trend (Figure 3). In the most recent years there appears to be a downward trend in Michigan's production. Indications of declining acreage suggest further decreases in future plum production from Michigan. This seems especially likely for orchards which are less well suited for fresh market. If demand for processing plums were to increase again in the future, Michigan growers would likely plant many new plum acreages as a diversifying crop.

Marketing Patterns for Michigan Plums

Both fresh and processing markets are important for Michigan plums. In the past, processing has been the more important of these two markets with an average of 60-65% of the state's crop sold this way until the mid-1970s. In recent years the percentage sold fresh has been more nearly equal to the amount sold for canning. The volume sold for fresh market has trended upward particularly in recent years (Figure 4). Michigan processing plum volumes trended upward between the 1950s and the latter part of the 1970s, but have experienced significant decline during the most recent four years. This recent decline is associated with the smaller demand nationally for canned plums.

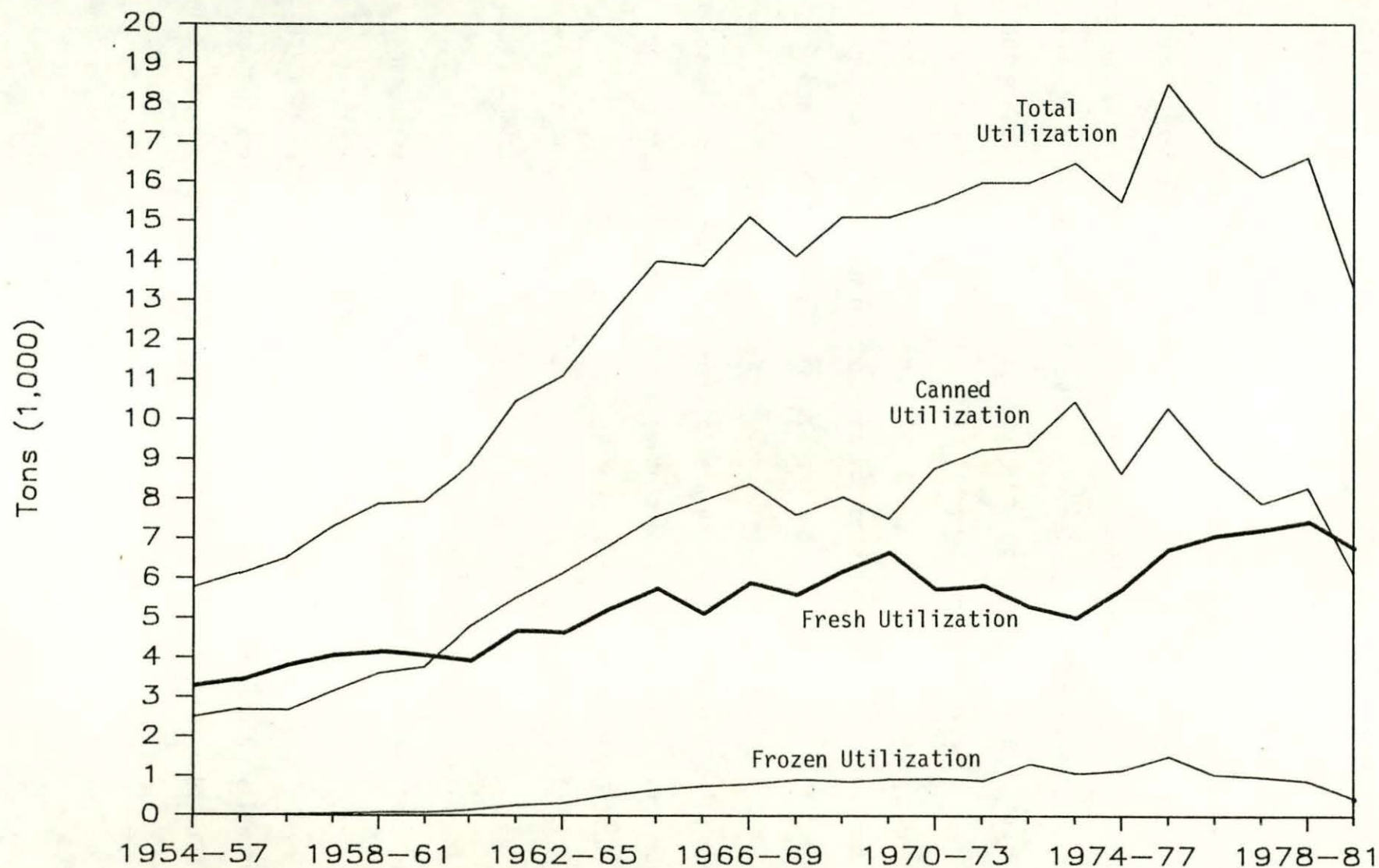
The existence of major markets for both fresh and processing plums has potential advantages for the Michigan industry. This can provide growers some flexibility and opportunities to sell in different markets depending

Figure 3. Michigan Plum Production



Source: Fruits, Noncitrus by States, Statistical Reporting Service,
U.S. Department of Agriculture (various issues).

Fig. 4 Michigan Plum Utilization Trends



Note: Graph shows four-year moving averages of utilization.

Source: Fruits, Noncitrus by States, Statistical Reporting Service,
U.S. Department of Agriculture (various issues).

upon fruit size and other characteristics and upon the relative strength of the two markets. The diversity of markets can add some stability to the industry, although careful attention must be given to meeting the specific needs of each market.

The somewhat different requirements for the two main markets means there is a need for a grower to decide on his primary market outlet fairly early in the season so that he can undertake certain special practices needed for that market. For example, a grower who decides to sell his plums in the fresh market in a given year might need to do some thinning to obtain the proper fruit size and/or use a somewhat different spray program for top quality fresh plums.

Plums are processed in Michigan by about 20 firms. Most processors pack canned plums only, while a few freeze a small volume. Baby food is also an important use for Michigan plums.

Most plums sold for processing are delivered by growers directly to the processor. In some years a percentage of the processed plums may be sorted out of fresh packing lines.

Canned plums in Michigan are packed in both consumer size (No. 2 1/2 and No. 303 cans) and in institutional size (No. 10 cans). In recent years about 57% of the state's plum pack has been consumer size cans and 43% in institutional size.^{1/} The percentage packed in No. 303 cans has trended upward, which is similar to can-size trends for many canned fruits.

Processors of plums all pack other fruit crops and in some cases vegetable crops as well. Plums are a minor part of the processing business for most firms. The plum processing season, however, comes at a time when processing

^{1/} For further details on the Michigan canned pack by can size see Appendix Table 20.

facilities would in many cases otherwise be idle. Hence, plums are a desirable supplementary crop for many processors whose primary business is other products such as cherries and apples.

Processors may buy plums in several areas of the state as well as in the area located near their processing plant. It is not uncommon, therefore for plums to be hauled a considerable distance before processing.

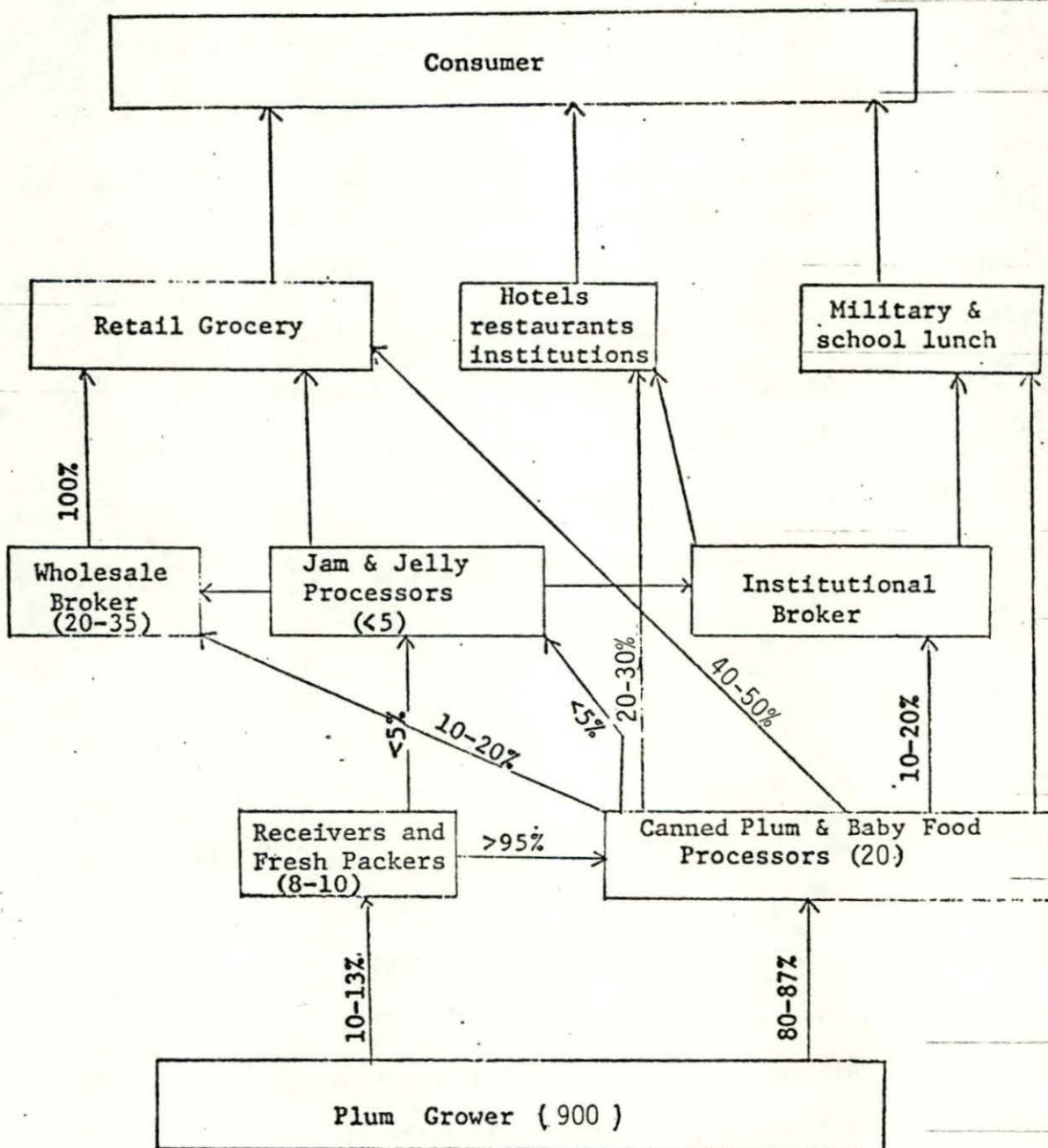
A portion of Michigan's canned plums are packed under private label, although some processors also produce packer labels. Consumer-size canned plums are primarily sold by processors directly to chain stores and other retail grocery buyers (Figure 5). Institutional-sized canned plums are sold both direct to larger institutional users and through institutional brokers as well as to the government for child nutrition and military purchase.

A major share of Michigan's fresh market plums are packed and sold by packing and marketing firms whose major business is fresh apples. For fresh plum sales these firms market substantial quantities to grocery chain and other buyers.

The Benton Harbor market was at one time an important fresh market channel for Michigan plums. In 1960, approximately 50% of the fresh Michigan plums moved through the Benton Harbor market. However, since that time the percentage of fresh plum sales through this traditional market has steadily declined (Table 3). In recent years, only about 7% of the state's fresh plum sales have been sold over this market. The importance of the Benton Harbor market in fresh plum sales will probably continue at a relatively low percentage in the future.

The volume of Michigan plums moving through roadside fruit stands and direct from growers to consumers seems to be increasing, although definitive data on the volume of plums sold in these ways is not readily available.

Figure 5. Marketing Channels for Michigan Processing Plums^{1/}



^{1/}The numbers on the arrows are percentage estimates of that group's plum products moving in the direction of the arrow. The numbers in parentheses are numbers of firms. These estimates are approximations that were made by Dr. Robert Anderson in his thesis entitled "Michigan's Purple Plum Industry" and are based primarily upon the situation at that time. Baby food percentages were not reported separately to avoid disclosure of individual operations.

The percent of the plum crop sold through roadside and direct-to-consumer probably remains relatively minor in relation to total fresh plum sales. In the future the volume of fresh sales moving this way may gradually increase.

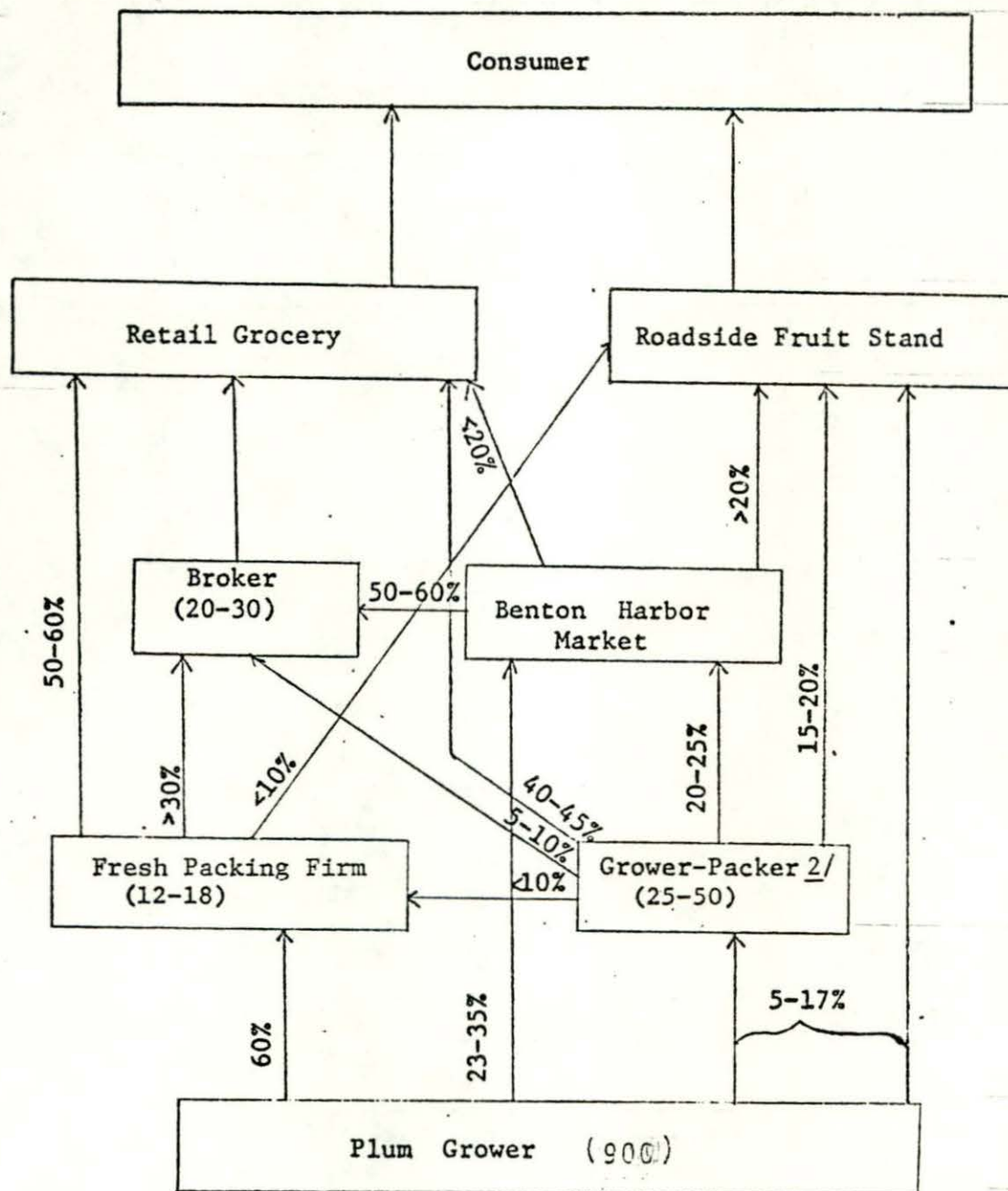
Table 3. Benton Harbor Market Plum Sales

Crop Year	Plums Sold Benton Harbor Market	Average Price Benton Harbor Market (per 1/2 Bushel)	Benton Harbor Market Share of Total Mich. Fresh Plum Sales
	-----tons-----	-----dollars-----	-----percent-----
1960	1890.0	\$2.34	51.9
1961	1767.5	1.98	39.3
1962	1557.5	2.15	44.1
1963	1505.0	2.37	41.8
1964	2625.0	1.43	38.8
1965	1592.5	2.28	37.0
1966	2117.5	2.23	34.2
1967	1802.5	2.41	31.1
1968	1032.5	3.12	24.6
1969	1767.5	1.80	23.9
1970	1225.0	2.60	24.5
1971	1785.0	1.71	21.8
1972	1032.5	3.54	16.9
1973	612.5	4.01	16.8
1974	875.0	4.15	16.5
1975	857.1	3.07	15.9
1976	279.9	4.90	5.6
1977	498.8	4.39	7.6
1978	769.7	3.68	8.2
1979	433.5	4.00	5.9
1980	361.9	5.21	6.5
1981	498.0	4.53	6.7
1982	494.5	5.84	7.4

Source: Benton Harbor Fruit Market Annual Summary.

Relationship to Other Crops

Plum growers typically grow several other crops which mainly include other tree fruits and asparagus. Although the typical crop combinations vary somewhat by region or area of the state, for a high percentage of the growers in all areas plums are a secondary crop.

Figure 6. Marketing Channels for Michigan Fresh Plums^{1/}

^{1/} The percentages shown on the market flow lines are estimates of the plums moving in the direction of the arrows. The numbers in parentheses are numbers of firms. These estimates are approximations made by Dr. Robert Anderson during his Ph.D. thesis study entitled "Michigan's Purple Plum Industry" and are based upon the situation in 1969.

^{2/} Growers who pack plums for other growers as well as their own fruit.

In regard to certain farm management aspects, plums and cherries constitute an advantageous crop combination. One reason for this is because plums, especially those sold for processing, can be mechanically harvested with the same equipment used for harvesting cherries. This allows the grower to spread to another crop some of the large overhead costs associated with expensive harvesting machinery. Plums can also provide an additional crop to reduce risks from the weather and from price fluctuations such as are typically associated with tart cherries.

Changes in marketing methods for other crops may affect the marketing of plums. For example, Northwestern Michigan growers historically sold both their plums and their tart cherries to canning firms whose primary business was cherry processing. During the 1970s there was an increase in the number of cherry processing firms, including a number of grower-owned, freezer processors, while at the same time the number of processors of plums decreased. Since most of these new cherry processing firms involve freezing only (no canning), and since plums are primarily canned, growers have had to adjust to the changing processor patterns in marketing their canning plums.

Since Michigan fresh plum marketing relies heavily on fresh packing and selling firms whose primary business is apples, changes in apple marketing can affect plum marketing as well. As markets for fresh apples expand and as packers and shippers continue to gear up to most effectively compete in apple marketing, they may also become increasingly effective for marketing fresh plums. On the other hand, because of the increased production of early apple varieties, such as Paula Red, some apple shippers may decide to concentrate exclusively on apples and discontinue handling plums.

The Plum Industry in Pacific-Northwestern States

Plums from the Pacific-Northwestern states of Oregon, Washington and Idaho compete directly with Michigan plums in both the canned and the fresh markets. In earlier years, plum production from the Northwestern states dominated the markets for this type of plum while Michigan's production was quite minor. During the 1950s and 1960s, however, plum production in the Northwestern states experienced a noteworthy downward trend while Michigan's production was trending upward. Thus the dominance of plums from the Northwestern states was much less by the early 1970s than during previous periods, such as during the 1950s. Since the early 1970s plum production in the Northwest has shown a fairly stable trend while Michigan has experienced a gradual downward trend (Figure 8).

Plum sales in Washington and Idaho are heavily oriented toward the fresh market. Processing markets, including both drying and canning, are of much greater importance in Oregon. Canning markets have been declining in volume in recent years while drying has increased. Thus the balance has shifted to a greater emphasis on drying in Oregon and less canning in all Northwestern states than in earlier years.

Trends in Northwestern States' Production and Tree Numbers

After experiencing a declining trend during the 1950s and 1960s, plum production in the Pacific-Northwest states has shown a relative stable trend since the early 1970s. Production in all three Northwestern states has been fairly stable during the 1970s and early 1980s.

Oregon is the single most important state producing purple plums with an average of approximately 32,000 tons during recent years. Washington and Michigan produce somewhat similar quantities at 13,000-16,000 tons on

Figure 7. Major Plum Production Areas in the Northwestern States

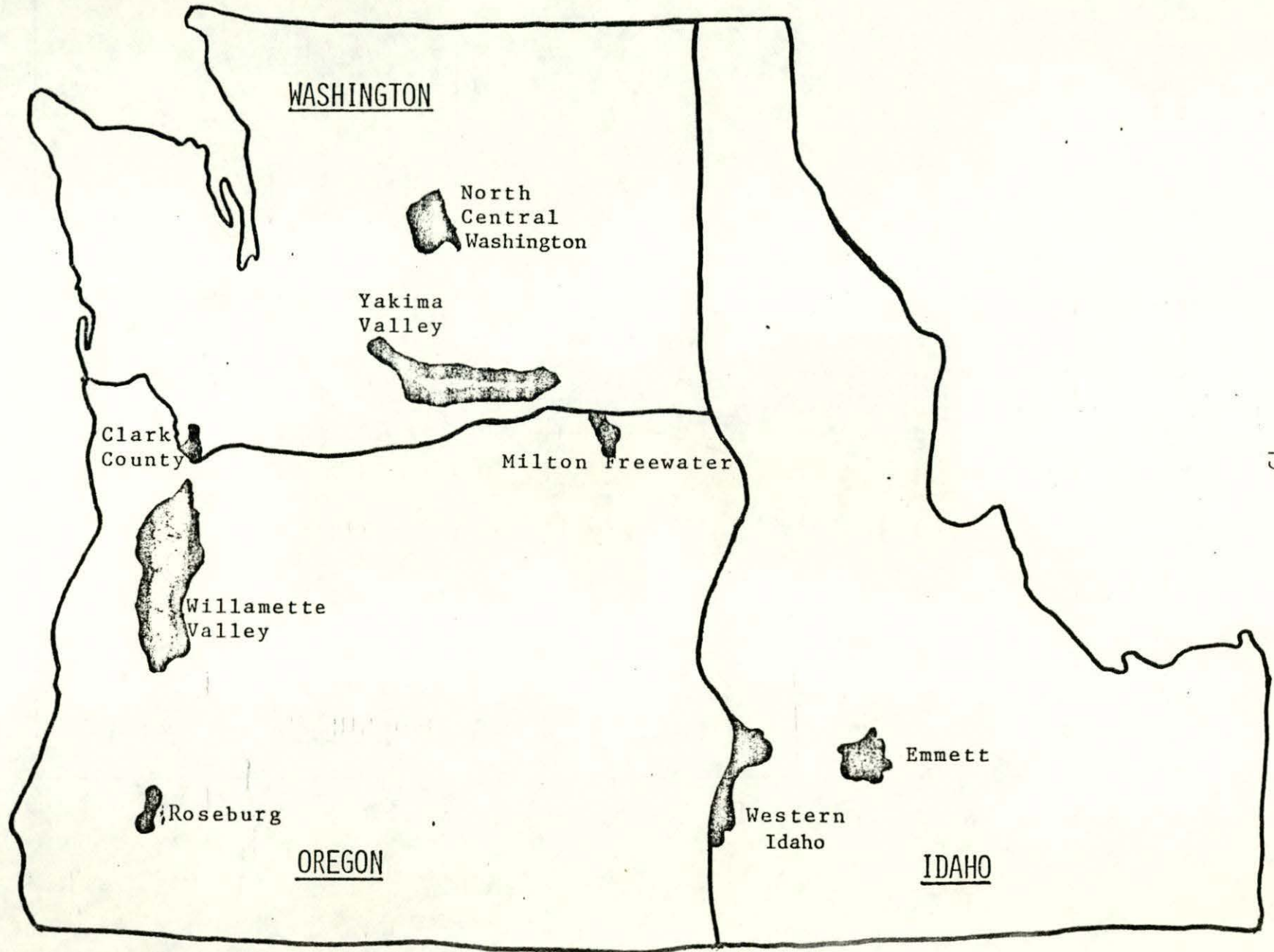
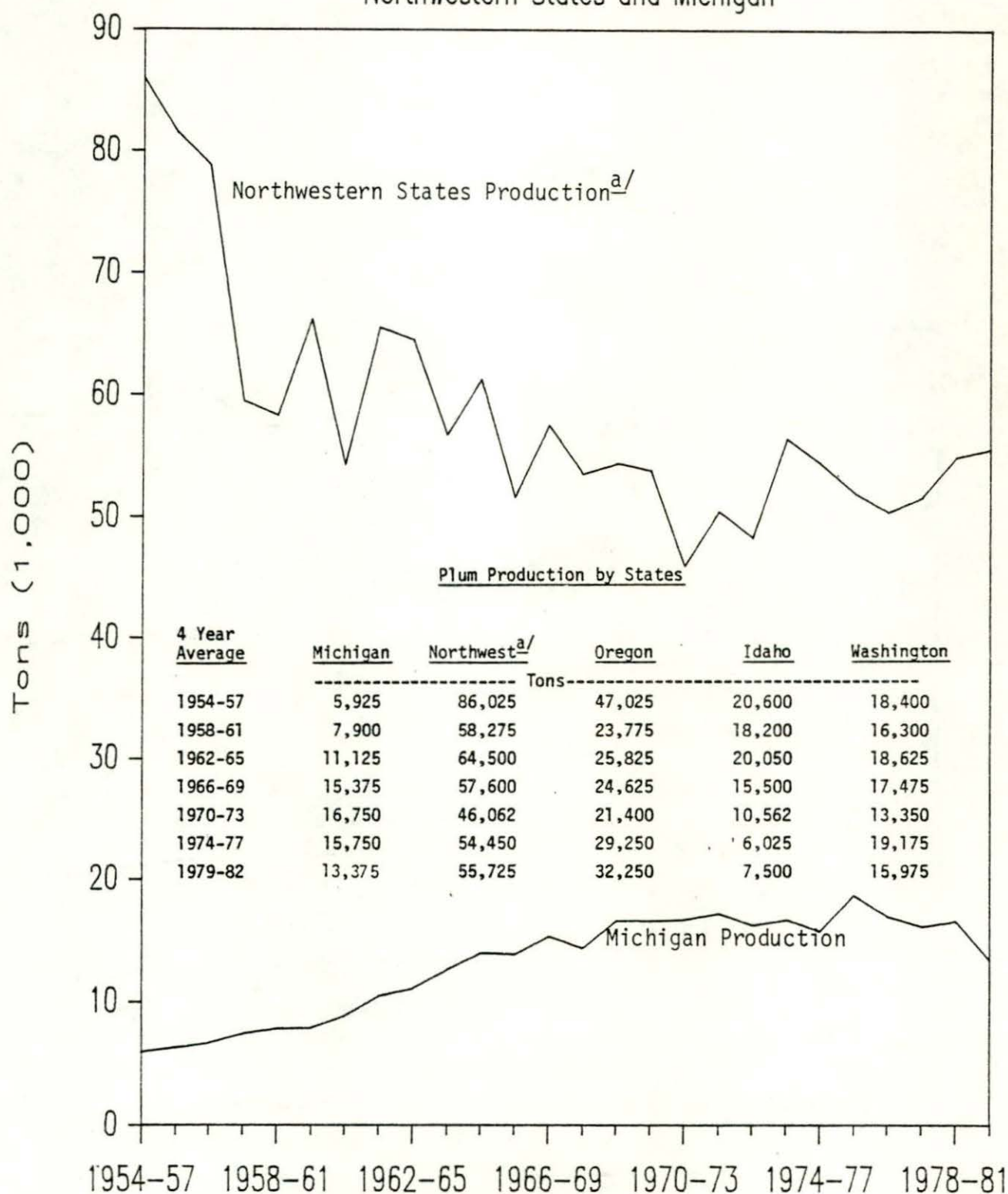


Figure 8. Plum Production Trends

Northwestern States and Michigan



a/ Includes Oregon, Idaho and Washington.

Note: Graph shows four-year moving averages of production.

Source: Noncitrus Fruits and Nuts, Statistical Reporting Service, U.S. Department of Agriculture (various issues).

the average. Idaho has produced an average of 7,500 tons of plums in recent years.

Idaho's plum production declined significantly between the early 1960s and the mid-1970s. During this period average production in that state decreased from about 20,000 tons to 7,500 tons -- a decrease to about 37% of previous levels within this period. Since the mid-1970s Idaho's plum production has been stable. (For further detail on Idaho's plum production, see Appendix Table 5).

Oregon production has not exhibited a distinct upward or downward trend in recent years, although that state's production has averaged somewhat higher than during the early 1970s. This is due, at least in part, to the fact that Oregon's production has been more stable in recent years than during earlier periods. (Appendix Table 3 has further data on Oregon's plum production.)

Washington plum production has shown a generally flat long-term trend, although considerable fluctuations have occurred in annual production. Crop size during the the most recent two years of 1981 and 1982 have been down considerably from a large crop in 1980 (Appendix Table 4).

Although the production trend for the three Pacific-Northwestern states together has been relatively stable in recent years, substantial fluctuations in production from year to year can occur. For example, the total Northwest plum production fluctuated from 48,000 tons in 1979 to 66,000 tons in 1980 (Appendix Table 6). However, annual crop fluctuations in the Northwestern states have been, in recent years, considerably smaller and less frequent than occurred during the 1960s and early 1970s.

Data on bearing and nonbearing trees can indicate future trends in plum production. Since Oregon and Washington do not have detailed fruit tree

censuses, the most recent available data are from the U.S. Census of Agriculture (see Appendix Table 9). The latest available census data is for 1978. Thus changes in tree numbers since that time cannot be specifically quantified.

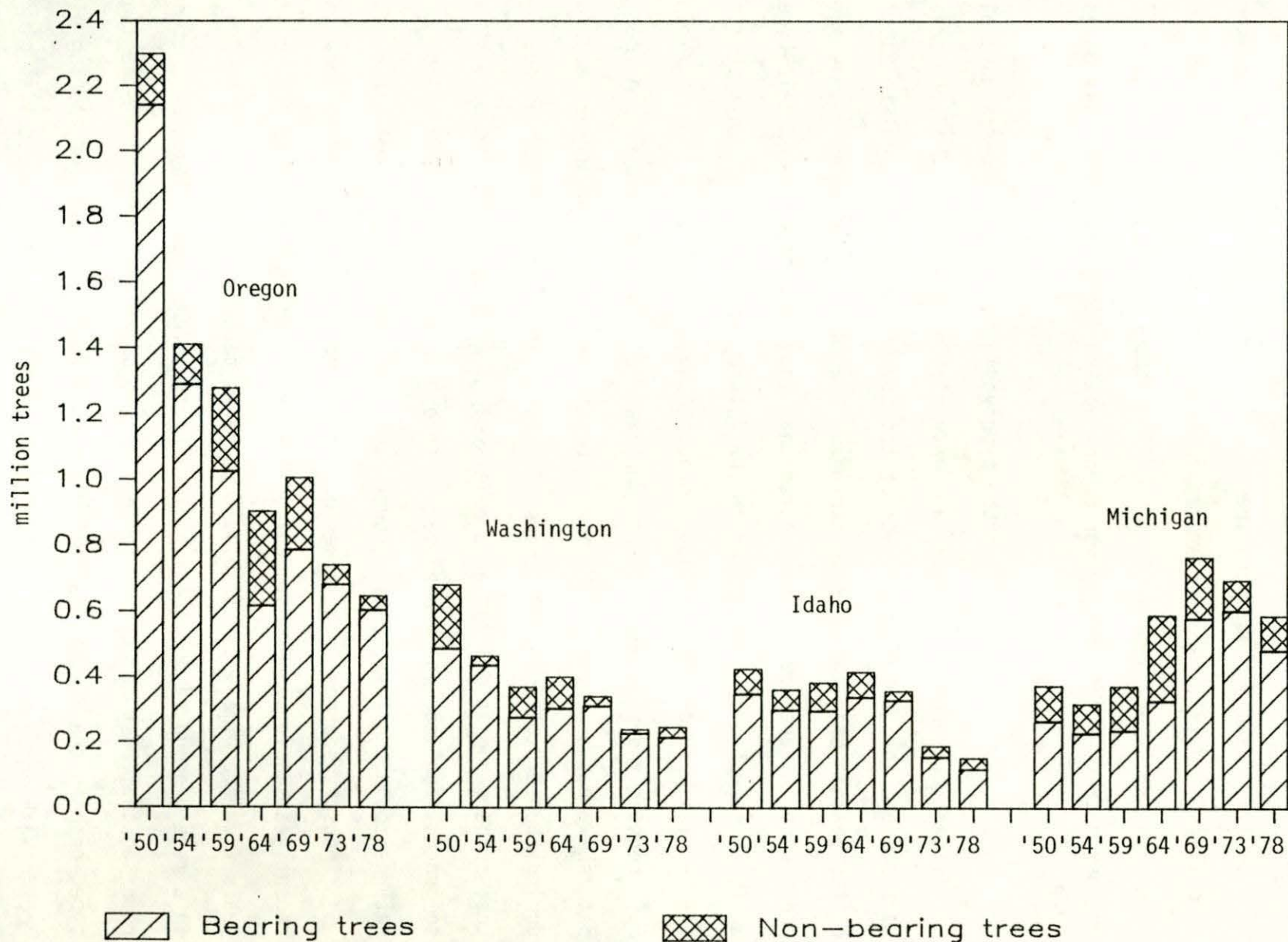
Oregon's bearing plum trees have shown a significant long-term downward trend. Particularly noteworthy decreases occurred during the early 1950s and early 1960s (Figure 9). Census figures for the 1970s show a more gradual downward trend in Oregon's bearing plum trees.

Nonbearing plum trees in Oregon, as shown by the most recent census in 1978, were at an unusually low level (Appendix Table 9). Also economic returns to growers in that state have not been favorable in some recent years as the demand for canning plums declined. For these reasons, Oregon industry observers predict that a number of growers there may decide to remove significant plum acreages because of low returns for plums. A decline in Oregon plum production is thus expected, although this will be tempered somewhat by growth in the dried prune market.

Bearing plum tree numbers in Washington have trended downward according to census data (Appendix Table 9). Moderate numbers of nonbearing trees indicate a stable to gradual decline in future bearing trees. Washington industry observers indicate that growers are decreasing their acreage of Italian-prune type plums and any new plantings are mainly varieties similar to California types of plums. Recent tree census data are not, however, available to quantify this change nor any new plantings and removals in recent years in Washington.

Idaho bearing plum trees decreased considerably during the 1970s, with the 1978 Census of Agriculture showing only about one-third as many bearing trees as 10 years earlier (Figure 9). The 1980 Idaho fruit tree census showed

Figure 9. Plum Tree Numbers by States



Source: U.S. Census of Agriculture, Bureau of the Census, U.S. Department of Commerce

Italian-prune type varieties down another 20% while California-type plum varieties were down by a smaller 9% from 1978.

By 1980 Idaho's nonbearing trees of Italian-prune type varieties were near zero (less than 1%). Growers are reportedly quite discouraged with returns from fresh sales of these varieties. It is expected that Idaho growers will further decrease their acreage of prune-type varieties substantially during the next few years.

In contrast to trends for prune-type varieties, Idaho growers have planted significant acreages of California-type varieties of plums. The 1980 tree census shows that nonbearing trees of this type of plum are equal to 21% of the state's existing bearing acreage. New plantings of these plums are continuing. Therefore it is expected that Idaho's production of this type of fresh market plum will expand in the future, while the Italian-type varieties will likely decline in future production.

Considering the three Pacific-Northwest states together, tree number data show that a continued decline in bearing and total plum trees occurred during the 1970s. The 1978 Census of Agriculture indicated that nonbearing tree numbers had stabilized at a relatively low level. This suggests stable to gradual declines in future bearing tree numbers. Unfavorable economic returns could, however, cause growers to remove substantial plum acreages.

Industry sources in Northwestern states report that grower returns in recent years have been unfavorable, especially for canning plums and in some years from fresh market. If plum acreage is taken out, this would result in a more pronounced decline in future Northwestern plum production. It is reported that most reductions in Northwest plum acreage will be of the Italian type, both in the Willamette Valley because of poor markets for canning plums, and in Washington and Idaho because of poor returns for fresh Italian plums.

Trends in Plum Production and
Acreage in Other States

In addition to purple or prune-type plums from the Pacific Northwestern states, plum production in California is increasingly important in the expanding U.S. market for fresh plums. This is especially so as both Michigan and the Northwestern states try to maintain or increase a significant share of the expanding overall fresh plum market of which California has a large share. New York plums also compete in fresh markets for the eastern U.S. Thus trends in plum production and acreage in these states are important for the future supply and market situation for Michigan plums.

California

Plum production in California has experienced a strong upward trend since the early 1970s (Figure 10). Average production during the recent years of 1978-1981 was 65% greater than the average produced during 1970-1973.^{1/} The expansion in California plum production occurred both because of increasing acreage and an upward trend in average yields per acre.

Nonbearing acreage of California plums increased continuously since the late 1960s (Figure 11). New plantings have been especially large during the most recent four years. As a result of the new plantings, bearing acreage of California plums has also grown steadily since 1970. The state's bearing acreage rose from 21,000 acres in 1970 to almost 33,000 acres in 1982 -- an increase of 150% during this 12-year period.^{2/} The especially large non-bearing acreages in recent years indicate that California's bearing acreage and production will increase still further in future years.

^{1/}Data on California plum production is shown in Appendix Table 11.

^{2/}Acreage data for California plums is summarized in Appendix Table 12.

Figure 10. California Plum Production

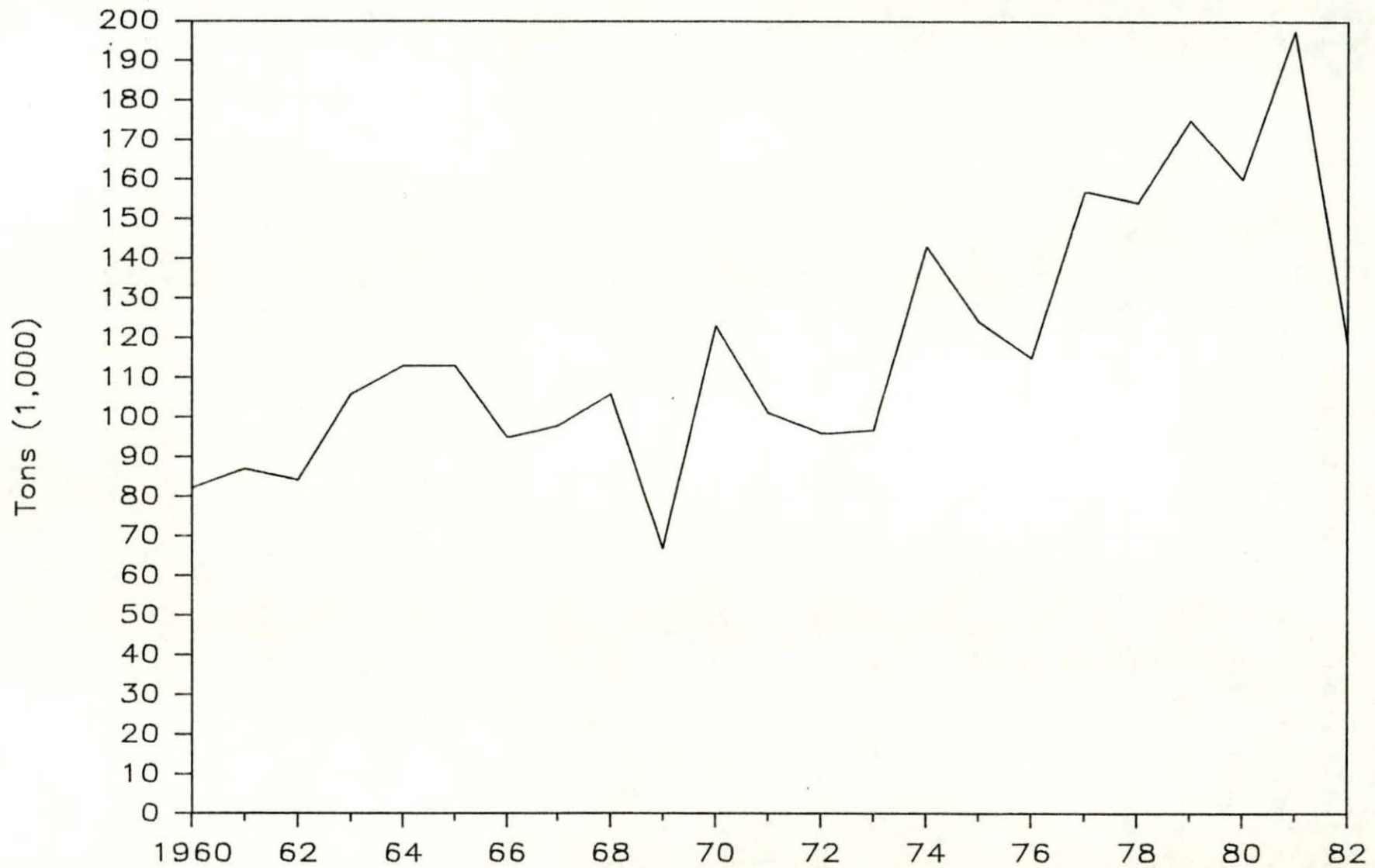
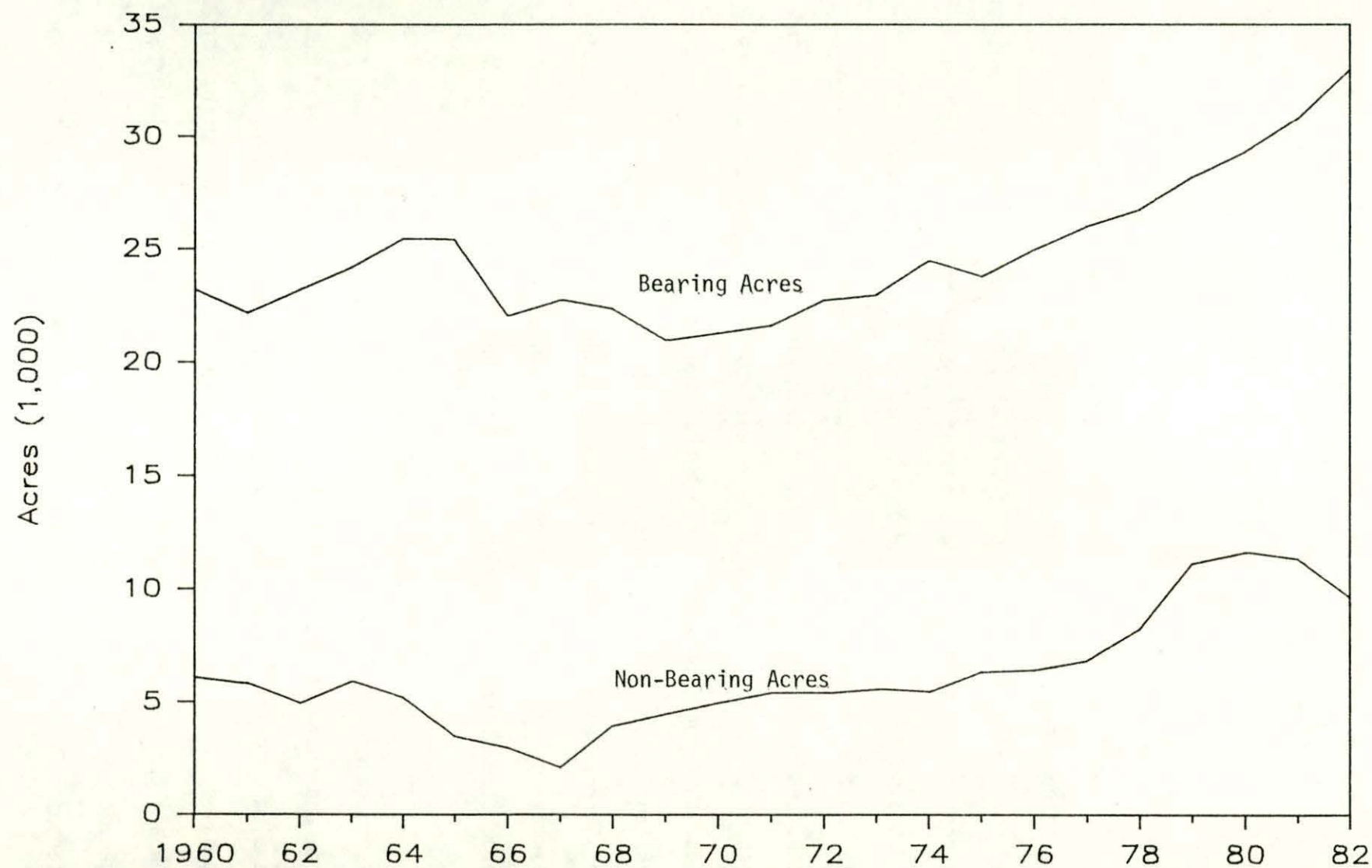


Figure 11. California Plum Acreage



While supplies of California plums have increased considerably, demand for this fruit has also grown substantially. Demand increases have been aided by increasing consumer preferences for fresh fruits, a relatively long season for California plums, generally high quality, and a substantial generic advertising and promotional program.

New York

While New York's plum production is relatively small, some plums from that state compete with Michigan plums. Since New York is, like Michigan, located near many eastern U.S. plum-consuming population centers, the transportation cost aspect aids New York's competitive position versus western regions.

According to the latest New York tree census in 1980, total plum trees and bearing tree numbers decreased from the levels existing in 1975. New York's nonbearing plum tree numbers, however, increased between those two tree censuses. Nonbearing trees were equal to 55% of the bearing trees in 1980, and there were one-third more nonbearing trees in 1980 than in 1975. The substantial percentage of nonbearing trees suggests rising plum production potential from New York in the future. Nevertheless, New York production will likely remain relatively minor in relation to production in the major plum-producing states of California, Washington, Oregon and Michigan.

Major Market Uses for Purple Plums

Fresh sales have been the most important market for plums from both Michigan and the Northwestern states. In recent years slightly over 50% of the plum crop from each region has been sold fresh (Table 4). While fresh market sales have trended upward in recent years, the canning market for plums has shown a distinct declining trend. The drying market has experienced a large increasing trend in recent years. Although drying is especially important for Oregon, the expansion of this market is significant for Michigan

as the dried market affects competing supplies available in national markets for purple plums. The frozen utilization of plums has been fairly minor in both Michigan and the Northwestern states.

Table 4. Utilization of Plums and Prunes by Regions, 1979-1982

	Percent of State's Total Sales			
	Northwestern States <u>a/</u>	Michigan	California	
			Plums	Prunes
	----- Percent -----			
Fresh	52	51	98	--
Canning	14	46		--
Drying	31	0		100
Freezing	2	4		--

a/ Includes Oregon, Washington and Idaho.

Source: Computed from data reported in Noncitrus Fruits and Nuts, Statistical Reporting Service, USDA (various issues).

While markets for canning plums have declined in both Northwestern states and Michigan, canning remains an important market outlet for Michigan accounting for an average of 46% of the Michigan crop in recent years. Oregon is the other major state in the canning market. Washington and Idaho contribute only minor quantities to the overall canning market. The decline in the canning plum market poses major adjustment challenges for the plum industry -- especially for Michigan and Oregon.

The Fresh Market

The fresh market for plums has been growing and is expected to continue to expand in the future. There has been a slow but steady upward trend in the sale of fresh plums, both from Michigan and the Northwestern states in

recent years (Figure 12). The growth in fresh sales of plums has occurred despite the fact that overall production of plums has been steady to declining during recent years in both regions.

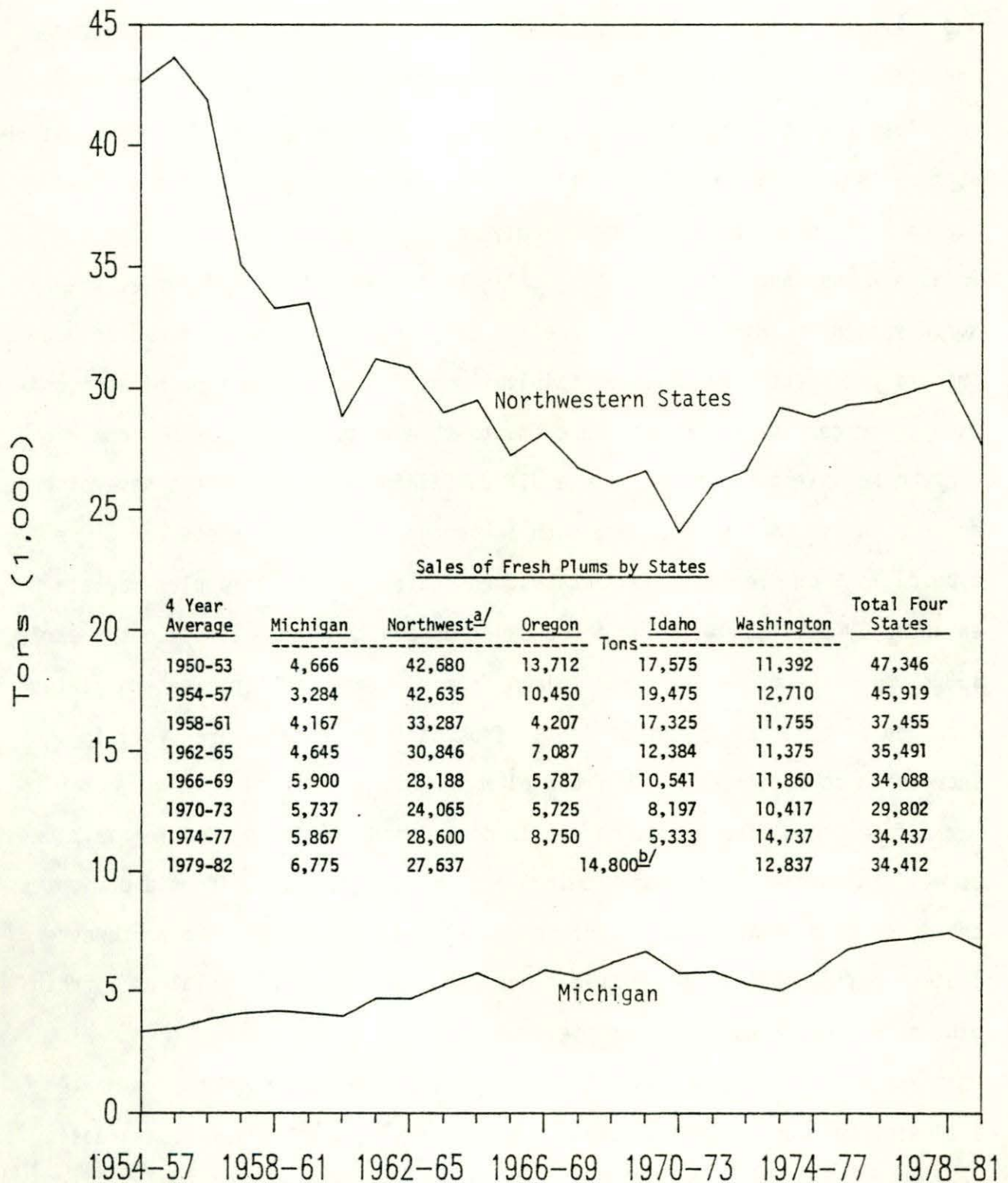
The growth of fresh market sales of plums is related to the noteworthy increase in consumer demand for fresh fruits and vegetables in general during recent years. Consumers are expressing increasing preferences for foods which they perceive to be natural, nutritious, non-fattening and with no sugar added. Fresh produce, including fresh plums, offers characteristics which fit these consumer preferences.

Recognizing the growth in consumer demand for fresh produce, grocery retailers are giving much greater emphasis to the produce section of their stores through more produce merchandising, expanded display space, offering a much wider variety of fresh items, and by emphasizing fresh produce in their stores' advertising. This emphasis on fresh produce by retailers has further strengthened the growing demand for fresh fruits.

The growth in consumer demand for fresh fruits, strengthened by retailers strong positive response, has provided a strong growth base for expanding fresh plum sales. This has aided the sale of fresh plums from both the Pacific Northwestern states and Michigan. Sales of California fresh plums have grown substantially in response to the increasing demand.

In fresh plum markets, purple plums produced in Washington, Idaho, Oregon and Michigan compete most directly with each other since these plums have similar characteristics and overlapping seasons. Apparently many consumers cannot readily tell the difference between an Italian plum produced in the Northwestern states or a Michigan Stanley plum. Therefore, consumers and some retailers view these plums as closely interchangeable. Preferences

Figure 12. Plum Sales for Fresh Use



^{a/} Includes Oregon, Idaho and Washington

^{b/} Data for Oregon and Idaho not reported separately by USDA.

Note: Graph shows four-year moving averages for fresh sales

Source: Noncitrus Fruits and Nuts, Statistical Reporting Service, USDA (various issues).

for Michigan fresh plums are increasing compared to Northwestern Italians as expressed by some retailers.

California plums compete increasingly with the fresh plums from Michigan and the Northwestern states. California plums are of substantially different varieties than Michigan and hence, in some respects, California plums compete in a less direct manner than do prune-type plums from the Pacific-Northwestern states. While the bulk of the California plums are shipped during an earlier season which peaks during June and July in comparison to Michigan's season in late August and September, many California plums are on the market when Northwestern and Michigan plums are shipped. Hence California plums provide important competition. California plums comprise a much more prominent position in grocery store produce departments than do prune-type plums from Michigan and Northwestern states. In addition California plum markets have experienced a substantially greater growth in demand than have markets for prune-type plums from Michigan and Northwestern states. California plum markets expanded by about 150% during the decade between the early 1970s to the early 1980s while the market for fresh plums from Michigan and Northwestern states expanded by a lesser amount of 115%. Thus California plums are providing increasing competition in the fresh plum market.

If the total fresh plum market is considered, including California plums as well as purple plums from Michigan and the Northwest, California dominates the fresh plum market with 82% of the total. By comparison, the Northwestern states contribute 14%, and Michigan has had about 4% of the total U.S. fresh plum sales volume during recent years.

For some purposes it is useful to consider the total fresh plum market including California plums. This is especially relevant with the increasing consumer demand for fresh produce including plums, and because California

plum production has shown a definite growth trend. On the other hand because of the similar type of plum and the close substitutability between Northwest and Michigan plums, for many issues in purple plum marketing it is appropriate to consider primarily plums from Michigan and the Northwestern states.

Overall, fresh sales of purple plums have shown a gradual increasing trend since the early 1970s. Before this upward trend began, fresh sales from Northwestern states of Washington, Idaho and Oregon had declined rapidly during the 1950s and more gradually during the 1960s (Figure 12). The regrowth of fresh sales from Northwestern states along with the gradual expansion trend for fresh sales from Michigan is related mainly to changing consumer preferences for fresh fruit and away from canned fruits.

Future demand for fresh plums from Michigan will be influenced by both (a) the overall growth of the fresh plum market, and (b) Michigan's competitive position for a share of that market. Both factors seem to be favorable for a continued growing demand for fresh Michigan plums. Most Michigan plum shippers and packers express optimism about the future fresh market for Michigan plums. Shippers are generally especially optimistic about the future fresh market for plums grown in southwestern Michigan because of the large size plums which are commonly grown in that part of the state.

Michigan's competitive position for fresh market plums is strong and seems to be improving over time in comparison to the Northwestern states of Washington, Idaho and Oregon. This is aided by Michigan's transportation cost advantages. In addition, Michigan plums are reportedly viewed generally as high quality by the grocery trade in comparison to the plums from the Northwestern states. The use of new materials for controlling brown rot, hydro-cooling and cold storage have enabled Michigan to have a much better control of brown rot in recent years than previously. This has been a significant

aid in improving Michigan's competitive position for fresh market plums. Because of competitive advantages regarding quality, Michigan plums generally receive a premium price on a delivered basis compared to Northwest plums. In addition, Michigan has the freight cost advantage compared to the Northwest, which is increasingly important as costs of trucking have risen considerably in recent years. Michigan's transportation cost advantage to many eastern U.S. cities has in recent years been about \$2-2.50 per bushel. The freight cost advantage is also expected to continue to improve Michigan's position further in the future.

Michigan's promotion and demand expansion program is a positive step which can help improve the market for Michigan fresh plums. Although small and relatively new, this program can help Michigan capture an important share of the overall expanding fresh plum market.

Returns to growers in the Northwestern states for fresh plums reportedly have not been favorable in many cases during recent years. Many growers are reported to be discouraged with plums there. It is reported that a number of Northwestern growers have been removing prune-plum orchards, especially older blocks, and replacing them primarily with apples or California type plum varieties. If this plum removal trend continues over time, prune-type plum production in the competing Northwestern states will decline, perhaps leaving Michigan a larger share of the growing fresh plum market.

Despite the number of favorable factors indicating continued growth for fresh market sales of Michigan plums, there are some factors which pose challenges and could limit the future growth for Michigan fresh plums. California fresh plum supplies have increased substantially and are expected to continue to rise. California plums are receiving substantial demand-expansion efforts and prominent treatment by grocery retailers. Plums from

California will likely pose increasingly important competition in the future for Michigan. On the other hand the strong demand expansion for plums which is generated by California might provide additional opportunities for Michigan fresh plums.

Michigan's performance in regard to fruit size and maturity of the plums will be important factors in regard to the future growth of the state's fresh sales. Effective brown rot control is another key factor, although there are several new, effective materials which can aid the Michigan industry in this regard. The relatively short season of Michigan plums is a limiting factor for overall fresh sales, especially with Michigan's emphasis on one variety. Some feel that the fact that plums are heavily consumed by ethnic consumers in certain markets is also a factor limiting future market growth for fresh Michigan plums.

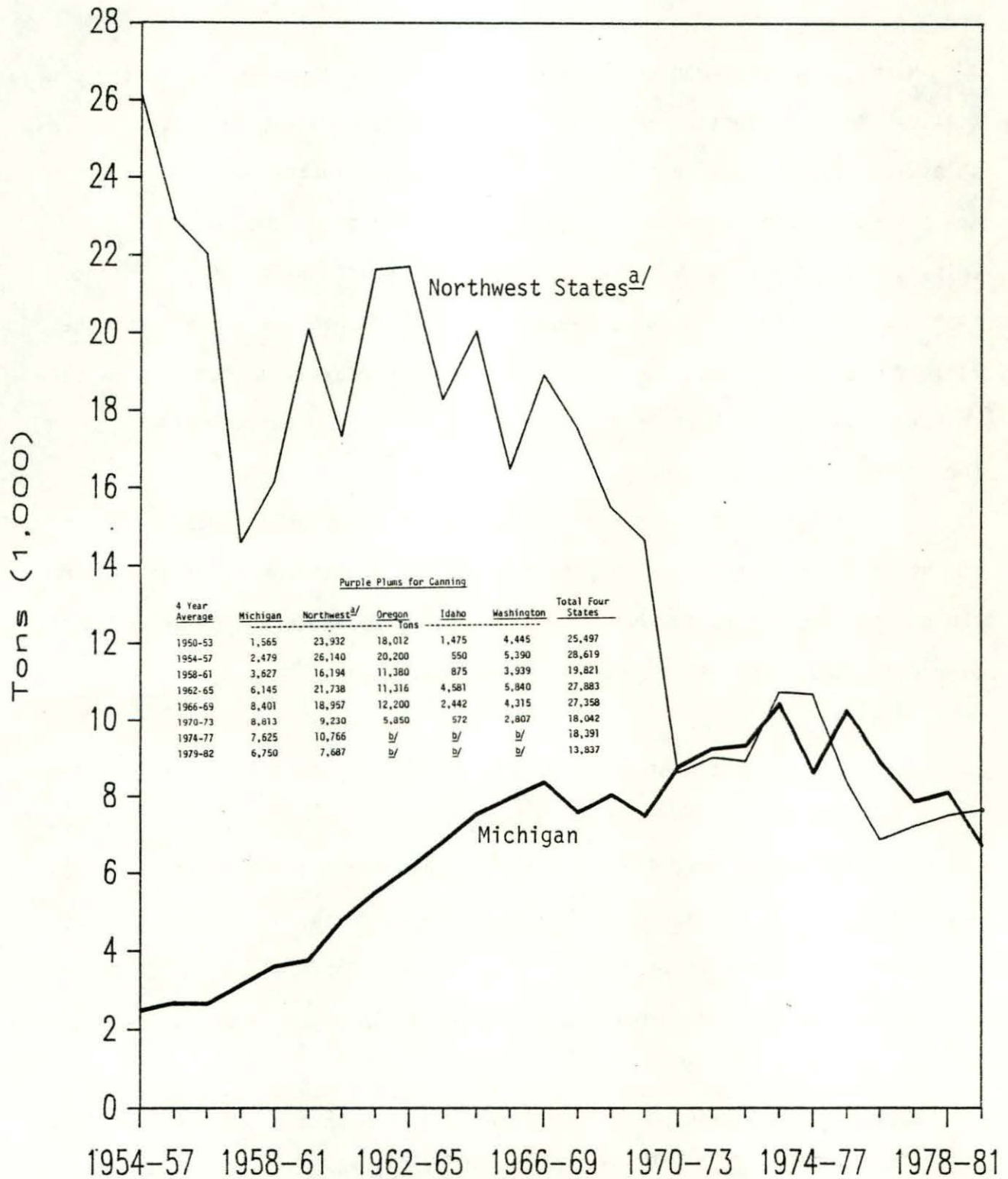
The challenging factors outlined above are areas which deserve industry attention in order to maximize potential future growth for Michigan within the general increasing fresh plum market. Some possible actions aimed at overcoming these challenges are being studied.

Processing Markets

While canning has historically been the main processing market for purple plums from the Northwestern states and Michigan, in recent years drying has grown and has become more important than canning in the Northwestern states. Drying has used an average of 31% of the plums from the Northwestern state region, while canning markets have fallen to 14% (Table 4). In Michigan canning remains the main processed market with 46% of the state's crop utilized in this manner.

Markets for canning plums have decreased in both the Northwestern states and in Michigan (Figure 13). The national market for canned purple plums

Figure 13. Plum Sales for Canning



a/ Oregon, Washington, Idaho

b/ Not reported by USDA.

Note: Graph shows four-year moving averages of sales for canning.

Source: Noncitrus Fruits and Nuts, Statistical Reporting Service, USDA (various issues).

has experienced a definite declining trend in recent years. This decrease is related, in part, to lessening consumer demand for the all canned fruits. In addition canned plums are an item of weak consumer preference within the canned fruit category, despite being one of the least expensive canned fruits.

Reasons for the decline in consumer demand for canned fruits include: (1) increasing preferences for fresh, "unprocessed" forms, (2) an aversion by some consumers to the sugar syrup in canned fruits, and (3) smaller family sizes, the related emphasis on smaller can size and hence less fruit involved with each consumer purchase. Probably the most important phenomena affecting consumer demand for canned fruits, including plums, is the switch in preferences to fresh fruits and vegetables which are perceived by increasing numbers of consumers as being especially "natural," "healthful," with no sugar added, and "good for your diet."

Decreasing consumer demand for canned fruits is strengthened by the response of grocery retailers to reduce shelf space for canned fruits, to curtail the variety of canned items carried, to reduce the merchandizing efforts for this category, and to reduce the frequency of retailer promotions for canned fruits as featured items in retailer newspaper advertising. These responses by grocery retailers are taken because they view canned fruits as a declining category which warrants less retailer emphasis both since this category is less important to retailer profits and is less important to their consumer customers. While these responses are quite logical and understandable from the retailers' perspective, the result is to further decrease demand for canned fruits including purple plums.

In addition to the response of the grocery trade, a number of marketing firms with strong brands for canned fruits have become discouraged with the poor performance and declining demand trend for this food category. Some

have therefore reduced their advertising and marketing efforts for canned fruits or have discontinued the canned fruit business altogether. These reactions add further to the declining demand syndrome.

The overall result is a situation of considerable challenge for a fruit crop industry like purple plums which has sold a major portion of the crop for canning. This type of serious problem is confronting several important West Coast canned fruit industries including California cling peaches and Pacific Coast pears. Their situation is similar to the declining demand phenomena of the plum industry.

Until the early 1970s, the Northwestern states dominated the canned plum market, with Oregon having been the primary canning state. Production of canned purple plums in the Northwestern states, however, exhibited a pronounced downward long-term trend during the 1960s and 1970s to the extent that Michigan produced an average of more canned plums than the Northwestern states. In recent years the market for canned plums in both regions has declined with the decreasing national demand trend. Thus while Michigan's market share remains relatively high, the overall demand decline is quite troublesome.

Michigan's share of the canned purple plum market has been aided by a number of factors. These include (1) lower transportation costs for Michigan to eastern population centers, (2) comparatively low costs for growing Michigan plums, (3) a dissatisfaction with plums by many Northwestern states' processors due to low profits associated with this canned product, and (4) in the 1960s and early 1970s expanding plum production from relatively young orchards in Michigan. The relatively low costs of growing plums in Michigan are aided by (1) a variety (the Stanley) with high average yields per acre and (2) widespread mechanical harvesting.

Transportation cost advantages will continue to aid Michigan's competitive position relative to delivered costs to eastern population centers. On the other hand, Oregon's position has improved somewhat because of their advantages for pitted plums which have taken a share of the canned plum market particularly for the institutional segment. The Oregon Italian plum is more readily adaptable to pitting with current technology than is the Michigan Stanley variety with its elongated pit and other characteristics.

Overall Michigan's competitive position for canned plums seems favorable in comparison to the Northwestern states. It is, however, a favorable competitive position in a market segment which is declining.

Markets for dried prunes have been expanding in recent years because of growing consumer demand. Dried fruits, including prunes, apparently fit many consumers preferences for "natural" foods with no sugar added. Unfortunately for Michigan in view of this growth market, Michigan's climate and plum characteristics have historically precluded Michigan from participating in the drying market. In the future perhaps Michigan can develop techniques to produce a satisfactory dried prune and thus take advantage of this growing market segment. At least the expanding dried market will likely take greater supplies of Oregon prunes which might otherwise compete with Michigan for markets for canned plums.

Summary

Plums have been an important supplemental crop for the Michigan fruit industry. The state's plum production expanded substantially during the 1960s, then plateaued during most of the 1970s, and has shown a downward swing during recent years. Bearing plum acreage is decreasing in Michigan and there are relatively few non-bearing trees. A number of Michigan growers have removed plum orchards and few have replanted this crop. Michigan's

future plum production will likely continue the declining trend for the next few years.

Michigan plums have experienced weak markets during some recent years. This is primarily related to the fact that demand for canning plums has decreased significantly because of a decline in consumer demand. Consumer demand for all canned fruits has decreased and consumers have shown an especially weak preference for canned plums. This poses a particularly difficult challenge for the Michigan plum industry, since historically approximately two-thirds of the crop was sold for canning.

While demand has been decreasing for canning plums, fresh market demand has been increasing. As a result, the share of the Michigan crop which is sold fresh has increased so that in recent years approximately half of the Michigan plum crop is sold for fresh market. Michigan fresh plum sales have benefited from an expanding national market for fresh plums as consumer preferences are switching to fresh produce which is viewed as natural, healthful and low in calories. The growing national market for fresh plums has also taken larger quantities of fresh plums from California and fresh sales of Pacific Northwestern prune-plums which compete with Michigan Stanley plums in this growth market.

Michigan's competitive position in the growing fresh market is favorable in comparison to plums from the Pacific Northwestern states. Michigan plums usually receive a delivered price premium compared to plums from the Northwestern states. In addition, Michigan has a significant transportation cost advantage to eastern U.S. markets. Michigan has also improved its competitive position in fresh market in recent years by improvements in brown rot control with new preventive materials, more extensive hydro-cooling, and by closer attention to harvesting at best maturity. Although there are also some

limiting factors, Michigan appears to be in a favorable position to continue to expand fresh market sales of plums as a part of the growing U.S. market for this fresh fruit.

Production of plums in Pacific Northwestern states has not shown a distinct upward or downward trend. Indications are that in future years production of prune plums in these states will likely be steady or experience a gradual decline. Thus, decreasing supplies from both Pacific Northwestern states and Michigan are indicated.

Because of the increasing demand for fresh plums, declining supplies of plums in Michigan and the Pacific Northwestern states would suggest a favorable supply demand-balance for the expanding fresh plum market. California plums are, however, experiencing a significant increasing trend in supplies. Although California plums are marketed primarily in a different season than those from Michigan and the Northwestern states, California's much larger production provides a very important supply factor in the fresh plum market. California plums will provide increasing competition in the fresh plum market and will fill a substantial proportion of the demand growth for that market. Michigan plums can also likely capture a portion of the growing national demand for fresh plums, particularly since Michigan is much closer to eastern U.S. markets and has primarily a different shipping season than does the predominant production from California.

In addition to expanding sales of fresh plums, Michigan will probably in the future be able to continue to sell a significant although decreasing quantity of canned purple plums. Michigan's favorable competitive position for canned purple plums led to an increasing share of the canned U.S. market for Michigan during the 1960s and early 1970s. During recent years, however, a more important factor is the marked decrease in overall demand for canned

purple plums. Thus, even though Michigan's competitive position remains favorable, it is in a distinctly decreasing market which is expected to continue to decline in the future.

Exploration of new markets or markets which have traditionally been relatively minor for Michigan plums is appropriate in view of the declining market for canned purple plums. Markets for dried prunes and markets for many fruit juices have been expanding in recent years. These may provide significant markets for Michigan plums in the future, although there are obstacles which must be overcome in order to develop these as a significant market for Michigan plums. New markets for plums in other uses such as frozen pitted plums and possible other new uses are being studied. If sufficient new markets for plums can be developed, Michigan fruit growers would likely plant more plum acreage because of the on-farm advantages of growing plums.

In the future, Michigan plums will likely to continue to be sold in increasing amounts for fresh market. A significant quantity will also continue to be sold for baby food. Canned markets will continue to take a significant portion of the Michigan plum crop, although probably a decreasing amount as demand for this market is expected to continue to decline. Hopefully new markets for some plum products can be developed, although development of new markets involves considerable challenges and risks.

APPENDIX
TABLES

Appendix Table 1. Production of Plums by States

Crop Year	Michigan	Oregon	Washington	Idaho	Northwest States ^{a/}	Total Four States	Michigan's Market Share ^{b/}
	----- tons -----						-- percent --
1950	6,500	22,300	13,600	10,000	45,900	52,400	12.4
1951	4,600	59,800	12,700	22,600	95,100	99,700	4.6
1952	7,500	45,100	17,100	24,800	87,000	94,500	7.9
1953	6,700	48,400	22,100	20,900	91,400	98,100	6.8
1954	6,300	42,500	15,100	12,700	70,300	76,600	8.2
1955	5,200	52,600	25,000	22,200	99,800	105,000	5.0
1956	4,900	59,000	17,500	25,500	102,000	106,900	4.6
1957	7,300	34,000	16,000	22,000	72,000	79,300	9.2
1958	7,800	19,700	13,500	19,100	52,300	60,100	13.0
1959	6,800	44,000	22,500	22,600	89,100	95,900	7.1
1960	8,000	4,000	10,100	10,600	24,700	32,700	24.5
1961	9,000	27,400	19,100	20,500	67,000	76,000	11.8
1962	8,000	46,000	21,400	16,700	84,100	92,100	8.7
1963	10,500	6,300	16,100	19,000	41,400	51,900	20.0
1964	14,500	23,000	23,300	23,500	69,800	84,300	17.2
1965	11,500	28,000	13,700	21,000	62,700	74,200	15.5
1966	14,000	25,000	17,200	11,000	53,200	67,200	20.8
1967	16,000	30,500	12,700	16,500	59,700	75,700	21.1
1968	14,000	11,000	11,000	9,000	31,000	45,000	31.1
1969	17,500	32,000	29,000	25,500	86,500	104,000	16.8
1970	10,000	20,300	9,700	7,150	37,150	47,150	21.2
1971	25,000	27,900	16,500	19,000	63,400	88,400	28.3
1972	14,000	8,400	12,500	7,500	28,400	42,400	33.0
1973	18,000	32,000	14,700	8,600	55,300	73,300	24.5
1974	12,000	28,000	21,100	6,100	55,200	67,200	17.9
1975	18,000	30,000	20,200	4,000	54,200	72,200	24.9
1976	16,000	31,000	23,000	7,000	61,000	77,000	20.8
1977	14,000	28,000	12,000	7,000	47,000	61,000	23.0
1978	24,000	17,000	21,300	7,500	45,800	69,800	34.3
1979	14,000	26,000	14,700	7,500	48,200	62,200	22.5
1980	12,500	35,000	23,100	8,000	66,100	78,600	15.9
1981	16,000	38,000	14,600	7,500	60,100	76,100	21.0
1982	11,000	30,000	11,500	7,000	48,500	59,500	18.5

(continued)

Appendix Table 1. (Con't.)

Four-Year Average	Michigan	Oregon	Washington	Idaho	Northwest States a/	Total Four States	Michigan's Market Share b/
1950-53	6,325	43,900	16,375	19,575	79,850	86,175	7.3
1954-57	5,925	47,025	18,400	20,600	86,025	91,950	6.4
1958-61	7,900	23,775	16,300	18,200	58,275	66,175	11.9
1962-65	11,125	25,825	18,625	20,050	64,500	75,625	14.7
1966-69	15,375	24,625	17,475	15,500	57,600	72,975	21.1
1970-73	16,750	21,400	13,625	10,562	45,587	62,337	26.9
1974-77	15,750	29,250	19,175	6,025	54,450	70,200	22.4
1979-82	13,375	32,250	15,975	7,500	55,725	69,100	19.4

a/ Oregon, Idaho and Washington

b/ Michigan production as a percent of four state total plum production.

Source: Noncitrus Fruits and Nuts, Statistical Reporting Service, U.S. Department of Agriculture (various issues).

Appendix Table 2. Michigan Plum Production and Utilization

Crop Year	Total Production	Total Utilization ^{a/} tons	Fresh	Canned ^{b/}	Frozen			
						Fresh	Canned	Frozen
						percent		
1950	6,500	6,500	5,220	1,280	b/	80.3	19.7	---
1951	4,600	4,600	3,310	1,290	b/	72.0	28.0	---
1952	7,500	7,125	5,295	1,830	b/	74.3	25.7	---
1953	6,700	6,700	4,840	1,860	b/	72.2	27.8	---
1954	6,300	6,300	3,515	2,785	b/	55.8	44.2	---
1955	5,200	5,200	2,820	2,380	b/	54.2	45.8	---
1956	4,900	4,900	2,650	2,250	b/	54.1	45.9	---
1957	7,300	6,650	4,150	2,500	b/	62.4	37.6	---
1958	7,800	7,800	4,170	3,630	b/	53.5	46.5	---
1959	6,800	6,800	4,340	2,310	150	63.8	34.0	2.2
1960	8,000	8,000	3,660	4,220	120	45.7	52.7	1.5
1961	9,000	9,000	4,500	4,350	150	50.0	48.3	1.7
1962	8,000	8,000	3,730	4,270	---	46.6	53.4	---
1963	10,500	10,500	3,800	6,340	360	36.2	60.4	3.4
1964	14,500	14,500	6,750	7,135	615	46.6	49.2	4.2
1965	11,500	11,500	4,300	6,835	365	37.4	59.4	3.2
1966	14,000	14,000	6,200	7,050	750	44.3	50.4	5.4
1967	16,000	16,000	5,800	9,250	950	36.2	57.8	5.9
1968	14,000	14,000	4,200	8,825	975	30.0	63.0	7.0
1969	17,500	16,500	7,400	8,480	620	44.8	51.4	3.8
1970	10,000	10,000	5,000	3,850	1,150	50.0	38.5	11.5
1971	25,000	20,000	8,200	11,100	700	41.0	55.5	3.5
1972	14,000	14,000	6,100	6,600	1,300	43.6	47.1	9.3
1973	18,000	18,000	3,650	13,700	650	20.3	76.1	3.6
1974	12,000	12,000	c/	5,700	c/	c/	47.5	c/
1975	21,000	20,000	6,000	11,500	2,500	30.0	57.5	12.5
1976	16,000	16,000	5,000	11,000	b/	28.3	69.2	2.5
1977	14,000	14,000	6,600	6,400	1,000	47.1	45.7	7.2
1978	24,000	24,000	9,400	12,300	2,300	39.2	51.2	9.6
1979	14,000	14,000	7,400	6,000	600	52.9	42.8	4.3
1980	12,500	12,500	5,600	6,900	b/	44.8	55.2	---
1981	16,000	16,000	7,400	8,000	600	46.3	50.0	3.7
1982	11,000	11,000	6,700	3,700	600	60.9	33.6	5.5

(continued)

Appendix Table 2. (Con't.)

Four-Year Average	Total Production	Total Utilization ^{a/}	Fresh	Canned	Frozen	Fresh	Canned	Frozen
			-----tons-----			-----percent-----		
1950-53	6,325	6,231	4,666	1,565	<u>b/</u>	74.9	25.1	--
1954-57	5,925	5,762	3,284	2,479	<u>b/</u>	57.0	43.0	--
1958-61	7,900	7,900	4,167	3,627	105	52.8	45.9	1.3
1962-65	11,125	11,125	4,645	6,145	335	41.8	55.2	3.0
1966-69	15,375	15,125	5,900	8,401	824	39.0	55.5	5.4
1970-73	16,750	15,500	5,737	8,813	950	37.0	56.9	6.1
1979-82	13,375	13,375	6,775	6,150	600 ^{d/}	50.7	45.9	4.0

a/ Difference between total production and total utilization is economic abandonment.

b/ Some amounts of frozen or otherwise processed included with canned.

c/ Not published by Statistical Reporting Service to avoid disclosure of individual operations.

d/ Includes years for which data are available.

Source: Non-Citrus Fruits and Nuts, Statistical Reporting Service, U.S. Department of Agriculture (various issues).