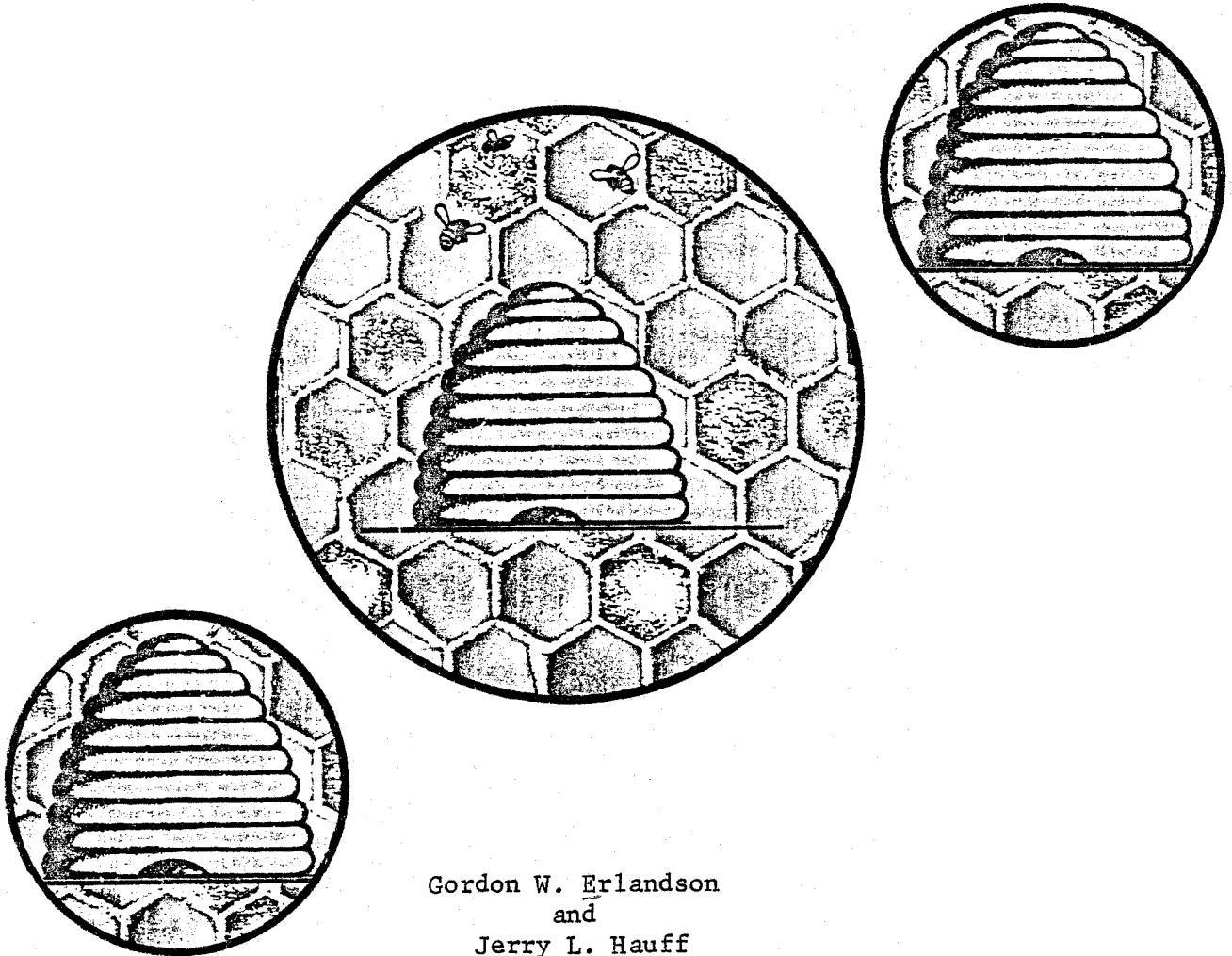


MARKETING NORTH DAKOTA HONEY



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FOREWORD

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Highlights

Honey production in the United States decreased by 22 percent from 1960 to 1980. Meanwhile honey production in North Dakota increased and the state became a major producer of honey. In 1979, North Dakota ranked first in the nation in honey production. Much of this growth has been recent-- colony numbers increased 5.2 percent per year, on the average, from 1960 to 1972, and by 19.1 percent per year from 1972 to 1979. The increase in colony numbers was due primarily to the influx of nonresident beekeepers. North Dakota ranks first in the nation in production per colony with about 110 pounds (1975-1979 average). The corresponding average in the United States was less than 50 pounds per colony.

The USDA estimates that only 1 percent of all beekeepers in the United States are of commercial size. The commercial beekeepers in North Dakota operated over 93 percent of all colonies in 1980. Morton County led all counties with respect to both number of commercial beekeepers and colonies in 1980.

Nonresident beekeepers move colonies into North Dakota during the honey production periods to take advantage of different honeyflows and then depart to milder climates during winter months. About 84,000 colonies were registered to 58 nonresident commercial beekeepers in 1980.

About one-third of all the commercial beekeepers registered in the state are members of the Sioux Honey Association. Other outlets for honey include producer-bottlers, brokers, and bottlers.

Price differentials for wholesale bulk honey sold by beekeepers are based primarily on the color of the honey rather than the USDA grade or floral source.

MARKETING NORTH DAKOTA HONEY

by

Gordon W. Erlandson and Jerry L. Hauff*

North Dakota has rapidly become a major honey producing state. Honey production contributed about \$12.5 million to the state's agricultural economy in 1979. North Dakota was the leading honey-producing state that year with 22.8 million pounds. The total economic importance of beekeeping is difficult to measure since honey and beeswax entail only a part of the value of the beekeeping industry. Honeybees are the most important pollinators of many food and seed crops. It is estimated that over 80 percent of the pollination of fruit and seed crops in the United States is accomplished by honeybees.

Beekeeping is an agricultural enterprise producing marketable products with no depletion of the soil. Honeybees do not draw nutrients or minerals from the soil, decrease moisture levels, or require the application of chemicals to the land. The complementary nature of honey production with other field and livestock enterprises permits the harvest of a vast amount of honey without taking away any acreage from other lines of production.

A colony of honeybees has other unique characteristics when compared with other food-producing animals. Individual honeybees within a colony have a limited life, but the self-regeneration ability of a colony gives it unlimited or perpetual life. Properly managed colonies are able to produce indefinitely regardless of whether the colony is kept for honey, beeswax, pollination, pollen, comb honey, queens, or bees.

This report addresses the trends and patterns of honey production in North Dakota. It investigates factors that influence production and marketing practices. It traces the marketing channels and analyzes the pricing behavior of honey.

*Professor and Graduate Assistant, respectively.

HISTORICAL BACKGROUND

United States Production

Honey production in the nation averaged 208 million pounds per year for the years 1975-1979. This marks a general decline in production since 1960 (Table 1). This decline was accompanied by a decline in colony numbers as well. The number of colonies decreased by 17.3 percent, a decline of 865,000 colonies, during the 1960's and 1970's.

TABLE 1. TOTAL ANNUAL HONEY PRODUCTION AND ESTIMATED NUMBER OF HONEYBEES, UNITED STATES, 1960-1980

Year	Honey Produced <i>000 pounds</i>	Number of Colonies <i>000</i>
1960	257,956	5,005
1961	274,088	4,992
1962	272,788	4,900
1963	298,967	4,849
1964	284,909	4,840
1965	244,549	4,718
1966	246,972	4,646
1967	223,363	4,635
1968	200,081	4,539
1969	282,653	4,433
1970	232,672	4,285
1971	197,428	4,107
1972	213,959	4,085
1973	238,213	4,124
1974	185,338	4,210
1975	197,938	4,206
1976	199,828	4,285
1977	178,499	4,346
1978	230,309	4,081
1979	237,764	4,155
1980	199,583	4,140
Average Per Year	221,909	

SOURCES: United States Department of Agriculture, Agricultural Statistics, United States Government Printing Office, Washington, D.C., 1969, p. 97; 1979, p. 93; 1980, p. 94.

United States Department of Agriculture, Honey Market News, Volume LXIV No. 12, Agricultural Marketing Service, p. 19.

The relative importance of honey production for the years 1975-1979 among the various states is shown in Figure 1. Florida was the nation's top honey producer during that period, followed by California, North Dakota, South Dakota, and Minnesota.

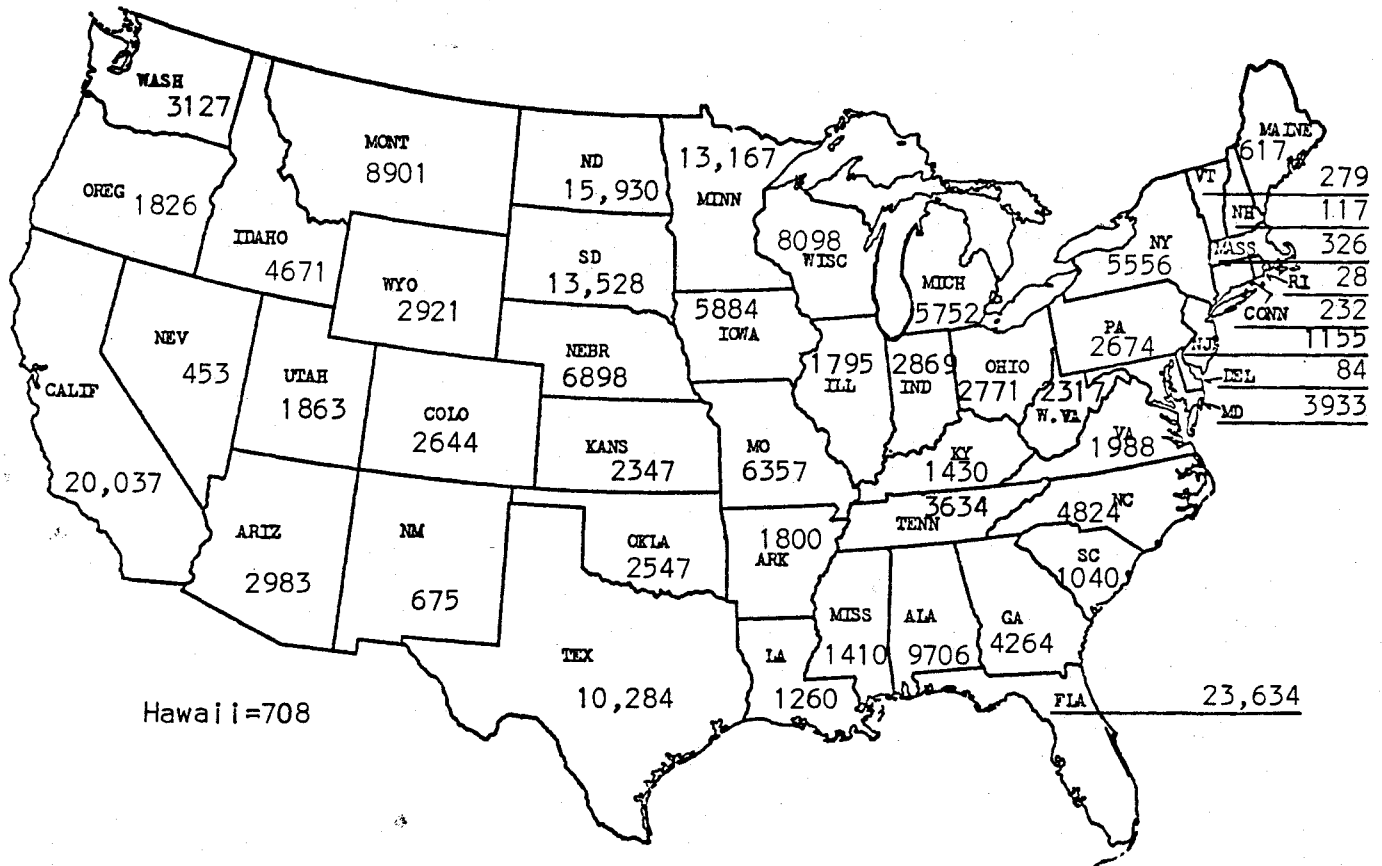


Figure 1. Honey Produced in the United States, Five-Year Average in Thousands of Pounds, 1975-1979

SOURCE: United States Department of Agriculture, Agricultural Statistics, United States Government Printing Office, Washington, D.C., Annual Editions 1976-1980.

Number of Colonies in the United States

California led the nation in the number of colonies for 1975-1979, followed by Florida, Texas, South Dakota, and Minnesota (Figure 2). The large number of colonies registered in the southern states is partially a result of winter migrations from the northern states. The average annual colony count was 4,206,000 for the nation during 1975-1979.

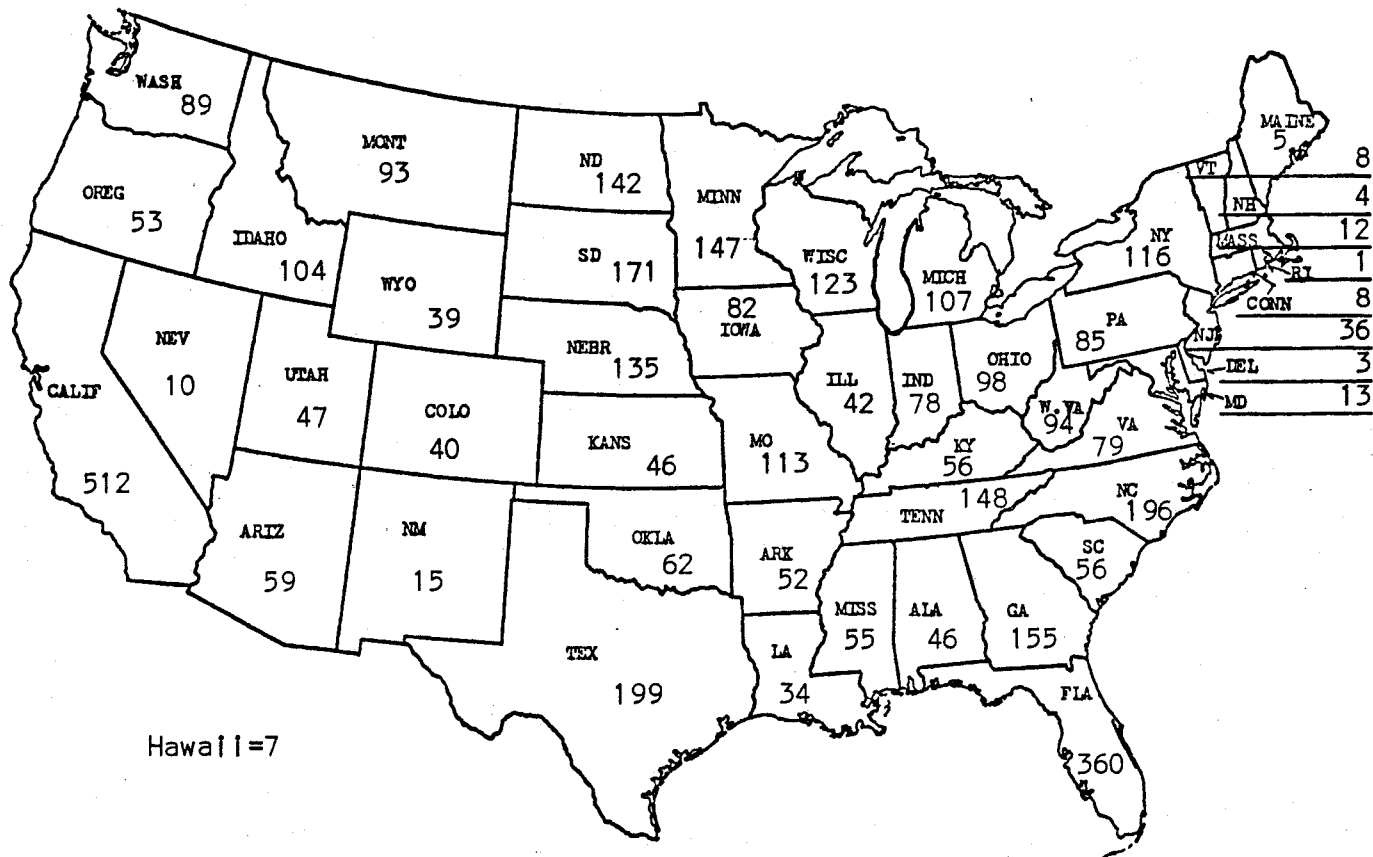


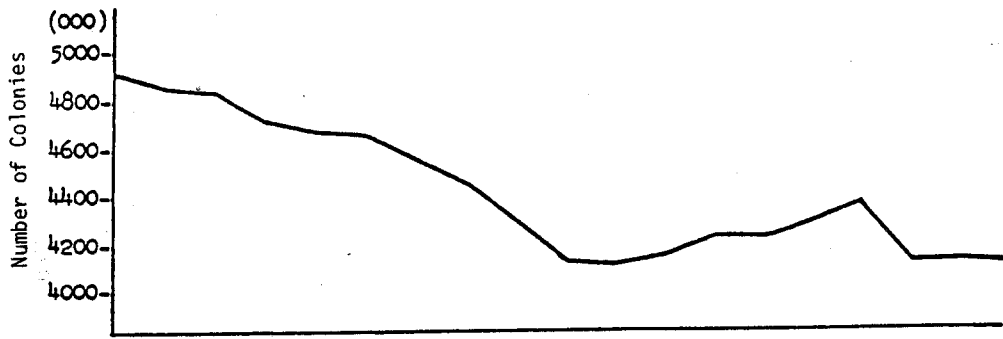
Figure 2. Number of Colonies Registered Per State in Thousands, 1975-1979 Average

SOURCE: United States Department of Agriculture, Agricultural Statistics, United States Government Printing Office, Washington, D.C., Annual Editions 1976-1980.

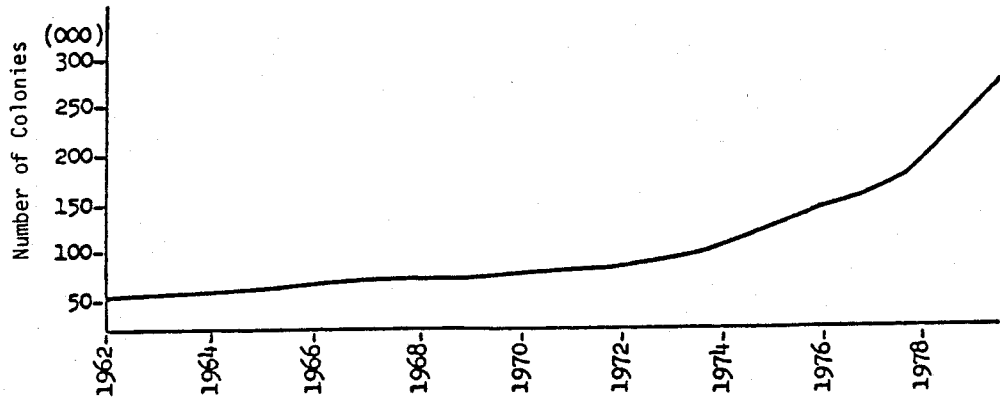
Trends in the number of colonies in North Dakota and for the United States is graphically presented in Figure 3. The national trend in colony numbers was sharply downward during the 1960's. The trend in North Dakota has been positively sloped with an especially rapid increase in numbers in the 1970's.

Number of Colonies in North Dakota

The importance of beekeeping in North Dakota is evidenced by colony registrations increasing from 33,000 in 1960 to 220,000 in 1980 (Table 2). Colony numbers increased 5.2 percent per year, on the average, from 1960 to 1972, and by 19.1 percent per year after 1972. The increase in colony numbers was due primarily to the influx of nonresident beekeepers. This influx may be attributed to several factors:



Colony Numbers in the United States, 1962-1980



Colony Numbers in North Dakota, 1962-1980

Figure 3. Colony Numbers in the United States and North Dakota, 1962-1980

1. Potential for a large volume honey crop produced by colonies placed on North Dakota lands.
2. A high proportion of water-white and extra-white honey. Honey color is a primary criteria for price determination.
3. An ample supply of sweet clover and alfalfa and increasing areas of sunflower create a potential for new production areas.
4. A lower insecticide risk to honeybees within North Dakota.
5. Continued dry conditions in production areas outside North Dakota.

Honey Production Per Colony

North Dakota ranks first in the nation in production per colony with 110 pounds (Table 3). Hawaii, Montana, Minnesota, and South Dakota report production levels of 103, 96, 89, and 78 pounds per colony, respectively. High production in the North Central Plains is due primarily to abundant sources of quality clover and alfalfa. A comparison of the consistently high production

TABLE 2. NUMBER OF COLONIES REGISTERED IN NORTH DAKOTA BY YEAR, AND ANNUAL CHANGE IN NUMBER AND PERCENT OF COLONIES, 1960-1980

Year	Number of Colonies	Change From Previous Year	
		Colonies	Relative Percent
	<i>000</i>	<i>000</i>	<i>percent</i>
1960	33	--	--
1961	36	+ 3	+ 9.1
1962	35	- 1	- 2.7
1963	38	+ 3	+ 8.6
1964	39	+ 1	+ 2.6
1965	41	+ 2	+ 5.0
1966	46	+ 5	+12.2
1967	52	+ 6	+13.0
1968	55	+ 3	+ 5.8
1969	53	- 2	- 3.6
1970	58	+ 5	+ 9.4
1971	59	+ 1	+ 1.7
1972	63	+ 4	+ 6.8
1973	72	+ 9	+14.3
1974	80	+ 8	+11.0
1975	100	+20	+25.0
1976	125	+25	+25.0
1977	136	+11	+ 8.8
1978	160	+24	+17.6
1979	208	+48	+30.0
1980	220	+12	+ 5.8

SOURCE: North Dakota Crop and Livestock Reporting Service, North Dakota Agricultural Statistics 1980, Number 45, Issued Cooperatively by North Dakota State University Agricultural Experiment Station and USDA, ESCS, May 1980, p. 70.

per colony as compared with the rest of the nation is shown in Figure 4. The factors influencing these production data are:

1. Accuracy and honesty of reporting beekeepers
2. Quantity of honey left in the hive for honeybee feed
3. Number of colonies exterminated at the end of the honeyflow
4. The amount of honey in hives when beekeepers move colonies between states.

TABLE 3. AVERAGE HONEY YIELD PER COLONY BY STATE, 1975-1979 AVERAGE

State	Production Pounds	State	Production Pounds
North Dakota	110	Vermont	36
Hawaii	103	Oregon	35
Montana	96	Arkansas	34
Minnesota	89	Pennsylvania	32
South Dakota	78	Delaware	32
Wyoming	76	New Jersey	32
Iowa	72	Maryland	30
Wisconsin	66	New Hampshire	29
Florida	66	Connecticut	29
Colorado	66	Ohio	29
Missouri	56	Rhode Island	28
Michigan	54	Washington	28
Texas	52	Georgia	27
Nebraska	51	Massachusetts	27
Kansas	51	Mississippi	26
Arizona	50	Kentucky	26
Nevada	48	Virginia	26
New York	48	Maine	26
Idaho	45	North Carolina	25
New Mexico	43	Tennessee	25
Illinois	43	West Virginia	24
Oklahoma	41	Alabama	21
Utah	40	South Carolina	18
California	39		
Louisiana	37		
Indiana	37	United States Average	49.6

SOURCE: United States Department of Agriculture, Agricultural Statistics, United States Government Printing Office, Washington, D.C., Annual Editions 1976-1980.

Characteristics of Beekeepers

Beekeeping requires cultural practices that are unique to each area of the United States. Differences result from variations in agricultural production, type of bee pasture, and amount of required pollination. A complex combination of factors such as rainfall, soil conditions, temperature, various environmental circumstances, and management abilities influence production levels.

The North Dakota Department of Agriculture, Apiary Division, classifies beekeepers into two groups. Noncommercial or hobbyists are those beekeepers who maintain less than 250 colonies, while commercial beekeepers maintain 250 colonies or more.

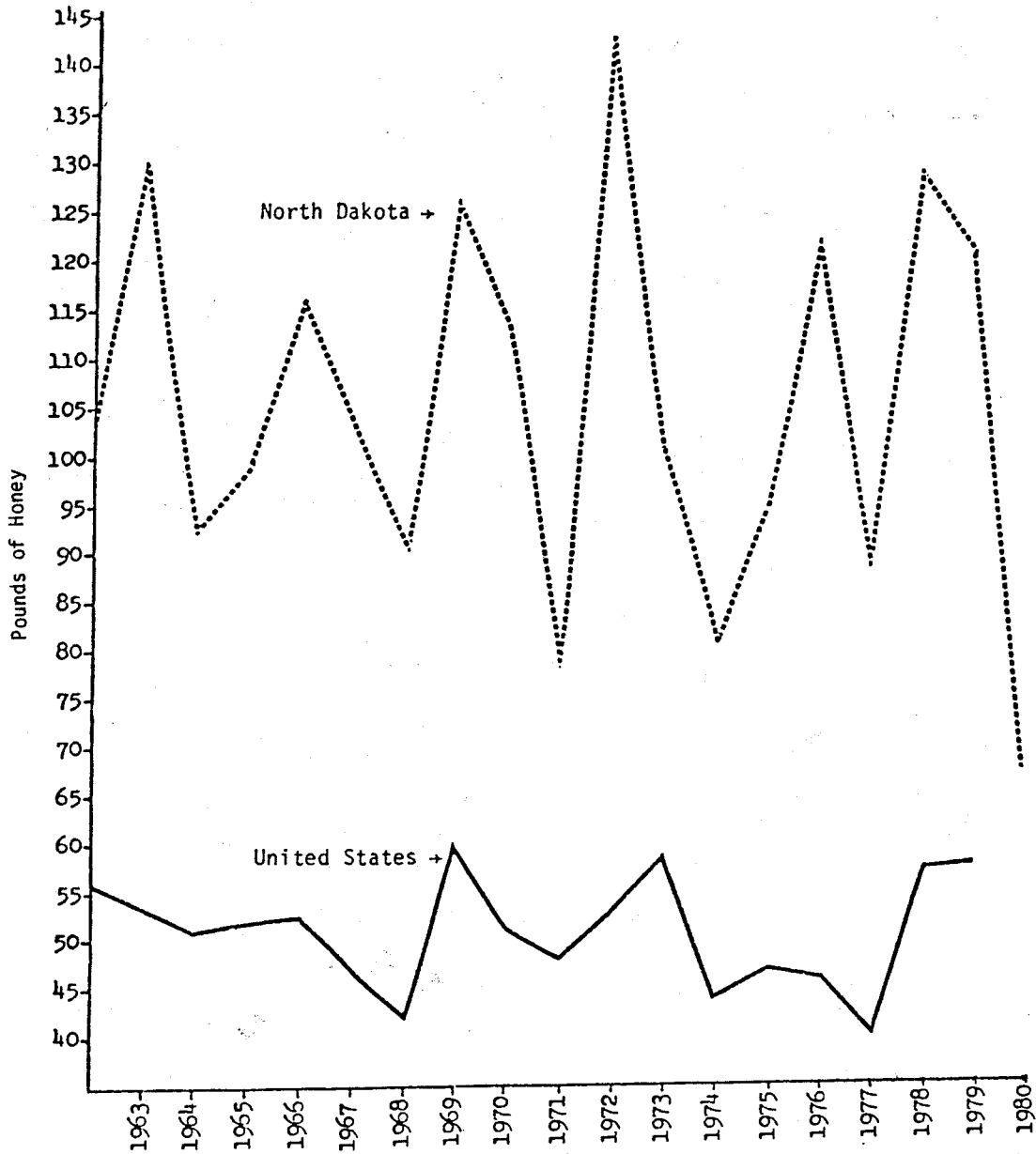


Figure 4. Honey Yield Per Colony, United States and North Dakota, 1962-1980

SOURCE: United States Department of Agriculture, Agricultural Statistics, United States Government Printing Office, Washington, D.C., Annual Editions 1963-1980.

Hobbyists or Noncommercial Beekeepers

Hobbyists are diverse, coming from every possible walk of life and encompassing all ages. Colonies are kept by hobbyists for extra income, study, enjoyment, and family honey requirements. A total of 349 hobbyists maintained 15,700 colonies in North Dakota in 1980 for an average of about 45 colonies.

Hobbyists make up about 70 percent of all beekeepers in the state, but account for only 6.3 percent of the total number of colonies.

The 1980 registrations indicate that noncommercial beekeepers generally concentrate near populated areas (Figure 5). The eight counties containing the eight largest cities in the state listed 169 hobbyists or 51 percent of all noncommercial beekeepers. Stutsman led all counties with respect to both number of beekeepers and number of colonies in 1980 (Table 4).

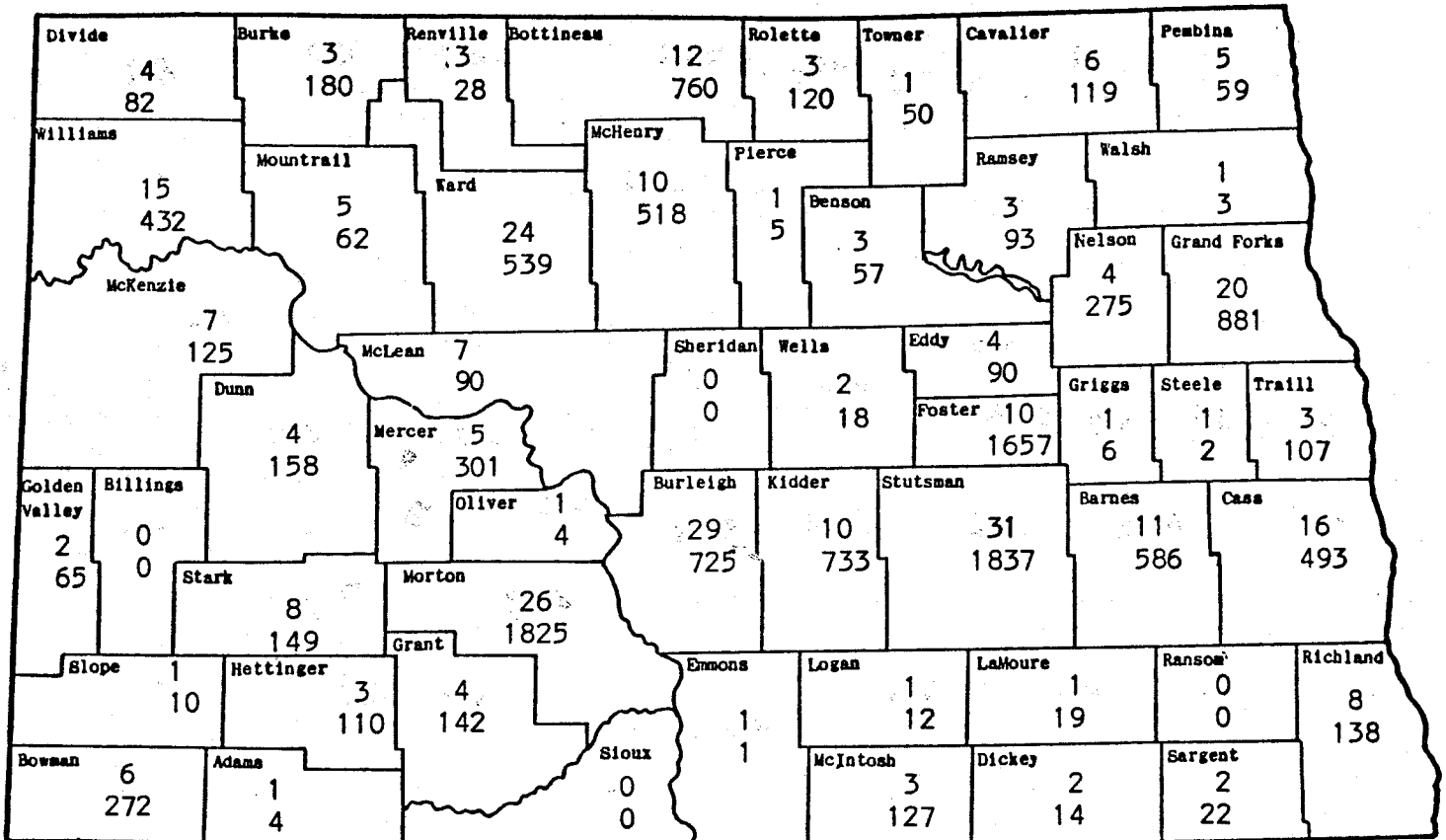


Figure 5. North Dakota Resident Noncommercial Beekeepers and Colonies by County of Home Residence, 1980
 Top figure is the number of registered noncommercial beekeepers per county, and the lower figure is the number of colonies they registered.

SOURCE: North Dakota Department of Agriculture, Apiary Division, 1981.

Commercial Beekeepers

The USDA estimates that 1 percent of all beekeepers in the United States are of commercial size. The commercial beekeepers in North Dakota operated 93.7 percent of all colonies with an average of 1,651 colonies in 1980. Residences of commercial beekeepers are distributed throughout the state without

TABLE 4. NUMBER OF NONCOMMERCIAL BEEKEEPERS AND COLONIES, LEADING COUNTIES, 1980

County	Beekeepers	Colonies
	- - - - - number - - - - -	
Stutsman	31	1,837
Morton	26	1,825
Foster	10	1,657
Grand Forks	20	881
Bottineau	12	760
Kidder	10	733
Burleigh	29	725
Barnes	11	586
Ward	24	539
McHenry	10	518
Cass	16	493
Williams	15	432

SOURCE: North Dakota Department of Agriculture, Apiary Division, 1981.

regard to population centers. Commercial beekeepers locate primarily according to bee pasture and apiary location availability (Figure 6). Morton led all counties with respect to both number of commercial beekeepers and colonies in 1980 (Table 5).

TABLE 5. NUMBER OF COMMERCIAL BEEKEEPERS AND COLONIES, LEADING COUNTIES, 1980

County	Beekeepers	Colonies
	- - - - - number - - - - -	
Morton	14	16,805
Stark	12	12,184
Ward	9	11,200
Adams	2	9,847
Foster	4	9,600
Williams	4	9,378
Dickey	2	7,900
Burleigh	2	6,700
Grand Forks	8	6,343
Nelson	3	4,100

SOURCE: North Dakota Department of Agriculture, Apiary Division, 1981.

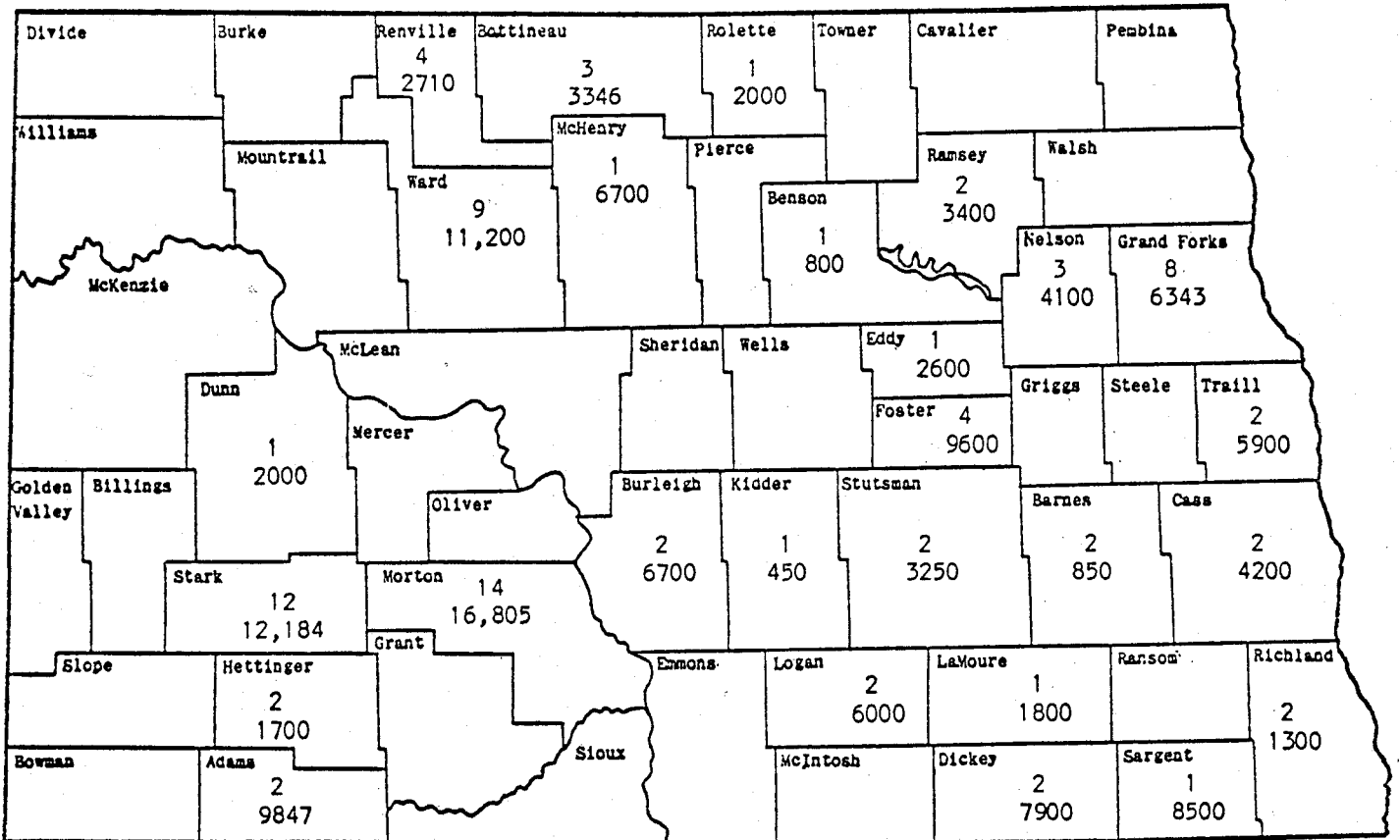


Figure 6. North Dakota Commercial Beekeepers and Colonies by County of Home Residence, 1980

Top figure is the number of registered commercial beekeepers per county, and the lower figure is the number of colonies they registered per county.

SOURCE: North Dakota Department of Agriculture, Apiary Division, 1981.

Nonresident Beekeepers

Commercial beekeepers generally move colonies of honeybees from one location to another or from state to state to take advantage of several different honeyflows and warmer climates during winter months. Thus, one must distinguish between resident and nonresident beekeepers. Resident beekeepers are individuals proclaiming a home address in North Dakota, while nonresident beekeepers are individuals who move colonies into North Dakota during honey production periods.

Registration of colonies in 1980 to nonresident commercial and noncommercial beekeepers in North Dakota totaled 85,570--a 29.2 percent increase over 1979 totals. Nonresident commercial beekeepers numbered 58 with 83,965 colonies. Noncommercial beekeepers registering as nonresidents come from seven states maintaining 1,605 colonies (Table 6 and Figure 7).

TABLE 6. STATE RESIDENCY OF NONCOMMERCIAL BEEKEEPERS IN NORTH DAKOTA, 1980

State	Colonies	Beekeepers
	- - - - - number - - - - -	
California	676	4
Minnesota	293	6
Nebraska	240	1
Texas	226	1
Wisconsin	100	1
South Dakota	60	1
Montana	10	1
Total	1,605	15

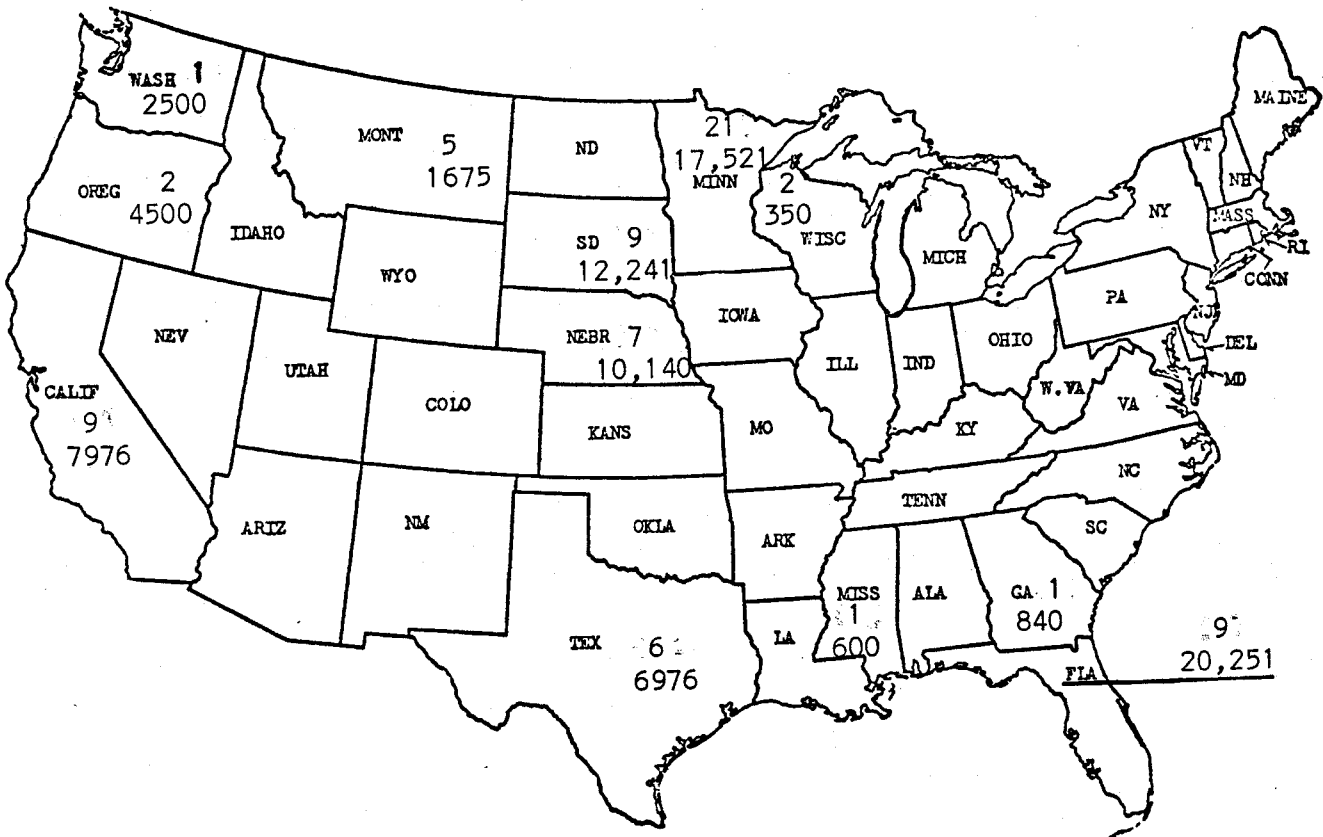


Figure 7. Number of Nonresident Beekeepers and Colonies by State of Home Residence Registered in North Dakota, 1980
 Top figure is the number of beekeepers registered in North Dakota by their state of residence, and the lower figure is the number of colonies they registered in North Dakota.

SOURCE: North Dakota Department of Agriculture, Apiary Division, 1981.

Apiary Management

The North Dakota Department of Agriculture defines "apiary" as any place where one or more colonies are kept. Commercial beekeepers are required to maintain a minimum of 25 colonies per location or apiary. Commercial beekeepers in North Dakota maintain from 25 to 100 colonies per location with 32 colonies suggested as ideal by beekeepers. Variation in availability of nectar sources accounts for the differences in colony number per location. State apiary regulations specify that all noncommercial beekeepers must list colony numbers per location. Commercial beekeepers are not required to list colony numbers per location--only the legal land description of the apiary.

Honeybee Pasture Selection

Honeybee pasture selection is one of a beekeeper's most important jobs. Honey cannot be produced without two basic raw materials in adequate supply: pollen and nectar. The sources of pollen and nectar are ever changing as a result of environmental and agricultural changes. Beekeepers must study an area to know which plants provide nectar and pollen during production periods.

Beekeepers must consider several factors when choosing honeybee pasture. An ideal location should provide:

1. Adequate sources of pollen (especially in the spring of the year as pollen is used as feed for young brood).
2. Attractive nectar sources--honeybees are attracted to various plants because of their shape or behavior and will avoid others.
3. Low humidity and rainfall--a humid environment creates more work for honeybees when transporting nectar to a colony and in the evaporation process.
4. Some wind protection as honeybees will not fly in winds over 15 m.p.h.
5. Available water sources (such as a small pond or stream).
6. Placement of colonies facing the south or east for the availability of morning sunlight.
7. Protection from or avoidance of possible insecticide killing.

Wintering Colonies

Wintering methods for colonies in North Dakota vary with the number of colonies beekeepers maintain. Noncommercial beekeepers generally have two options:

1. Kill colonies and replace in the spring with honeybees purchased from a bee supply dealer or another beekeeper.
2. Leave an adequate quantity of honey in the hive (usually 50 to 70 pounds) for honeybee feed during winter. Beekeepers often attempt to insulate colonies in some fashion.

Wintering of colonies is a major management problem for commercial beekeepers. Many commercial beekeepers feel replacement bees in a colony do not have the extra strength to aggressively collect pollen and nectar during the early spring honeyflows.

Winter-kill creates problems for beekeepers in North Dakota. Problems include:

1. Potential loss of honeybees
2. Potential loss of honey left in hive to feed honeybees if winter-kill takes place
3. Difficulty obtaining package bees and queen at the proper time in the spring
4. Colonies that survive the relatively severe northern winter are usually weaker than colonies wintered in warmer climates, so time is needed during early honeyflows to rebuild honeybee numbers. The rebuilding process will reduce honey production by honeybees during the early honeyflows that produce water-white and extra-white honey. This honey receives the highest premium from packers.

Various methods used by beekeepers of overwintering colonies in North Dakota include:

1. Colonies kept in North Dakota are wrapped with various materials such as insulation, cardboard, straw, or tarpaper. Beekeepers retain from 50 to 70 pounds of honey within the hive for honeybee feed during the winter.
2. Many beekeepers move complete colonies to southern gulf states and California. During the stay in the South, beekeepers fulfill pollination contracts and attempt to strengthen colonies for early honeyflows in North Dakota. Honey production is not a concern of beekeepers during the time colonies are in southern states.
3. Beekeepers exterminate from 50 to 75 percent of all colonies before leaving North Dakota, moving only the strongest colonies to warmer climates. On about March 1, beekeepers divide each colony into three or four nucs or nucleus (small colonies of honeybees) occupying two to five standard broad frames to build up nuc strength. Warm spring weather brings beekeepers and strong nucs back to North Dakota where each nuc will be the heart of a new colony. Nucs are popular because of the ease in handling and reduction in transportation costs over conventional colonies.

Industry Entry

Individuals interested in beekeeping should contact an established beekeeper. Beekeepers are generally very helpful to individuals taking an interest in beekeeping. Various publications and reference materials helpful for further study are listed in the Appendix.

Beginning beekeeper kits are available at a cost of about \$130 to \$170 (1980 list prices). Kits contain everything a beginner needs to establish the first colony (except the bees): (1) two standard beehive boxes and two shallow supers complete with frames and wax foundation, (2) entrance reducer, (3) protective bee veil, (4) hive tool, (5) bee smoker, (6) proper gloves, (7) entrance feeder, and (8) a basic instruction manual. The honeybees can be ordered from a bee supply company in two or three pound packages at a range in cost of \$24 to \$30 (1980 list prices).

Bee Laws and Regulations

Federal Regulations

The federal government does not regulate the interstate transport of colonies of honeybees. The Honeybee Act of 1922, last revised in 1976, restricts importation of honeybees in all stages of growth into the United States; exceptions include the unrestricted movement of honeybees from Canada. Honeybees from countries which the Secretary of Agriculture has determined as disease free, parasite free, and containing no undesirable species of bees may be imported.

State Regulations

In general, state laws and regulations influencing beekeepers have been enacted primarily to control infectious diseases common to honeybees. Infectious diseases of greatest concern to the beekeeper are American foulbrood and European foulbrood.

Enforcement of honeybee regulations within a state is the responsibility of the State Apiary Inspector. Specific regulations for a particular state must be obtained from the State Apiary Inspector. In North Dakota the Apiary Inspector publishes a booklet entitled Beekeeping in North Dakota which lists the laws and regulations affecting migratory beekeepers.

The two mile limit law is important to most beekeepers. Specific details of the law can be found in the publication Beekeeping in North Dakota available from the Department of Agriculture. The initial law was passed in 1967 with two major objectives:

1. Prevention and control of the contagious diseases American and European foulbrood. The spread of these diseases is increased during periods of limited nectar flows. Honeybees will rob neighboring colonies during dry weather and after frost in the fall of the year when nectar quantities are limited, promoting the spread of disease problems.
2. Economic incentives for beekeepers to keep honeybees in established areas--giving beekeepers the security that bee pasture is protected from incoming beekeepers.

HONEY MARKETING

Overall Market Flow

Commercial beekeepers in North Dakota use four primary outlets for honey, including: (1) producer-bottlers, (2) brokers, (3) bottlers, and (4) cooperative associations (Figure 8). Individual beekeepers may perform one or more of the necessary functions to complete the marketing process from beekeeper to consumer.

Producer-Bottler

Beekeepers assuming any function of the marketing system by selling honey in retail-sized containers are called producer-bottlers. The direct sale of raw unprocessed honey to consumers by both commercial and hobby beekeepers makes up a sizable portion of the honey consumed within the state. High volume consumers favor the producer-bottlers as a source of honey because they are generally able to obtain raw honey at a lower price than processed honey. Small commercial and hobbyist beekeepers find direct marketing of honey very convenient.

Brokers

The function of brokers is to establish contracts between sellers and buyers of honey. Part-time sales personnel, who generally do not buy on their own account nor take title to the product, perform this service. Commercial beekeepers in North Dakota generally do not use brokers but deal directly with buyers.

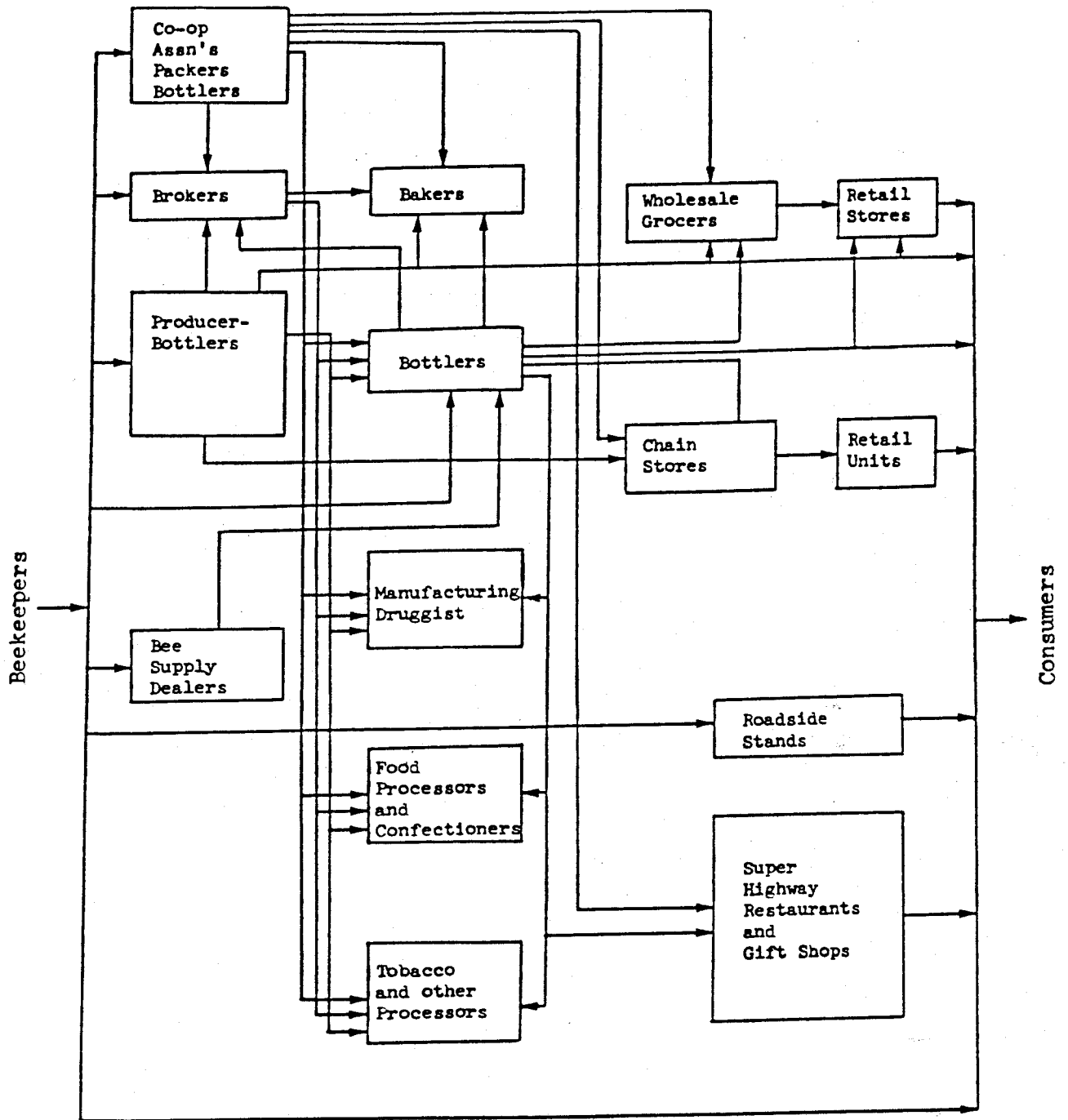


Figure 8. Market Channels for Honey

SOURCE: Motts, George N., Marketing Handbook for Michigan Honey, Department of Agricultural Economics, Agricultural Experiment Station, Michigan State University, East Lansing, 1961, p. 10.

Bottlers

Bottlers do not produce honey but purchase it from beekeepers in bulk for blending and packaging. Products that bottlers provide may be sold directly to consumers, retail grocers, wholesale grocers, brokers, bakers, chain stores, food processors, and various other honey consumers. Consumers may demand unique varieties of honey in different areas of the country. Southern states may prefer orange blossom, western states--buckwheat, and midwest and eastern states--clover and alfalfa honeys.

Commercial beekeepers in North Dakota favor bottlers as a wholesale outlet for bulk honey. Bottlers generally are able to purchase large quantities of honey for processing and redistribution. Beekeepers sell raw, unprocessed bulk honey to various bottlers with negotiations influenced by:

1. Price paid for commodity
2. Payment date for commodity
3. Terms of negotiations affecting cleaning and return of drums
4. Past experiences with buyers.

Cooperative Marketing Association

The Sioux Honey Association, Sioux City, Iowa, was founded in 1921 by five beekeepers and now contracts with many beekeepers producing honey in North Dakota. About one-third of all the commercial beekeepers registered in the state are Sioux Honey Association members. Producer-member benefits increase as a cooperative gains control of increasing percentages of the volume marketed. Commercial beekeepers benefit primarily from the marketing improvements a cooperative honey association is able to provide. Members are then able to concentrate on the production aspects of beekeeping.

Market Information

Honey marketing requires that beekeepers be aware of supply and demand conditions throughout the United States and the world. A honey cooperative membership enables beekeepers to concentrate on production and to shift the burden of watching the market to the cooperatives.

Honey Market News,* used by beekeepers as a guideline to estimate supply and demand conditions for honey, includes:

1. Monthly summary of imports, supply, production, and other relevant information which might affect domestic supply of honey.
2. Representative prices paid to beekeepers for bulk honey during a particular month for states and areas within the United States. For each state price quotes are given in terms of honey type, price per pound, volume of sales, market demand conditions, and approximate amounts of honey offered for sale.
3. World honey production and supplies in various countries including type of honey offered to bottlers, price in United States currency, and time of available delivery.
4. State by state description of factors affecting honey production within the particular state include moisture levels, temperatures, colony numbers, general colony strength, availability of nectar sources, market activity, concerns of handlers and packers, expected production levels, pollination activity, requeening of colonies, beeswax trading, and various miscellaneous information pertinent to beekeepers.
5. List prices of extracted packaged honey for a particular month with wholesale prices listed by state.
6. Imports and exports by country with totals for previous two months. A rounded total for the year involved is also calculated.
7. A monthly activity report of the honey Commodity Credit Corporation Loans. Summary includes state, number of loans, quantity of honey put under loan, loan quantity repaid, loan quantity delivered, and quantity outstanding.

Grades of Extracted Honey

USDA grades for honey are not mandatory, but beekeepers and bottlers labeling honey as a particular grade are responsible for the accuracy of the label. Four factors determine USDA grades: (1) soluble solids or percent moisture content, (2) flavor, (3) absence of defects, and (4) clarity. Grades of honey are evaluated on the USDA scorecard with determination of soluble solids first, followed by a scoring system weighted as follows: flavor, a maximum of 50 points; absence of defects, a maximum of 40 points; and clarity, a possible 10 points; for a possible 100 points. USDA standard highlights are:

*Honey Market News is available from the United States Department of Agriculture, Agricultural Marketing Service, 2503 South Agriculture Building, Fruit and Vegetable Division, Washington, D.C. 20250, Phone--(202)447-6592.

U.S. GRADE A OR U.S. FANCY is a honey which contains not less than 81.4 percent soluble solids; possesses a good flavor for the predominant floral source or, when blended, a good flavor for the blend of floral sources; is free from defects; and is of such quality with respect to clarity as to score not less than 90 points on the USDA scorecard.

U.S. GRADE B OR U.S. CHOICE is a honey which contains not less than 81.4 percent soluble solids; possesses a reasonably good flavor for the predominant floral source or, when blended, a reasonably good flavor for the blend of floral sources; is reasonably free from defects; is reasonably clear; and scores not less than 80 points on the USDA scorecard.

U.S. GRADE C OR U.S. STANDARD is a honey for reprocessing which contains not less than 80 percent soluble solids; possesses a fairly good flavor for the predominant floral source or, when blended, a fairly good flavor for the blend of floral sources; is fairly free from defects; and is of such quality as to score not less than 70 points on the USDA scorecard.

U.S. GRADE D OR SUBSTANDARD is a honey which fails to meet the requirements of U.S. Grade C or U.S. Standard.

Grading and Inspection

Color is not a quality factor in the USDA honey grade standard because all colors of honey may have excellent flavor and be suitable for table use in the United States. However, price differentials for wholesale bulk honey sold by beekeepers is based primarily on the color of the honey rather than the USDA grade or floral source. The Pfund color scale instrument is most commonly used by the honey industry for determination of honey color. The color classification, ranging from water-white to dark amber, is used primarily to describe the honey type to potential consumers. Colors of honey are listed in Table 7 along with respective Pfund scale readings. (Beekeepers also may find Pfund scale readings divided by a value of ten.) Honey color in containers may be very deceptive as color may appear different in various types of containers. Small quantities of honey, for example, appear lighter in color than the same honey in a larger, thicker container. North Dakota honey color varies depending on the following factors:

1. Time of season produced
2. Area of state and type of bee pasture
3. Management techniques used by the beekeeper.

Time of Season

The majority of water-white and extra-white honeys is produced from mid-June to mid-August. Sweet clover in North Dakota is the most important floral

source during early honeyflows. Honey buyers usually pay a small premium for light colored honey.

TABLE 7. HONEY COLOR CLASSIFICATION AND CORRESPONDING PFUND SCALE READINGS

Color Designations	Pfund Scale Readings
Water-white	8 or less
Extra-white	9 to 17
White	18 to 34
Extra-Light Amber	35 to 50
Light Amber	51 to 85
Amber	86 to 114
Dark Amber	114 and over

SOURCE: Langstroth, L. L., The Hive and the Honeybee, Dadant and Sons, Hamilton, Illinois, 1975, p. 458.

Area of State and Type of Bee Pasture

Western North Dakota landowners traditionally plant many acres of sweet clover which provide excellent honey yields, early honeyflows, and light colored honey. Increased acres of sunflower in eastern and central North Dakota provide a late season honeyflow and a slightly darker honey.

Quality of Management Techniques

Beekeepers able to have strong colonies ready for early honeyflows will produce a greater quantity of water-white honey. Beekeepers may begin extracting honey as early as mid-July to ensure all light colored honey is put into particular lots. Beekeepers who wait until the end of all honeyflows before extracting find it difficult to separate the lighter colored honey from the late season darker honey.

Advertising and Promotion

General promotion techniques are discussed in this section rather than specific details. Beekeepers' expenditures for advertising and promotion are minimal, and beekeepers in North Dakota have no strong unified method of advertising and promotion.

In North Dakota the potential honey market is limited by low population. Advertising in the form of newspaper want ads, posters, and a variety of miscellaneous techniques is used to promote honey sales to patrons in small towns. Word of mouth is the most prominent form of advertising for the noncommercial beekeeper.

Commercial beekeepers in North Dakota are divided into four categories according to advertising and promotion techniques:

1. Sioux Honey Association members.
2. Commercial beekeepers concentrating only on production.
3. Commercial beekeepers selling a portion of the honey crop to retail outlets and the remaining production for wholesale in bulk.
4. Small commercial firms packing honey for retail sale.

Commercial beekeepers are generally not concerned with advertising and promotion at the wholesale level. Beekeepers indicated that advertising and promotion should be carried out by packers and dealers. Developing public awareness of the nutritional value of honey was the only specific promotional technique suggested by beekeepers.

Organized promotion and advertising of honey in North Dakota are carried out by the North Dakota Beekeepers Association. The Beekeepers Association selects a North Dakota Honey Queen who reigns for one year and is available for fairs and similar promotional activities.

North Dakota Honey Promotion Act

The North Dakota Honey Promotion Act passed in 1979 defines market development as research, promotion, and education programs toward better and more efficient production, marketing, and utilization of honey for resale. Market development also refers to methods including (but not limited to) public relations and other promotional techniques for the maintenance of present honey market; for the sale of honey; and for prevention, modification, or elimination of trade barriers which obstruct the free flow of agricultural commodities to market. Market development also refers to North Dakota Honey Queen activities.

Financing for activities under the North Dakota Honey Promotion Act is secured from a 5 cent assessment per colony. The Commissioner of Agriculture collects the assessment at the time beekeepers register colonies with the Department of Agriculture. A minimum assessment of one dollar is collected from beekeepers with less than 20 colonies. Beekeepers may request in writing a refund of fees paid to the Department of Agriculture for honey promotion.

Honey Price

Honey price in the United States is affected by the forces of supply and demand. World honey supply varies from year to year depending primarily on weather conditions. United States honey supplies have been abundant from the early 1950's to early 1970's. Extracted wholesale honey price per pound for 1945-1979 is listed in Table 8. Colony number buildup after World War II and increased production did not affect prices until 1948.

Between 1949 and 1970 wholesale extracted honey prices did not vary more than 2 cents per pound per year. Beekeepers caught in this price-cost squeeze were forced to remove colonies from production. The wholesale honey price in 1971 increased by 25 percent, followed by a sizable increase every year until 1974 when wholesale prices leveled out. The period of increasing honey prices generated high beekeeper interest in high production areas of North Dakota. Price increases from 1971-1974 brought many colonies into production as indicated by colony counts in the United States.

North Dakota and United States honey prices are plotted in Figure 9. Speculations by beekeepers as to why North Dakota consistently receives a lower honey price in spite of a good quality honey produced include:

1. The distance from main markets, since beekeepers may be at a bargaining disadvantage, and higher transportation costs are reflected in price of honey.
2. A high percent of commercial beekeepers in North Dakota sell nearly their entire honey crop wholesale. Beekeepers in highly populated states sell a high percentage of their honey crop through "direct channels."

Honey Support Price

The Agricultural Stabilization and Conservation Service (ASCS), under the direction of the USDA, maintains a honey support price program. Price support is available through loan and honey purchase agreements between the beekeeper and county ASCS.

Loans provide interim financing for beekeepers to assist them in marketing their crop in an orderly manner. This provides market stability to producers and encourages maintenance of bee populations which are vital for pollination of important seed, fruit, and vegetable crops.

Beekeepers may use honey for collateral against loans secured from the ASCS. The beekeeper also has the option of selling the honey crop to the Commodity Credit Corporation (CCC) at the support price.

TABLE 8. EXTRACTED PRICE PER POUND FOR WHOLESALE, RETAIL, AND ALL HONEY, NORTH DAKOTA, 1945-1979

Year	Extracted Price			Wholesale-Retail-Spread
	Wholesale	Retail	ATT	
	----- cents per pound -----			
1945	18¢	21¢	19.2¢	3¢
1946	25	27	25.8	2
1947	24	28	25.3	4
1948	13	22	16.1	9
1949	9	19	10.7	10
1950	11	19	12.2	8
1951	10	18	11.4	8
1952	11	21	12.4	10
1953	12	23	12.6	11
1954	12	22	13.4	10
1955	13	24	14.5	11
1956	14	25	15.4	11
1957	15	26	16.4	11
1958	14	25	15.5	11
1959	13	24	13.4	11
1960	15	26	15.4	11
1961	14	26	15.1	12
1962	13	25	13.7	12
1963	14	25	14.5	11
1964	14	26	14.8	12
1965	14	25	14.0	11
1966	13	26	13.2	13
1967	13	26	13.6	13
1968	13	26	13.7	13
1969	14	26	14.6	12
1970	15	27	16.2	12
1971	20	32	21.4	12
1972	27	42	28.1	15
1973	44	53	44.0	9
1974	49	64	49.0	15
1975	46	73	46.3	27
1976	49	72	49.2	23
1977	49	72	49.0	23
1978	47	77	47.1	30
1979	51	81	51.9	30

SOURCES: United States Department of Agriculture, Agricultural Statistics, United States Government Printing Office, Washington, D.C., Annual Editions 1946-1980.

North Dakota Crop and Livestock Reporting Service, North Dakota Agricultural Statistics 1980, Number 45, Issued Cooperatively by North Dakota State University Agricultural Experiment Station and USDA, ESCS, May 1980, p. 70.

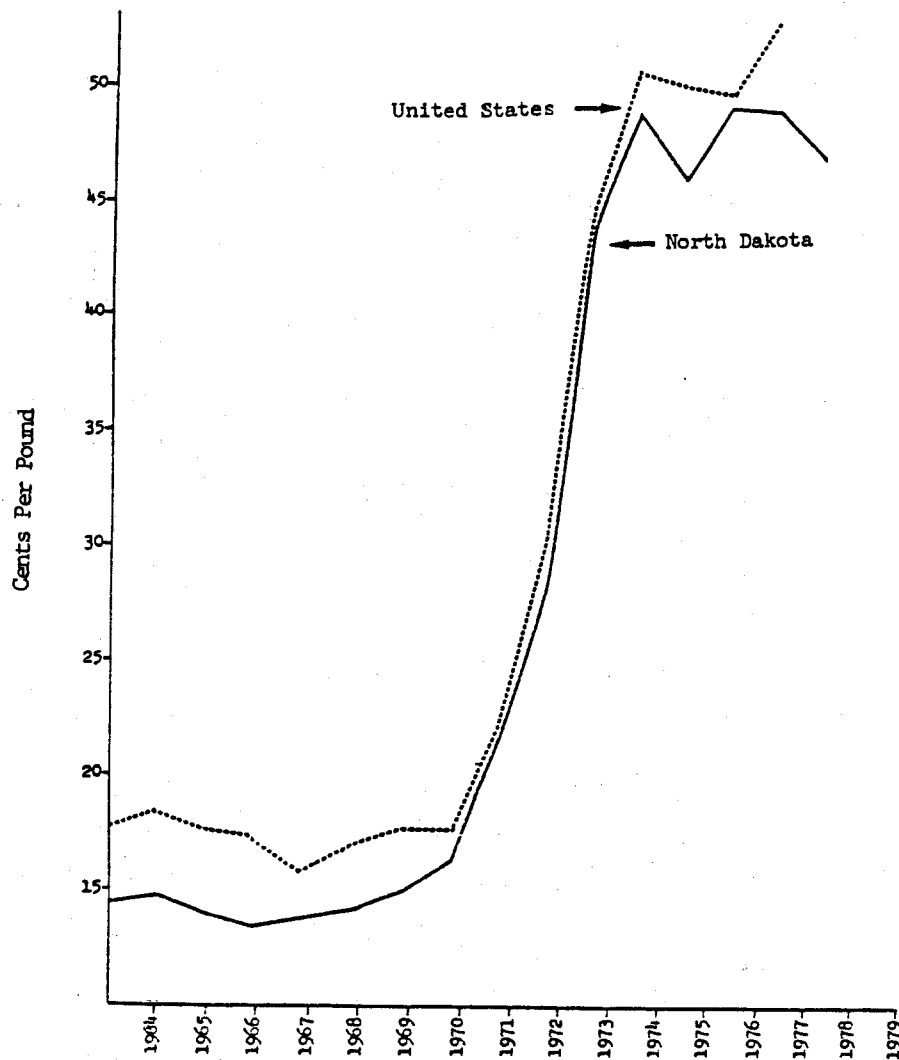


Figure 9. Average Price Per Pound of All Honey, United States and North Dakota, 1963-1979

SOURCES: United States Department of Agriculture, Agricultural Statistics, United States Government Printing Office, Washington, D.C., Annual Editions, 1946-1980.

North Dakota Crop and Livestock Reporting Service, North Dakota Agricultural Statistics 1980, Number 45, Issued cooperatively by North Dakota State University Agricultural Experiment Station and USDA, ESCS, May 1980, p. 70.

The requirements for eligibility in the honey loan and purchase program for the 1980 crop included:

1. The applicant was required to be an individual or legal entity who extracts honey produced by honeybees owned by him or her. Cooperative marketing associations which are approved by the executive vice president of the CCC are eligible on behalf of their members.

2. Beekeepers were required to apply for loans from the ASCS on or before March 31, 1981, with loans maturing no later than June 30, 1981.
3. Beekeepers were required to apply at the ASCS office in the county where honey is stored.
4. Honey had to be produced in the United States during the year support was requested.
5. The support level is currently 60 percent of the April adjusted parity price for each year. Differentials are provided to distinguish color of honey as follows:

	<u>Support Price</u>	
	<u>1980*</u>	<u>1981*</u>
	<i>cents per pound</i>	
<u>Table Honey**</u>		
White or Lighter	51.1	58.2
Extra Light Amber	50.1	57.2
Light Amber	49.1	56.2
Other Table Honey	47.1	54.2
<u>Nontable Honey**</u>	47.1	54.2

6. The support price of honey is currently adjusted according to the following descriptions:
 - a. Deduction of 2 cents per pound for honey that is graded nontable because of defects.
 - b. Honey with a moisture level over 18.5 percent is discounted according to ASCS schedules.
7. Honey must be stored in five gallon cans, 55 gallon drums, or approved bulk storage. The containers must be stored in facilities owned or leased by the beekeeper within the county in which the loan is secured.
8. Loans could be obtained for up to 90 percent of the beekeeper's certified honey quantity. The state ASCS Office determines the percent based on:
 - a. Production conditions
 - b. Factors affecting quantity peculiar to an area
 - c. Factors affecting storage.

The margin between support prices and prices received by beekeepers in the marketplace between 1950 and 1970 was very small (Table 9). The marketplace has provided beekeepers a price for honey at a considerably higher level than

*The 1980 parity base price at 83.9 cents per pound and the 1981 parity base price at 95.6 cents per pound.

**Description of table and nontable honeys as defined by ASCS.

TABLE 9. NATIONAL AVERAGE SUPPORT PRICE AND AVERAGE PRICE RECEIVED BY PRODUCERS, UNITED STATES, 1950-1980

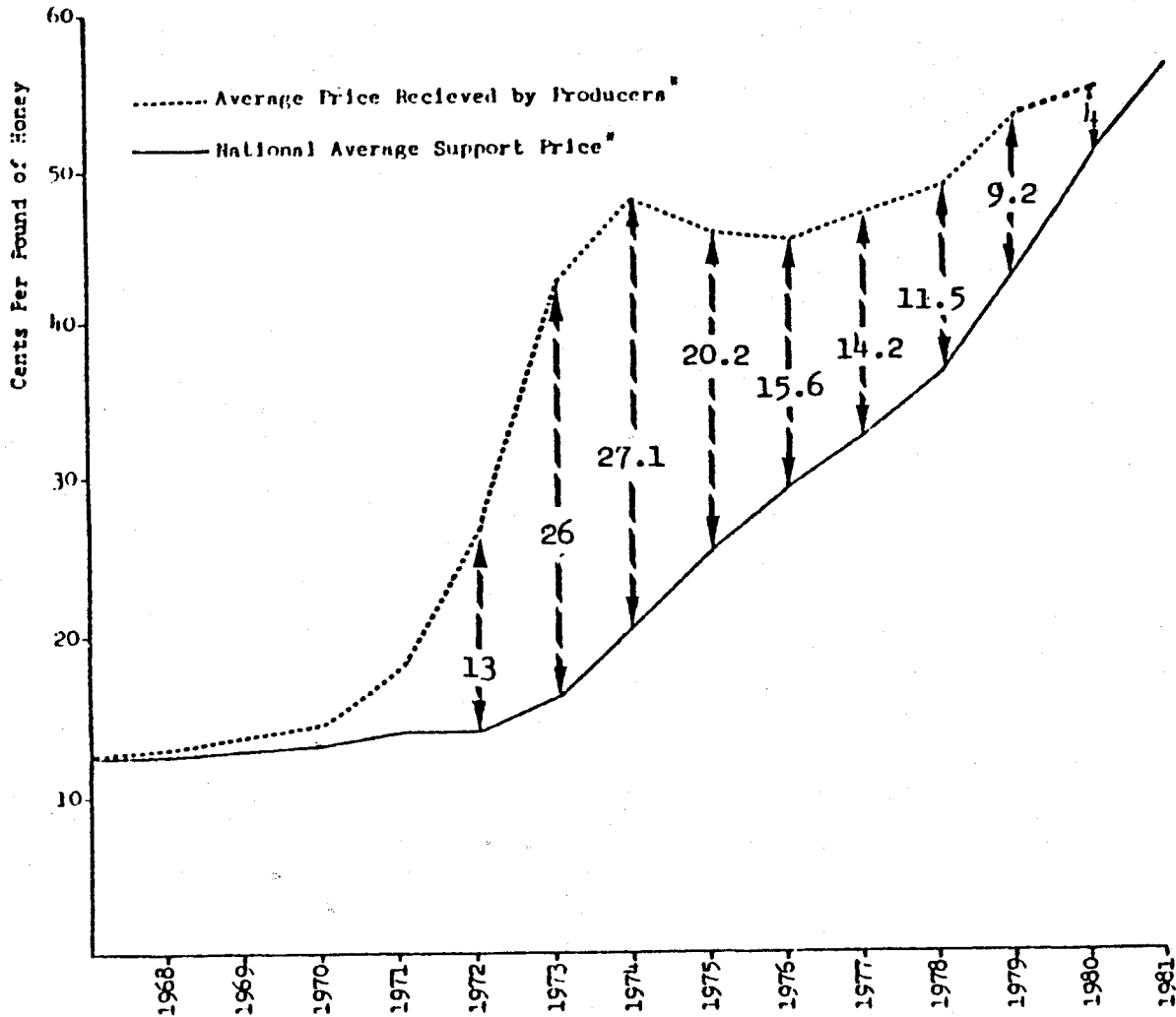
Crop Year	National Average Support Price ^a	Average Price Received by Producers ^a
<i>----- cents per pound -----</i>		
1950	9.0	10.2
1951	10.1	10.3
1952	11.4	11.4
1953	10.5	11.5
1954	10.2	11.8
1955	9.9	12.9
1956	9.7	13.6
1957	9.7	13.4
1958	9.6	12.0
1959	8.3	12.2
1960	8.6	12.9
1961	11.2	13.2
1962	11.2	12.8
1963	11.2	14.2
1964	11.2	13.8
1965	11.2	13.2
1966	11.4	13.1
1967	12.5	12.4
1968	12.5	12.9
1969	13.0	13.6
1970	13.0	14.2
1971	14.0	18.0
1972	14.0	27.0
1973	16.1	42.1
1974	20.6	47.7
1975	25.5	45.7
1976	29.4	45.0
1977	32.7	46.9
1978	36.8	48.3
1979	43.9	53.1
1980	50.3	54.5

^aFor extracted honey in 60 pounds or larger containers.

SOURCE: Agricultural Stabilization and Conservation Service, United States Department of Agriculture.

the government support price between 1972 and 1979 (Figure 10). Honey produced in the United States in the past ten years has not met domestic consumption requirements. The reduced production of honey and consistent levels of consumption have forced honey prices up, increasing the margin between support prices and prices in the marketplace. The spread between average market price and

average support price in cents per pound has gradually narrowed from 1974-1980 (Figure 10). A force behind the narrowing of price spreads is the increased offerings of foreign honey to the United States (Figure 11 and Table 9). Honey imports per year between 1968 and 1973 averaged 8,573 metric tons compared to the annual average between 1974 and 1980 of 23,721 metric tons.

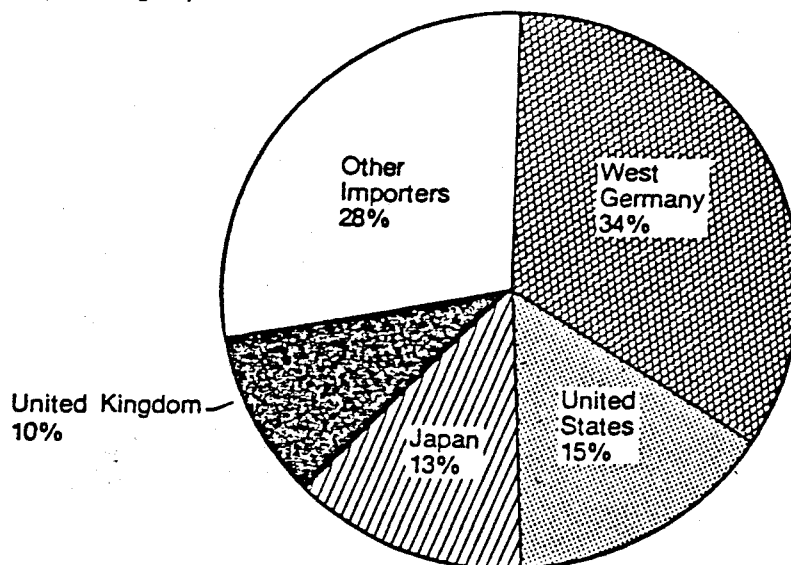


*For Extracted Honey in 60 Pounds or Larger Container

Figure 10. Comparison of National Average Support Price, Average Price Received by Producers, and Yearly Spread in Cents Per Pound

SOURCE: Agricultural Stabilization and Conservation Service, United States Department of Agriculture.

By leading importers



By leading exporters

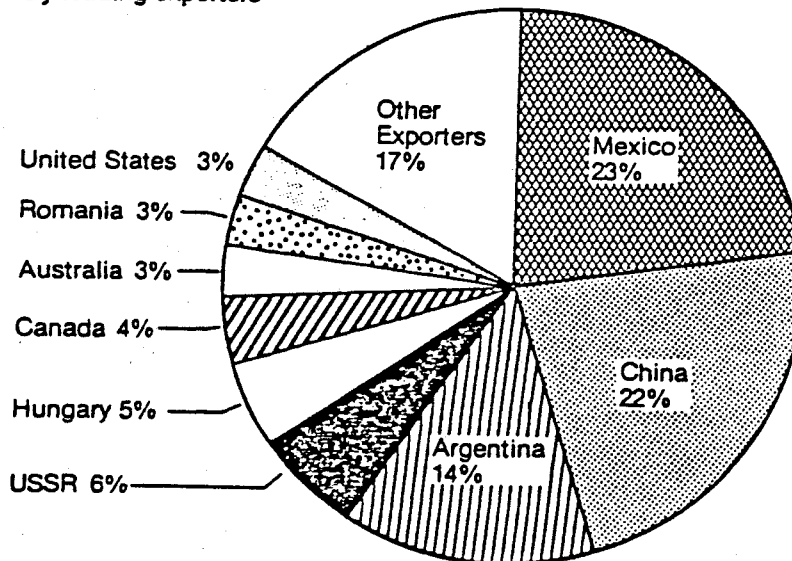


Figure 11. World Honey Trade, 1979

SOURCE: Patty, Gordon E., The Honey Industry of Mexico, Situation and Prospects, FAS M-285, Foreign Agriculture Service, United States Department of Agriculture, October 1979, p. 1.

International Honey Trade

World Honey Production

Worldwide production and consumption have increased in recent years (Figure 12 and Table 10). The greatest increase in honey production has taken place in Mainland China. The 1971-1975 average honey production in China was

31,200 metric tons compared to 105,000 metric tons in 1980. Mainland China led the world in quantity of honey produced during 1980 (Table 11).

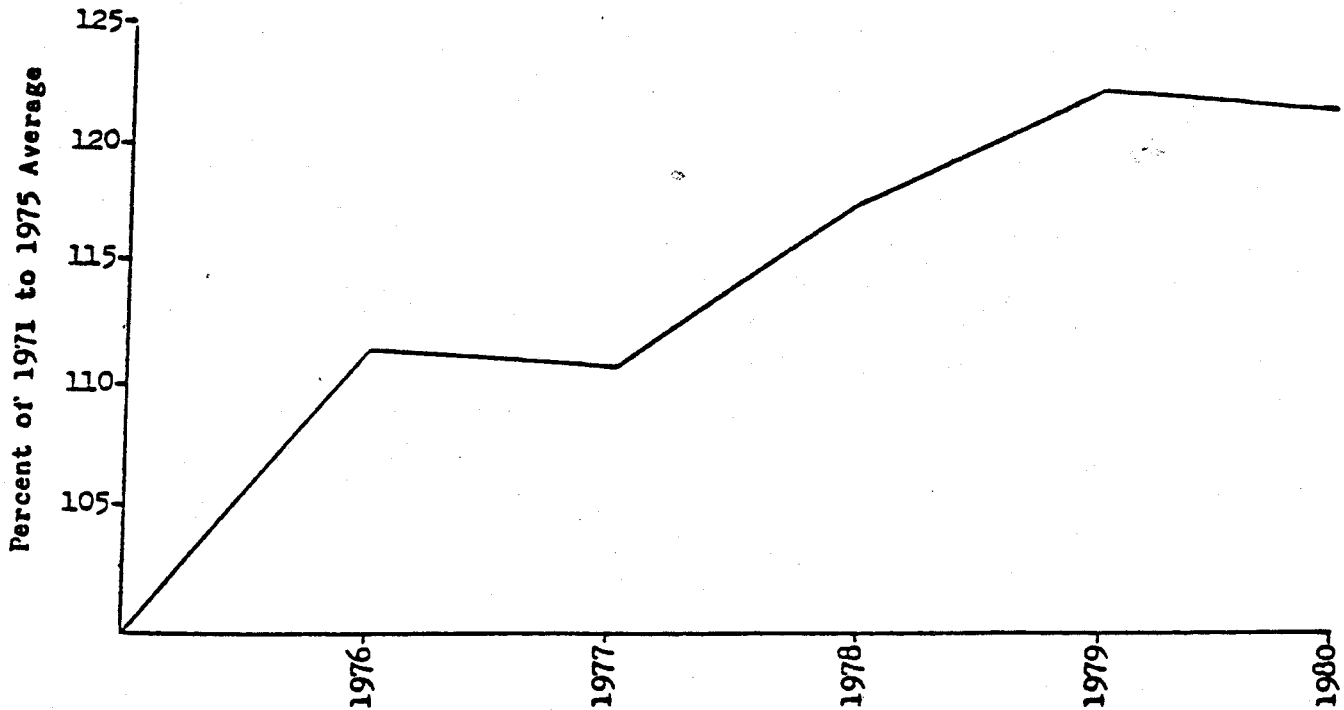


Figure 12. World Honey Production

SOURCE: Patty, Gordon E., Foreign Agriculture Circular-Honey, FHON 1-80, Foreign Agricultural Service, United States Department of Agriculture, Washington, D.C., October 1980, p. 7.

TABLE 10. WORLD HONEY PRODUCTION, CONSUMPTION, AND AVAILABLE STOCK OF HONEY, 1976-1980

Year	Beginning Stock	Production	Consumption	Ending Stocks	Ratio of Ending Stocks to Consumption
	<i>metric tons</i>				<i>percent</i>
1976	142.8	672.1	649.7	150.0	23.1
1977	150.0	667.6	682.8	136.5	20.0
1978	136.5	708.8	704.5	133.7	19.0
1979	133.7	737.1	726.0	145.2	20.0
1980	145.2	732.0	738.0	139.2	18.9

SOURCE: Patty, Gordon E., Foreign Agriculture Circular-Honey, FHON 1-80, Foreign Agricultural Service, United States Department of Agriculture, Washington, D.C., October 1981, p. 1.

TABLE 11. TOP HONEY PRODUCING COUNTRIES, YIELD OF HONEY PER COLONY, AND NUMBER OF COLONIES, 1980

Country	Total Honey Production	Yield Per Colony	Number of Colonies
	<i>metric tons</i>	<i>pounds</i>	<i>000</i>
Mainland China	105	51	4,300
United States	91	49	4,200
Soviet Union	90	na	na
Mexico	58	73	1,780
Canada	29	106	612
Argentina	24	44	1,200
Turkey	23	na	na
Australia	22	na	na

^{na}Data not available.

SOURCE: Patty, Gordon E., Foreign Agriculture Circular-Honey, FHON 1-80, Foreign Agricultural Service, United States Department of Agriculture, Washington, D.C., October 1980, p. 2.

Consumption

The per capita honey consumption for selected countries is listed in Table 12. The West German people consume the greatest quantity of honey per capita in the world. A combination of factors including high consumption, low yield per colony, and low colony numbers makes West Germany the world's number one importer of honey.

TABLE 12. PER CAPITA HONEY CONSUMPTION, 1975

Country	Per Capita Consumption
	<i>pounds</i>
West Germany	2.40
United States	1.10
Soviet Union	.97
Japan	.48
Argentina	.37
Mexico	.30

SOURCE: Patty, Gordon E., The Honey Industry of Mexico, Situation and Prospects, FAS M-285, Foreign Agricultural Service, United States Department of Agriculture, October 1979, p. 6.

The total world consumption of honey for 1976-1980 has steadily increased (Table 10). The USDA reports that honey prices in recent years have strengthened as a result of increased consumption and sporadic production throughout the world.

Export-Import Markets

The honey exporting nations of Mexico, Mainland China, and Argentina sold approximately 59 percent of the world's export honey in 1979 (Figure 11). Mexico exported an average of 81 percent of its honey crop between 1965 and 1977 primarily to West Germany, the United Kingdom, and the United States.

Mainland China's honey production has increased greatly in recent years, making available a surplus of honey for export. Honey is a source of foreign exchange and supplements China's tight supply of sugar. Japan, West Germany, and the United States are China's largest customers.

West Germany, the United States, and Japan imported 62 percent of all honey imports throughout the world in 1979. West Germany imports honey primarily from Mexico and Mainland China. Current United States' imports exceed its exports, with honey brought in primarily from Mexico, Mainland China, and Canada (Table 13). The United States assesses only a 1 cent tariff per pound of honey imported from noncommunist countries and Mainland China, but imports of honey from communist countries are assessed a 3 cent per pound tariff.

Honey prices strengthened in the United States after 1970 (Figure 13). The increased prices attracted foreign honey available for sale to United States packers. Economic theory indicates that as the price of honey in the United States increased, foreign honey supplies available to United States markets increased (Figure 13).

Beeswax

Beekeepers collect beeswax, a by-product of honey production, from discarded combs and from cell cappings sliced off the comb when honey is extracted. Beekeepers are careful to not damage the comb during honey extraction as honeybees require the equivalent of eight to ten pounds of honey to rebuild one pound of beeswax.

Beeswax collected by North Dakota beekeepers represents approximately 3-6 percent of a beekeeper's gross income each year. Beekeepers frequently

exchange beeswax for new comb foundation with bee supply dealers. The value of beeswax sold in North Dakota during 1979 was estimated at \$668,000.

TABLE 13. UNITED STATES HONEY IMPORTS AND EXPORTS, 1966-1980

Year	Imports	Exports
	<i>metric tons</i>	<i>metric tons</i>
1966	4,326	6,635
1967	7,597	5,367
1968	7,767	3,723
1969	6,680	4,534
1970	4,021	3,745
1971	11,446	3,484
1972	17,672	1,883
1973	4,825	8,078
1974	11,793	2,101
1975	21,038	1,834
1976	30,120	2,155
1977	28,981	2,537
1978	25,385	3,696
1979	26,519	3,877
1980	22,212	4,010

SOURCES: United States Department of Agriculture, Honey Market News, Vol. LXV, No. 1, Agricultural Marketing Service, February 9, 1981, p. 18.

United States Department of Agriculture, Agricultural Statistics, United States Government Printing Office, Washington, D.C., Annual Editions 1967-1980.

Comb Honey

Comb honey is generally not considered a product of the honey industry in North Dakota. A factor which greatly influences this is the increased labor requirements needed to properly produce marketable comb honey.

Pollination Services

Pollination services in North Dakota have not been important relative to honey production in the past. Pollination services are required on crops when the transfer of pollen from anther to stigma of a flower does not naturally occur or native pollinators are insufficient. Crops dependent upon honeybees for production or improvement of yield in North Dakota include: alfalfa, clover, sunflower, and some varieties of flax. Expanded acres of sunflowers in North Dakota have increased the necessity of honeybees for pollination services in the production of hybrid seed.

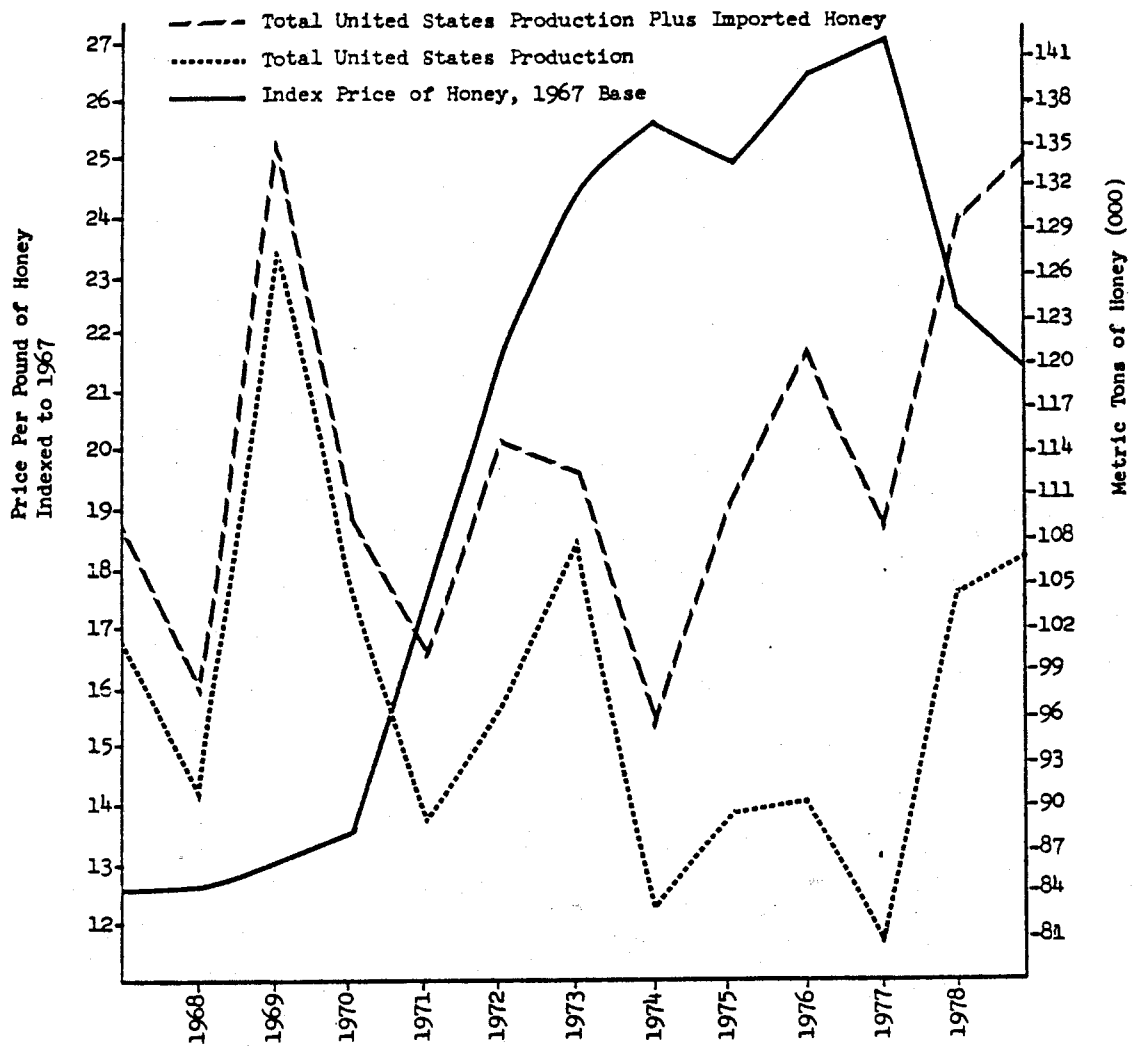


Figure 13. United States Honey Production, Total Domestic Stock Available (United States and Imports), and Honey Price Per Pound Indexed to 1967

SOURCES: United States Department of Agriculture, Honey Market News, Vol. LXV, No. 1, Agricultural Marketing Service, February 9, 1981, p. 18.

United States Department of Agriculture, Agricultural Statistics, United States Government Printing Office, Washington, D.C., Annual Editions 1967-1980.

Pollination services for any type of crop involve extensive and increased apiary management. The production rate of honey per colony is reduced because pollination service requires more colonies in a specific area than are desired for optimum honey production. Nationally, pollination fees account for an average of 10 percent of a beekeeper's income; thus beekeepers usually consider pollination a service rather than a product. Beekeepers do not generally engage

in pollination services for payment in North Dakota. Reasons for the nonparticipation in pollination services include:

1. Western North Dakota supports a low percent of commercially grown seed for sunflower resulting in a low demand for pollination by honeybees.
2. The moving of colonies at a particular time for pollination may decrease the amount of honey produced if honeybees are on good bee pasture.
3. Economically, beekeepers must be compensated for expenses incurred during the movement of colonies, and many farmers are unwilling to make the financial compensation.
4. Beekeepers lack knowledge about the sunflower industry, and farmers lack knowledge of beekeeping. Honey producers find it difficult to move colonies at the proper time for pollination and during pesticide spraying. The moving process creates a risk of physical damage to the hives.

The North Dakota Department of Agriculture requires beekeepers to register colonies for pollination purposes. Beekeepers in 1980 registered 21,550 colonies or 8.6 percent of all registered colonies in North Dakota for pollination services.

APPENDICES

Beekeeping Equipment Supply
Companies

A.I. Root Company
Council Bluffs, IA 51501

Dadant and Sons
Hamilton, IL 62341

Hubbard Apiaries
Onsted, MI 49265

Leahy Manufacturing Company
Higginsville, MO 64037

Walter T. Kelly Company
Clarkson, KY 42726

National Beekeeping Publications

AMERICAN BEE JOURNAL
Hamilton, IL 62341

GLEANINGS IN BEE CULTURE
Medina, OH 44256

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