

Table 4. Summary of factors which make plantations susceptible to vole and lemming attack.

Factor	Significant	Not significant
Proximity to alpine	+	
Tree species	+	
	pine > spruce	
Origin	+	
	planted > natural	
Stock type	+	+
Density planted		+
Age of plantation		+
Time since last disturbance		+
Size of block		+
Forest type	+	
Aspect	+	
Elevation	+	
Site preparation	+	
	unburned > burned	
Vegetation cover		+
young		
older	+	
Structural complexity of post-harvest debris		
young	+	
older	?	

mosses and dead woody material providing suitable microhabitat for voles and lemmings. These sites may also provide suitable habitat after harvest, particularly if there is heavy logging debris and the area is not broadcast burned.

The minor importance of vegetation cover to degree of damage may be related to the considerable variability in vegetation in most young plantations, which is typical of early successional stages after disturbance. This pattern also suggests that the presence of vegetation, particularly grasses and shrubs (see Table 2) may help reduce damage to seedlings. Thus, in areas of limited vegetation cover, provision of

alternative foods could protect seedlings from damage (Sullivan and Sullivan 1988). This relationship should also be considered in areas where vegetation management with herbicides could increase tree damage if natural foods are removed at a critical time for a vole population. Clearly, vegetation reduction as a tool to reduce vole populations must be timed appropriately to be effective.

As recorded in the older plantations, vegetation cover was a significant factor in terms of intensity of attack. Therefore, vegetation may become the major factor limiting the habitat carrying capacity for voles in older (>5 yr) successional stages. □

Economic and Marketing Implications of Special Forest Products Harvest in the Coastal Pacific Northwest

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ABSTRACT. *The special forest products industry has recently become an important factor in forest management. Plants common to the understories of many Pa-*

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cific Northwest United States and coastal British Columbia forests are harvested, processed, and marketed worldwide in floral greens markets as supplements and complements in floral arrangements. The industry employed over 10,000 people in Washington, Oregon, and southern British Columbia in 1989, and generated an estimated \$128.5 million in sales. Forestland managers are discovering the advantages associated with leasing harvesting rights to the producers and harvesters of these products.

A mail survey was used to sample special forest products businesses in Washington, Oregon, and British Columbia during 1989. Descriptions of plant materials harvested and their value are presented and discussed. Business characteristics and total industry affects are discussed. The industry's impacts on the regional economies and the industries marketing strategies including channels of dis-

Plants having deep green color and long-lasting evergreen properties are desired commodities in the worldwide marketing of "floral greens," which are used by the decorative floral industry to accent and complement flowers in arrangements. Many such forest plants are common to the Pacific Northwest and British Columbia. Over the past 50 years forest plants and plant parts have been harvested from northwestern forests for use by the floral greens and seasonal decorative industries. This industry has expanded to become an important regional industry with potentially significant implications for forest land management. However, the economic importance and marketing of these products have not been well documented.

The major evergreen plants used as floral greens are salal (*Gaultheria shallon*); evergreen huckleberry (*Vaccinium ovatum*); dwarf Oregon-grape (*Berberis nervosa*); sword fern (*Polystichum munitum*); and deer fern (*Blechnum spicant*). Some deciduous plants such as Scotch broom (*Cytisus scoparius*) are also used. Evergreen boughs are marketed during the Christmas season in the form of wreaths, door charms, and swags.

The special forest products industry consists of five distinct components composed of forest landowners, harvesters, producers, floral wholesalers or floral greens brokers, and floral retailers (Figure 1). The flow of products begins on the forest site and moves via harvesters to producers. Following processing, plant materials are marketed to floral retailers for final sale.

Harvest rights are usually secured by harvesters through formal leases (Figure 1), although some producers also own land. Whether producers own or lease harvest rights, they generally contract with harvesters to pick the products. Most harvesters are self-employed, securing leases from multiple landowners and selling to several producers based on current prices (Figure 1). Both full-time harvesters and part-time harvesters are common.

Producers buy from the harvesters, process the plant materials, and sell the greens to wholesalers, brokers, or even retailers. In some cases producers also buy and sell among themselves. Businesses have become horizontally integrated by opening production plants in diverse areas, usually through franchise agreements. Some year-round workers are employed to process products that are

harvested throughout most of the year. Temporary full-time employees are hired mainly during late September, October, November, and early December to process Christmas-related materials.

Some products are marketed through wholesalers and brokers (Figure 1). Vertically integrated producers market their products directly to retailers, usually in cased units.

This paper identifies the characteristics of producers in the Pacific Northwest floral greens industry, including average business size and economic contribution to the region. The products bought by the industry are surveyed, their total value estimated, and the industry's methods of marketing and approaches to product/market development outlined.

METHODS

A mail survey was used to sample special forest products producers west of the Cascade Mountains in Washington, Oregon, and British Columbia. The sample frame was derived from telephone listings and reviewed by selected producers in the region for completeness. Dillman's Total Design Method (Dillman 1978) was used to design and administer the questionnaire. Four mailings were sent to each producer. The first, in mid-December, 1989, included a 10-page questionnaire, a cover letter, and a return envelope. Subsequent mailings followed at regular intervals. At a later symposium, producers not on the original mailing list were given a questionnaire, a cover letter, and a return envelope.

Eighty-four potential producers were identified in the initial population and mailed questionnaires. Twenty-eight of these returned completed questionnaires. Twenty-three companies explained that they were not in the business. Three businesses returned questionnaires covering multiple businesses covering franchise agreements. Twenty-two producers did not return the questionnaires by mid-March 1990. The effective response rate for this sample is 47.46%.

Nonrespondents were telephoned and asked an abbreviated set of questions. The nonrespondent sample indicated that the respondent and nonrespondents populations were very similar for the key items of interest addressed in the survey.

RESULTS AND DISCUSSION

Respondent Profile

Respondents to the questionnaire had been in business for an average of 27 years (range 5-88 yr). They employed an average of 12 full-time year-round employees and 71 full-time seasonal employees. Many seasonal employees were hired to help in processing Christmas season materials. Special forest products were harvested by about 50 full-time and 50 part-time harvesters per business.

Producers typically procured plant materials up to an average of 300 miles from the business headquarters, and some from as much as 1,000 miles away. Long distances were usually associated with the annual harvest of baby's breath (*Gypsophila paniculata*) in

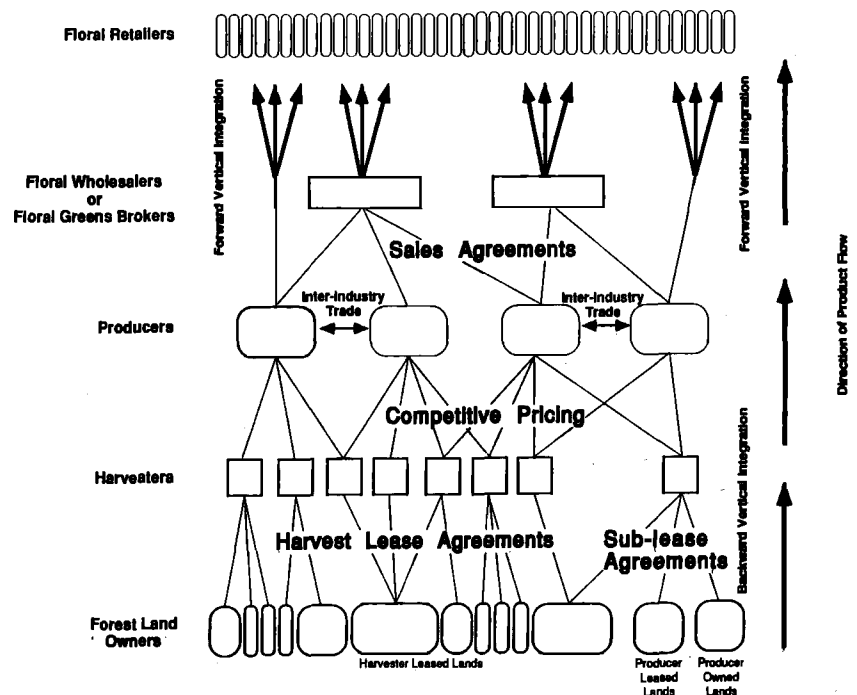


Figure 1. Structure of the special forest products industry.

eastern Washington, eastern Oregon, Idaho, and Montana.

Producers were divided into three groups based on the value of products purchased. Those spending more than \$1 million, annually, on raw product acquisition were classified as "large." Producers spending less than \$1 million but more than \$100,000 were classified as "medium," and those purchasing less than \$100,000 were classified as "small."

Harvest leases were generally secured by independent harvesters. Only 45% of the producers leased harvest rights directly from forest landowners accounting for 44% of wholesale value. Of those producers leasing harvest rights, leases averaged 11,750 acres per firm. About 47% of producer leases were short-term in nature, lasting 1 year. The high proportion of short-term leases occurred partially because public lands represent a large proportion of the total land base, and most public harvest leases have a 1-year duration. An additional 38% of producer leases were for 2 to 5 years, and 15% exceeded 5 years.

Producer-leased lands were supplemented by a small land base of producer-owned lands. Eight percent of industry raw product value came from producer-owned lands. Twenty-three percent of the producers owned land for growing products. The average holdings was 145 ac.

Impact on the Regional Economy

Not all firms responded, so it was necessary to expand the available data to estimate the total size of the industry. Expansion factors considering differential treatment of the respondents by size and geographic location were considered, but responses indicated no need for deviation from a uniform expansion factor. The response rate of 47.46% translates into an expansion factor of approximately 2.10 for estimating the total size of the industry and its direct effect on the regional economy. This multiplier does not include any secondary affects on the economy, since there was no reliable way to estimate such effects.

Special Forest Products Industry The industry is estimated at about 60 businesses, most of which are located in Washington. The producers employed an estimated 700 full-time year-round employees and 4,180 full-time seasonal employees. In addition, an estimated 2,670 full-time and 2,750 part-time harvesters participated in product harvest. Combined employment for the industry totaled approximately 10,300 workers during 1989.

An estimated 1,800 acres were owned by producers for growing plant materials. About 322,000 acres were leased by producers in the re-

gion during 1989. It was estimated that an additional 351,200 acres were leased by harvesters. Thus a total of 673,000 acres of land were estimated to be under lease for the production of special forest products.

Product Acquisition

Prices paid to harvesters by producers vary by the time of the year and demand for the individual products. For example, evergreen huckleberry prices ranged from below \$0.60² to over \$0.74 per bunch³ for an average of \$0.65 per bunch during 1989. Salal bunch values also varied, averaging \$0.90 per bunch. Scotch broom was lower in value at \$0.40 per bunch. Reported product volumes were combined with the average product values to estimate the total cost of plant materials purchased. An estimated \$47.7 million was paid for raw plant materials in 1989.

The product groups representing the highest value, based on producer expenditures, are presented in Figure 2. Beargrass (*Zerophyllum tenax*), and salal were the two most important products in terms of producer expenditures. Beargrass, a relatively new product, was dried, dyed, and sold mainly to floral retailers in the eastern United States and Europe for use in floral arrangements. The marketing of salal and salal tips (fourth most important product) is done with the product in its natural condition. Nobel fir (*Abies procera*) boughs were the

third most important product in value terms being used primarily in wreaths and other Christmas decorations. Baby's breath was usually treated and dyed for use in floral arrangements and business decorations.

Although baby's breath expenditures were ranked fifth in total acquisition costs, we believe that this value underestimates the total amount of this product purchased within the Pacific Northwest. This is because baby's breath grows east of the Cascade Mountains, while our questionnaire focused on producers west of the Cascades.

Evergreen boughs (Figure 3) were harvested almost exclusively during fall and winter for use in Christmas decorations. Although noble fir was the preferred product for evergreen wreaths, swags, and charms, subalpine fir (*Abies lasiocarpa*) was also favored. Western red cedar (*Thuja plicata*) was popular in the manufacture of garland chains, and as additions to wreaths and charms. Douglas-fir (*Pseudotsuga menziesii*) provided inexpensive material for lower valued wreaths, charms, and swags. Western white pine (*Pinus monticola*) was an important product used to accentuate other bough products. The remaining evergreens were also generally used in combination with other bough materials in seasonal decorations.

Additional products (Figure 4) were harvested throughout the remainder of the year, except during the growing season, when leaf tips were soft and unmerchantable, or when flowering. Both holly and cones were used extensively to accent evergreen bough products during the Christmas season.

Industry Value Value added is the amount of additional revenue generated by a particular industry over a period of time. Conceptually, it is the value of resources available for wages,

² Product prices were gathered from an informal survey of five producers and harvesters in the region.

³ A bunch of salal or evergreen huckleberry is defined as 1.63 pounds of dry product, ready for shipment; a bunch of sword fern or Oregon-grape is defined as 60 pieces of product; Scotch broom and beargrass are measured as 2 pound bunches.

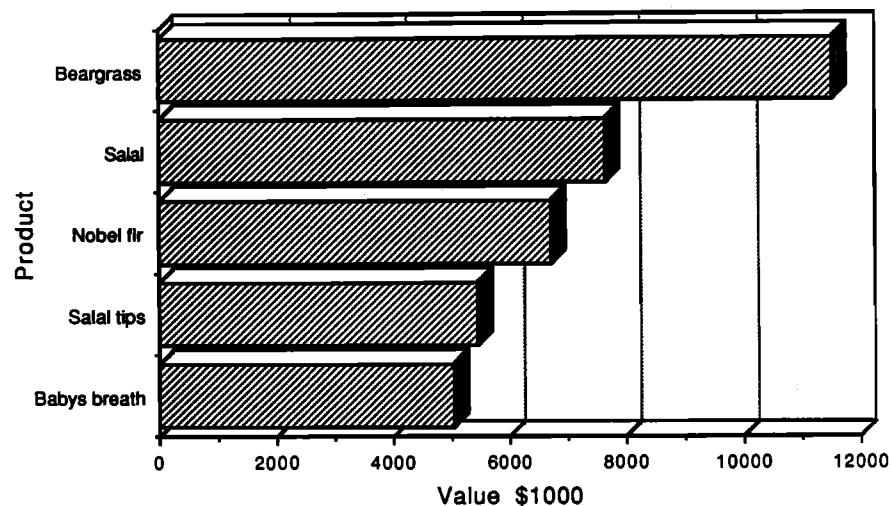


Figure 2. Total producer expenditures for selected plant product groups during 1989.

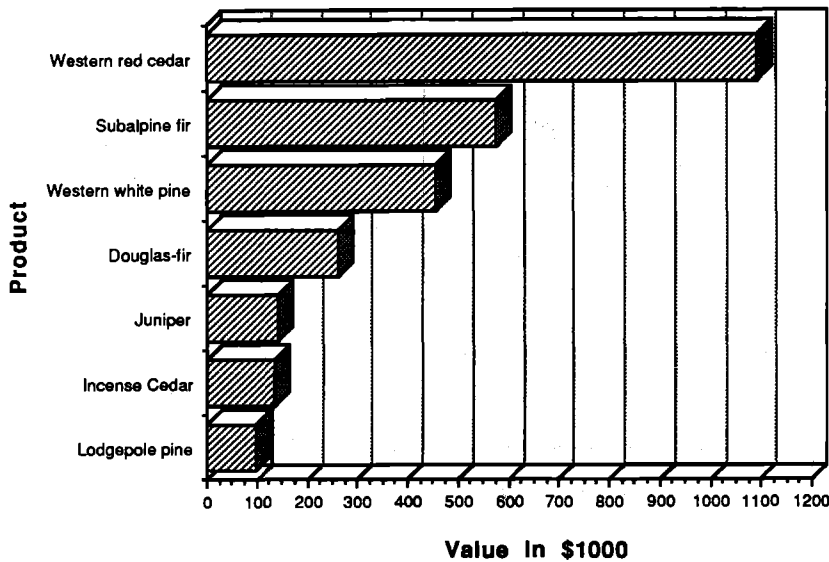


Figure 3. Total producer expenditures for evergreen boughs (excluding noble fir, see Figure 2) paid to harvesters during 1989.

salaries, interest payments, profits, taxes, depreciation, depletion, and other charges for a specific industry. Value added represents the contribution of an industry to the total gross national product (GNP) (Gregory 1987). The total value generated by an industry (value of sales) equals the value added plus the cost of operations (i.e., electricity, fuel, etc.). Both measures are useful in describing the impact of an industry on the region. In this study the special forest products industry was defined as spanning the harvest of the plant through processing and sale by producers. It should be noted that the following value estimates were derived indirectly from collected data, published data for similar industries and other sources.

Plant materials cost the producer sector about \$47.7 million in 1989. Approximately 700 people were employed as full-time, year around employees in the special forest products

industry. Assuming an average cost of employment (including employer contribution) of \$7.50 per hour, and 2000 hours per person, the payroll for full-time year-round employees was approximately \$10.5 million. Similarly, 4,180 full-time seasonal employees were identified. Assuming a cost of employment of \$6.40 per hour at 500 hours per person, the payroll for full-time seasonal employees was approximately \$13.4 million. Combined, these estimated values total over \$23.8 million in wages, salaries and payroll taxes paid by the industry (Table 1).

An estimate of the cost of operations for the industry was more difficult to assess. Because no data was readily available, an extrapolation from other industries was necessary. The cedar shake industry was used as a proxy, because of its similarities to the special forest products industry, particularly with respect to product acquisition and the labor intensive nature of primary processing. The cedar

shake industry showed an operating expenses-to-wages paid ratio of approximately 2 to 1 (U.S. Dept. of Commerce 1984). Applying this ratio to the special forest products industry, the estimated cost of overhead expenses totaled approximately \$48.0 million. Assuming a 7.5% fair rate of return to business investments, the total value of products sold was estimated at \$128.5 million (Table 1). Removing the estimate of overhead expenses, the value added contribution the producer sector of this industry to GNP was estimated at \$80.5 million for 1989.

Value to Leasers The value of products harvested from an average acre of producer leased lands was estimated at \$65.15.⁴ Assuming landowners receive approximately 10%⁵ of the gross revenue to the harvester, an estimate of the region-wide value to landowners is \$4.39 million in lease fees; the average acre of land harvested generated \$6.51 per acre to the landowner in 1989. Other benefits may accrue to the landowner of leased forestlands. Because leasers often patrol leased lands, indiscriminate dumping of domestic trash is reduced. Many forest roads are also kept open due to the maintenance performed by harvesters.

Marketing Strategies

Channels of Distribution Approximately 63% of the total value of special forest products were sold directly to retailers. Fourteen percent were sold to floral wholesalers. Franchise agreements represented 22% of total industry sales, with the remaining 1% sold directly to final consumers.

Of the products marketed to floral retailers (Figure 5), 17% (wholesale value) was distributed locally. Fifty-two percent was marketed to the rest of the United States and 2% was marketed in Canada. Exports represented about 28% of the market with the Pacific Rim importing 4% and Europe importing 24%.

Marketing strategies were aggressive with 73% of the total value generated coming through direct contacts, with floral wholesaler and retailers. Passive marketing, represented by buyer initiated call-ins and contacts, accounted for approximately 15% of

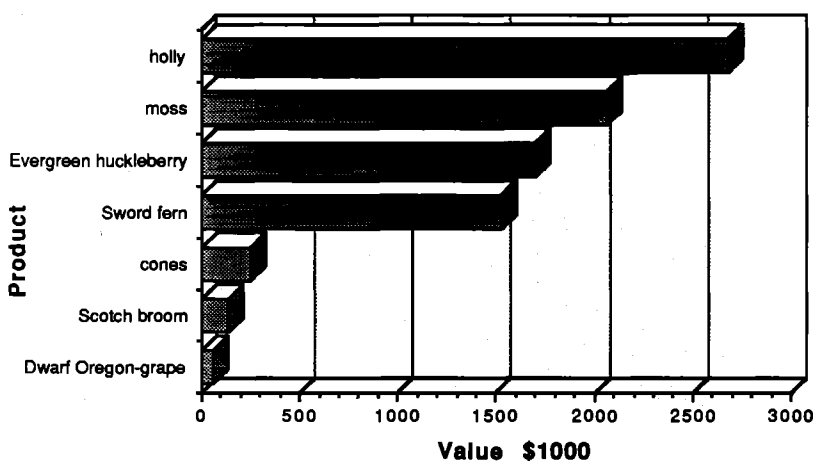


Figure 4. Acquisition expenditures for other special forest products.

⁴ Forty-four percent of acquisition value harvested is from producer leased lands. Therefore, $0.44 * \$47,671,328 = \$20,975,384$. Divide this number by the total number of acres which are producer leased (321,929 acres) and value per acre is estimated.

⁵ Estimate obtained via discussions with various knowledgeable individuals working in the special forest products industry.

Table 1. Estimated total value of products sold by the special forest products producer sector in 1989.

Source of expense	Millions of dollars
Product acquisition	\$ 47.7
Wages to employees	23.8
Overhead, advertising, etc.	48.0
Fair rate of return on investment (7.5%)	9.0
Total value of products sold	\$128.5

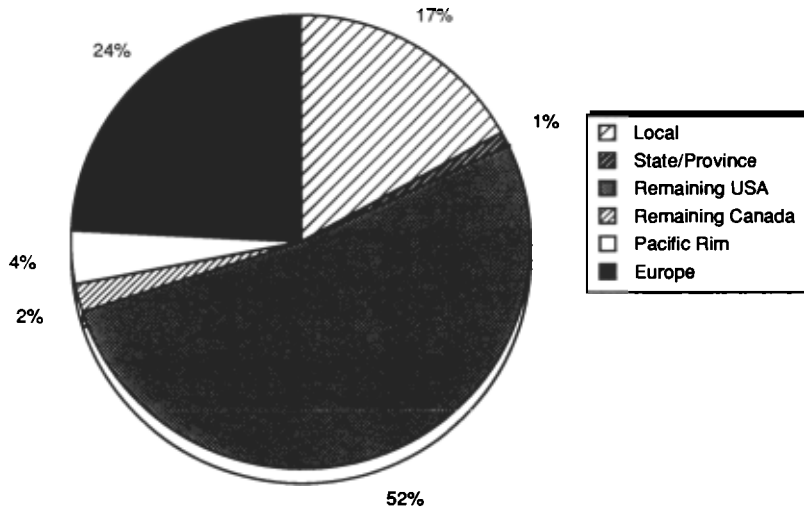


Figure 5. Geographic distribution of northwest special forest product markets.

Table 2. Industry market perceptions and the relationship between producer size and market perceptions.

Industry-wide	Total large	Producer size*		
		Small	Medium	8
Number of producers responding	28	5	15	8
Importance of product development to business success.		(%)		
Very Important	37	38	20	100
Important	44	50	53	0
Not important	11	0	20	0
Don't know	7	12	7	0
		$\chi^2_{(6)} = 10.54, \alpha = 0.1035$		
Importance of floral shows in market development.				
Very important	24	0	36	33
important	40	63	21	67
Not important	16	0	29	0
Don't know	20	37	14	0
		$\chi^2_{(6)} = 10.78, \alpha = 0.0955$		
Importance of future product promotions in Europe.				
Very important	39	33	23	100
important	35	17	53	0
Not important	4	17	0	0
Don't know	22	33	23	0
		$\chi^2_{(6)} = 12.10, \alpha = 0.0599$		
Product development experience				
Yes	41	22	44	75
No	59	78	56	25
		$\chi^2_{(2)} = 3.26, \alpha = 0.1957$		

* Large: purchases greater and equal to 1 million dollars; medium: purchases less than 1 million dollars but above or equal to 100,000 dollars; small: product purchases less than 100,000 dollars.

total sales on a value basis. Advertising referrals were responsible for 12% of producer sales. However, this may be underrepresented since advertising may have influenced the number of buyer call-ins and contacts.

Product/Market Development Product/market development for this industry is focused on efforts to reach new markets or promote products not previously utilized. Such development has been important historically to the industry and will continue to play a key role. Much of the industry's growth over the past several decades has resulted from the efforts of producers and others to expand the number of different plant materials used and to increase the number and type of floral applications for these products.

Only 41% of the respondents reported they had participated in product development activities. However, 81% felt that product development was "important" to "very important" to the future of their business (Table 2). All large producers felt that new product development was "very important" to their success, while only 20% of the medium producers felt that product development was "very important" to their future business success. This suggests the smaller producers may rely on large producers for product development, due to the added costs and risks associated with such efforts.

Historically the industry has used floral shows, personal contacts with potential buyers, and advertising to develop and maintain markets. Twenty-four percent of the respondents felt that floral shows were "very important" to maintaining and/or increasing market opportunities for their products. An additional 40% felt that shows were "important," while only 16% felt it was "not important," and 20% didn't know (Table 2). Large producers placed more importance on shows than did other members of the industry. All large producers felt shows were "important" to "very important," while only 57% of the medium producers indicated shows were "important" to "very important."

Eighty-five percent of all respondents felt that personal contacts were "very important" to their business, similarly 67% of respondents believed existing accounts were "very important" to their business (Table 3).

Producers' views on the role of advertising in market development differed little in relation to business size. However, perceptions differed on the importance of advertising between those producers who had, versus those who had not, participated in any form of product development (Table 3). Among producers who had

Table 3. Perceptions of market development among special forest product producers.

Approach	Importance of approach			
	Very important	Important	Not important	Don't know
 (%)			
Direct contacts	85	12	0	3
Advertising				
All producers	16	52	24	8
Producers with product development exposure	36	46	18	0
Producers without product development exposure	0	57	29	14
	$\chi^2_{(3)} = 7.101, \alpha = 0.0687^*$			
Existing accounts	67	25	0	8

* Null Hypothesis Test: samples arise from the same populations.

Table 4. Producer perceptions of the importance of product promotions by regions during the next 5 years.

Region	Very important	Important	Not important	Don't know
 (%)			
Locally	17	48	30	4
State	16	48	26	11
United States				
Northwest	16	42	26	16
Southwest	37	42	11	11
Southeast	26	47	16	11
Northeast	32	37	16	16
Canada	5	58	16	21
Pacific Rim	50	23	5	23
Europe	39	35	4	22
Australia	22	17	17	44
South America	16	11	26	47
Africa	6	11	33	50
Middle East	11	11	32	47

product development experience, 36% felt that advertising was "very important," and 46% believed that it was "important." Conversely, among producers who had not participated in product development, 57% felt that advertising was "important," 29% felt advertising was "not important," and 14% didn't know.

Almost all producers view personal contacts as a highly important ap-

proach to maintaining and/or increasing market opportunities for their products, reflecting their long history of use within the industry and their simplicity.

Future Market Opportunities The vast majority (76%) of products sold through floral retailers in 1989, were marketed in the eastern United States and Europe. However, producer views on

the importance of product promotions in all areas of the world over the next 5 years differed from current markets.

While only 17% of the products (wholesale value) were marketed locally in 1989, two-thirds of producers (65%) felt that local marketing would be "important" to "very important" over the next 5 years. Only 30% of the producers felt local markets would be "not important" (Table 4). Expectations for the other regions of the United States suggest that producers believe the Southeast and Southwest will become increasingly important markets over the next five years.

Overseas markets became increasingly important during the 1980s and based on the results of the survey will continue to receive considerable attention in the 1990s. Markets in both the Pacific Rim and Europe were indicated as having a strong potential. Seventy-four percent of the respondents felt that product promotion efforts in Europe would be "important" to "very important" over the next 5 years (Table 4). Fifty percent of the respondents felt product promotion efforts would be "very important" with respect to increasing exports to the Pacific Rim. In addition, several respondents indicated that exports to Europe and the Pacific Rim would probably increase substantially if a more efficient means of product preservation were developed for the more perishable products. □

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