Survey of Residential Pesticide Use and Sales in the San Diego Creek Watershed of Orange County, California

Prepared for the California Department of Pesticide Regulation

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Survey of Residential Pesticide Use and Sales in the San Diego Creek Watershed of Orange County California
October 13, 2001

Executive Summary

The University of California conducted a telephone survey of adults living in the San Diego Creek Watershed in Orange County, California at the request of the California Department of Pesticide Regulation. Additionally, in-store pesticide inventories were obtained as well as annual sales data from a sample of the stores located within the watershed selling home-use pesticides. The purpose of these studies was to determine the attitudes of non-professional pesticide applicators regarding pesticide choice, use, and disposal in and around homes as well as estimate the range of products available and purchased by non-commercial consumers. The results of these studies will supply data for developing regulatory and educational programs to reduce the use of certain pesticides determined to have a detrimental impact on the ecology of watersheds in southern California. Cheryl A. Wilen, PhD, UC Statewide IPM Project, directed the overall project.

In August, 2000, the Social Science Research Center (SSRC) at California State University, Fullerton, under the direction of Dr. Gregory Robinson and Ms. Shelley Osborn, conducted a telephone survey sponsored by U.C. Cooperative Extension to assess the use and disposal of pest control products in randomly selected households located within the boundaries of the San Diego Creek and East Costa Mesa/ Newport Beach Watershed areas. A total of 1,212 interviews were completed in English and 212 interviews were completed in Spanish or in a mix of Spanish and English.

City of Residence	Frequency	Percent
Irvine	267	19.1%
Santa Ana	260	18.6%
Costa Mesa	219	15.7%
Tustin	207	14.8%
Newport Beach/ Corona Del Mar	200	14.3%
Lake Forest/ Foothill Ranch	132	9.4%
Laguna Woods	99	7.1%
Mission Viejo	11	.8%
Other	4	.3%
Total	1399	100.0%

Key findings from telephone survey:

- Residents who owned a single family home were most likely to apply outdoor pest control products themselves, as opposed to those who owned or rented an single family home, attached home, or an apartment. Those in the latter groups were most likely to hire a professional company for pest control.

- Insects (particularly ants) and snails/slugs were identified as the major outdoor pest problems.

- The majority of the pest control products (55.1%) were purchased at large home supply stores, with Home Depot accounting for the greatest proportion (49.2%).

- Approximately one-third of respondents reported applying products between one and three times per year, followed by 25.2% who apply products between four and six times per year. 13.9% report applying products more than 12 times per year.

- The highest proportion of respondents (71.1%) had at least one pest control product at their residence that was between 1 and 3 years old. 10.2% reported storing products that were 3-5 years old and 13.4% had at least one product that was older than 5 years. Only 5.2% said that the oldest product in their home was less than one year old.

- 61.9% of the respondents indicated that they "read and follow all directions on the container" when deciding how much of a product to use. However, only 38.4% indicated that they actually measure the amount to be used, while 61.6% estimate.

- For the most part, respondents did not use outdoor pest control products that needed to be mixed with water (53.4%). Of those that did, the largest proportion of respondents (34.8%) indicated that they only make enough to use and that there is no mixture left over, 26.8% reported that they store it for later use, and 17.1% would reapply it to the same area until it was used up.

- Over one-half (54.5%) of the respondents indicated that they dispose of unused pest control products by throwing them in the trash. Less than one fifth (18.1%) indicated that they take them to a disposal site.

- The majority of the respondents (78.6%) did not know the location of a household waste disposal site.

In addition to the telephone survey, we attempted to obtain pesticide sales data from retail outlets located within the watershed. Ms. Rosemary Flynn of David Evans and Associates conducted this portion of the study. Despite the refusal of the largest seller of pesticide products (Home Depot) to supply any sales information, we were able to obtain

sales records from two nurseries and 7 hardware stores. We then extrapolated their sales data to estimate residential sales. This required a number of assumptions that may or may not be valid.

Key findings from retail sales survey:

- The large home supply stores had the greatest number and variety of pesticide products available for sale and devoted the most shelf space to pesticides.
- Grocery and drug stores pesticide sales were primarily insecticides under the "Raid" trade name.
- Ortho brand products dominated the choices at home supply and discount department stores as well as nurseries and hardware stores.
- Nurseries tended to have the best-trained staff in relation to pesticide use and a larger proportion of products were "reduced-risk" pesticides.
- In terms of active ingredient, 14.2 times more diazinon was sold than chlorpyrifos.
- The majority of chlorpyrifos was sold as granules in 10 lb bags with 6.62% a.i.
- The majority of diazinon was sold as Ortho 40 oz diazinon insect spray (25% a.i.) and 30 oz Bug-B-Gone Insect Killer (22.4% a.i.).
- Snail and slug control products containing metaldehyde accounted for a large proportion (15%) of the *total* active ingredients of all pesticides sold in the watershed.

Assuming that the sales data from nurseries and hardware stores were representative of overall consumer purchases, we estimate that the total pounds of active ingredient of products containing chlorpyrifos, diazinon, and metaldehyde purchased *in the watershed* in 2000 to be 710, 10103, and 19653 respectively. It is important to note that *this does not necessarily mean that this was the amount applied, only the amount purchased.*

Overall recommendations based on the results of this study:

1. Increase consumer awareness of pesticide use and hazards by increasing signage on shelves where pesticides are sold. This signage should be in English and Spanish.
2. A sales associate training in pesticide selection and safety as well as overall pest control should be assigned to the pesticide area and be available to answer customer questions.
3. Handouts with the location and hours of household hazardous waste stations should be supplied with every pesticide sale.

4. Pesticides should be sold in smaller quantities to discourage storage of large amounts as well as decrease the tendency to over apply the product.
5. Encourage the use and sale of less toxic pest control products and increase the use integrated pest management.
6. If the Department of Pesticide Regulation is truly interested in measuring pesticide sales, require retailers to submit a monthly report of pesticide sales by store.

UC COOPERATIVE EXTENSION
2000 PEST CONTROL PRODUCTS SURVEY

I. INTRODUCTION

In a 1999 study, the US Geological Survey found that common lawn and garden insecticides, particularly diazinon, carbaryl, chlorpyrifos, and malathion, are frequently found in urban streams. The USGS also reported that these insecticides are often found at higher concentrations in urban streams than in agricultural streams (USGS, 1999). Market estimates corroborate these findings. The USEPA estimated that the most common insecticides sold in the lawn and garden market in 1995/1996 were diazinon, chlorpyrifos, and carbaryl. Chlorpyrifos and malathion are the most commonly used insecticides by the industrial /commercial/ government sector (Aspelin and Grube, 2000).

Two of these pesticides, diazinon and chlorpyrifos, are of primary interest to regulatory agencies and environmental organizations. However, diazinon sales for non-agricultural use are scheduled to cease by December 31, 2004 while sales of most products containing chlorpyrifos are scheduled to end by December 31, 2001. Termiticides containing chlorpyrifos are allowed until December 31, 2005. The sale of these pesticides has been halted because of the health risks to children (USEPA, 1999, USEPA, 2000). There is also evidence that these materials can impair some beneficial uses of water bodies when found at levels which are toxic to certain aquatic organisms (Siepmann and Finlayson, 2000). Previous reports have reviewed the water quality issues related to these pesticides in urban areas of California (Cooper, 1996, Moran, 2001).

To better understand the habits of non-commercial pesticide applicators in the San Diego Creek Watershed in Orange County, the California Department of Pesticide Regulation contracted with University of California Cooperative Extension (UCCE). The principal investigator, Cheryl A. Wilen, Ph.D, of the U.C. Statewide IPM Project subcontracted the Social Science Research Center at California State University, Fullerton to conduct a telephone survey targeting households in the San Diego Creek Watershed. Additionally, in-store pesticide inventories were obtained together with annual sales data from a sample of the stores located within the watershed that sell home-use pesticides.

These studies were conducted to determine the self-reported attitudes and behaviors of non-professional pesticide applicators regarding product choice, use, and disposal in and around homes and to estimate the range of products available to and purchased by non-commercial consumers. The resulting data will be used to develop regulatory and educational programs to reduce the use of certain pesticides that have been determined to have a detrimental impact on the ecology of watersheds in Southern California.

In general, the telephone survey was designed to answer the following questions:

A. Which pests are perceived as the major problems outside of the dwelling,
B. Which pesticides are used,
C. How pesticides are selected for use,
D. How often pesticides are used,
E. How pesticides are mixed,
F. Where pesticides are purchased,
G. How pesticides are disposed of,
H. Where information regarding pest control is obtained, and
I. The extent to which users read pesticide labels.

The survey instrument was based on similar surveys conducted previously by U.S. EPA (Whitmore et al., 1992), Maryland Department of the Environment (Kroll and Murphy, 1994), Alameda County (Scanlin and Cooper, 1997), and King County, WA (Evans/McDonough Co., 2000).

In concert with the residential survey, a survey of retail outlets was conducted. For the purposes of this study, retail outlets are defined as any location where a non-professional pesticide applicator can purchase pest control products. This includes department stores (e.g. Target, Kmart, Wal-Mart), retail nurseries, mail order or Internet, and hardware stores (e.g. Ace, Home Depot). The focus of the retail outlet survey was to obtain information regarding:

A. Which pesticides are purchased,
B. The time of year they are purchased,
C. What educational resources are provided for the consumer at the store site, and
D. The level of pest management training or experience of the store personnel.

This report identifies educational and regulatory gaps and barriers that influence residential product use by non-commercial applicators. In this context, educational interventions that could be employed to change use patterns are recommended, and regulations that may be needed if education fails are considered. The report also highlights particular constraints to behavioral change. The survey results can be used to prioritize efforts likely to result in the most rapid changes in use and disposal of pesticides. A follow-up study is desirable to quantify the extent of change due to education or regulation.

Scope of this report:

While pesticides applied to control indoor pests, e.g. roaches, ants, silverfish, spiders, may be contributing to pesticides in the watershed, this study primarily concentrates on the use and disposal of pesticides in an outdoor setting.

Definitions:

"Non-professional applicators" are persons that apply pesticides in their own homes, and "Housing unit" refers to a person's primary dwelling. "Residential use" or "Home use" refers to pesticides primarily sold to or applied by non-commercial pesticide applicators.

Subcontracting

The Social Science Research Center (SSRC) at California State University, Fullerton was selected to conduct the telephone survey. This group conducted interviews in both English and Spanish and is experienced in conducting surveys pertinent to issues in Orange County. The primary contact at SSRC was Dr. Gregory Robinson.

Dr. Wilen trained the survey team prior to the administration of the pilot survey. The training included definitions of types of pesticides, types of pests, possible responses to expect to open-ended questions, and other technical information required to prepare the interviewers.

David Evans and Associates, an environmental consulting firm, conducted the retail survey with guidance from Dr. Wilen. The primary contact at David Evans and Assoc. was Ms. Rosemary Flynn.

II. Residential Telephone Survey

A. Method

In August, 2000, the Social Science Research Center (SSRC) at California State University, Fullerton conducted telephone interviews in English and Spanish with persons in 1,424 randomly selected households located within the boundaries of the San Diego Creek and East Costa Mesa/ Newport Beach Watershed areas. A total of 1,212 interviews were completed in English and 212 in Spanish or in a mix of Spanish and English. Telephone interviews were conducted from the SSRC's survey research laboratory, utilizing Computer Assisted Telephone Interviewing (CATI) equipment and software. The CATI system is a sophisticated information gathering protocol that contributes to the accuracy of data and to preserving the random nature of the sample.

Telephone interviews were conducted between August 29th and October 3rd, 2000, Monday through Thursday from 4-9 PM, Saturday from 11 a.m. to 5 p.m., and Sunday from 1-7:00 p.m. The questionnaire consisted of approximately 80 items and required from one to thirty-one minutes to complete. The average administration time depended upon whom in the household assumed primary responsibility for applying outdoor pest control products. Respondents that indicated that no outdoor pest control products were applied at their residences required an average of four minutes and 49 seconds to complete the survey. Respondents that indicated that an outside company applied pest control products around their households completed the survey in an average time of five minutes and five seconds. Respondents that applied products themselves or shared this

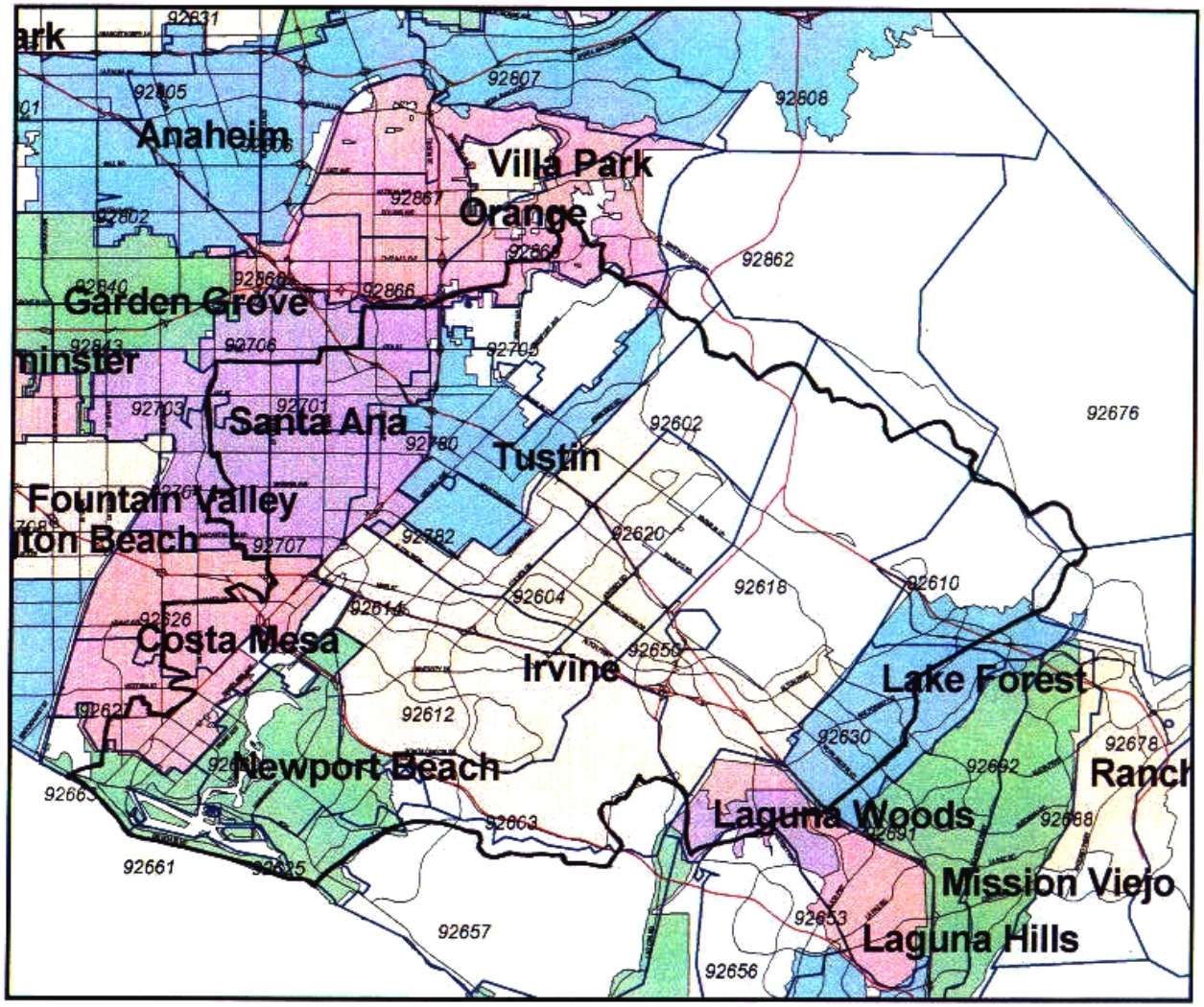
responsibility with an outside company required an averaged time of twelve minutes and 34 seconds to complete the survey.

The survey sample was developed in consultation with Scientific Telephone Samples (STS), a proprietary firm specializing in the production of Random Digit Dial (RDD) telephone samples. The sample was constructed in proportion to the number of households within each of 27 ZIP codes falling within watershed boundaries. When zip code alone was not sufficient to determine whether a potential respondent resided within the watershed, extensive screening was undertaken (see Appendix A to review the survey instrument and the script for this process). If potential respondents were unable to answer the screening questions necessary to determine whether they resided within watershed boundaries, they were not included in the study.

The sample frame consisted of listed and unlisted, old and recently established telephone numbers of all households within the designated watersheds. Therefore, every household in this area with a telephone had an equal non-zero chance of being selected to participate in the study. The telephone company estimates that the penetration of phone lines in residential households in Orange County is 98.5%. It is our belief that no major events occurred during the interview period that might have affected responses to the survey items.

Since the sample was selected in proportion to the number of households in each zip code within the watershed areas, the number of households in Santa Ana and Irvine far exceeded those in other cities in the watershed area. To ensure an adequate number of respondents from cities with smaller populations, quotas were established for Irvine (Zip Codes 92604, 92606, 92612, 92614, and 92620) and Santa Ana (Zip Codes 92701, 92703, 92704, 92705, and 92707). On September 25, 2000, these quotas were closed and interviewing continued only for residents of Newport Beach, Costa Mesa, Tustin, Lake Forest, Laguna Woods, and the unincorporated areas within the watershed boundary. The map on the following page depicts the boundaries of the watershed area.

San Diego Creek & E. Costa Mesa/ Newport Beach Watershed



Road Labels
Major Roads
Freeways

N
W
E
S

20 0 20 Miles

To complete 1,424 interviews, 61,009 individual dialing attempts were made. About 26% (26.3%) of the interviews were completed on the first attempt, 15.8% on the second, 12.7% on the third attempt, 9.1% on the fourth call, and 36.4% on the fifth or higher attempt. This persistence paid off in a response rate of 72.86%; an excellent outcome for an RDD study of this length. The final disposition of each unique telephone number attempted is depicted below.

Table 1

Final Dispositions for Sample Records	
Completes	1424
No Answer	509
Busy	54
Answering Machine/ Voice Mail	364
Phone Disconnect	1,901
Fax Machine	1,040
Incoherent	20
Not a Residence	1,181
Language Problem- Spanish	34
Language Problem- Other	169
Teenager Phone	34
Qualified Refusal	33
Unqualified Refusal	289
Qualified Callback	95
Unqualified Callback	552
Complete Came Back	2
Not Qualified	921
Not Available Project Dates/ Hours	1,212
Call Blocked	1
Unsure if Residence is in Watershed	41
Santa Ana & Irvine Quota Cell Full	499
Total Sample	**10,375**

B. RESULTS

1.0 RESPONDENT DEMOGRAPHICS

Gender

At the conclusion of each survey, interviewers coded respondent gender. Of the 1,424 completed interviews, 832 were female (58.4%) and 591 were male (41.5%). Interviewers were unable to determine the gender of one of the respondents by voice alone.

Age

Respondents averaged 42 years of age. The median age was 39. As depicted in the table below, there were more respondents in the 18 to 30 (27.9%) and 31 to 40 (26.1%) age groups than in others. The smallest group consisted of respondents who were 61 and older (12.7%). Eighty-two respondents of 1424 (5.8%) declined to state their age.

Table 2

Age	Frequency	Percent
18 to 30	375	27.9%
31 to 40	350	26.1%
41 to 50	276	20.6%
51 to 60	171	12.7%
61 to 90	170	12.7%
Declined to state	82	(omitted from total)
Total	1424	100.0%

Race/Ethnicity

As depicted by Table 3 on the following page, the largest racial/ethnic group is Caucasian/ White (62.5%), with Hispanics/ Latinos comprising the second largest ethnic group (23.8%). Fifty-seven of 1424 respondents (4.0%) refused to disclose their racial/ethnic background.

Survey respondents who self-identified as Asian were asked to specify their race. The largest number of Asian respondents, (27.2%), indicated that they were Chinese, 23 (16.9%) were Vietnamese, 17 (12.5%) Asian Indian, 13 (9.6%) Japanese, 12 (8.8%) Korean, and 12 (8.8%) Filipino. Responses also included Pacific Islander, Bi-or Multi Racial, Thai, and Indonesian. Eight of the 33 respondents (24.2%) who specified their race/ethnicity as "other" self-identified as Middle Eastern. Other responses included Bi- or Multi-Racial and Native American.

Table 3

Race/Ethnicity	Frequency	Percent
Caucasian or White	854	62.5%
Hispanic or Latino	325	23.8%
Asian	136	9.9%
Other Race/Ethnic Group	33	2.4%
Black or African American	19	1.4%
Declined to state	57	(omitted from total)
Total	1424	100.0%

Primary Language Spoken at Home

Of the 1,403 valid responses, the majority (76.6%) of respondents indicated that the primary language spoken in their home was English, followed by 245 (17.5%) who speak Spanish.

Table 4

Primary Language Spoken	Frequency	Percent
English	1075	76.6%
Spanish	245	17.5%
Chinese/ Mandarin	16	1.1%
Vietnamese	15	1.1%
Korean	8	.6%
Japanese	6	.4%
Farsi	6	.4%
Other	32	2.3%
Total	1403	100.0%

Other responses included Filipino, Hindi, Indonesian, Indian, German and a mix of English and another language (such as Spanish or Chinese).

Total Annual Household Income

Sample proportions tend to increase as income categories rise. By a very small margin, the largest proportion of the sample (22.8%) fell into the highest income category; $100,000 or more annually. Approximately 9% of the sample reported earning less than $15,000. A total of 411 respondents (28.9% of the total sample) either did not know or declined to state their total annual household income. The percentages in Table 5 on the following page are computed based upon valid replies.

Table 5

Total Annual Household Income	Frequency	Percent
Less than $15,000	97	9.6%
Between $15,000 and $24,999	126	12.4%
Between $25,000 and $44, 999	156	15.4%
Between $45,000 and $69, 999	219	21.6%
Between $70,000 and $99,000	184	18.2%
$100,000 and above	231	22.8%
Total	1013	100.0%

City of Residence

As indicated by Table 6 below, the largest proportions of the sample reside in Irvine (19.1%) and Santa Ana (18.6%). These are followed by 219 respondents (15.7%) in Costa Mesa, 207 (14.8%) in Tustin, and 200 (14.3%) in Newport Beach and Corona Del Mar. These proportions are approximately consistent with the size and density of the city populations within the watershed boundaries. Twenty-five (1.8%) of the 1,424 respondents refused to provide the city of their residence.

Table 6

City of Residence	Frequency	Percent
Irvine	267	19.1%
Santa Ana	260	18.6%
Costa Mesa	219	15.7%
Tustin	207	14.8%
Newport Beach/ Corona Del Mar	200	14.3%
Lake Forest/ Foothill Ranch	132	9.4%
Laguna Woods	99	7.1%
Mission Viejo	11	.8%
Other	4	.3%
Total	1399	100.0%

Other responses included Westminster, Aliso Viejo, and Anaheim Hills.

Level of Education

As depicted in Table 7 below, of the 1,378 survey respondents who supplied an answer, the highest proportion of survey respondents (30.5%) reported receiving a college degree, followed by 25.3% who reported having completed some college.

Table 7

Highest Level of Education	Frequency	Percent
Some high school or less	162	11.8%
High school graduate	221	16.0%
Some college	348	25.3%
College graduate	420	30.5%
Post-graduate degree	227	16.5%
Total	1378	100.0%

Type of Residence

As indicated by Table 8, just over one-half of the respondents (50.4%) report living in a single family detached home and equal proportions of respondents (23.6%) report living in attached homes (such as a condo or town home) and in apartments. Other responses included retirement home/ assisted living, dormitory, and boat. Two respondents did not describe their residence type.

Table 8

Type of Residence	Frequency	Percent
Single family detached home	717	50.4%
Attached home	335	23.6%
Apartment	335	23.6%
Mobile home	23	1.6%
Other	12	.8%
Total	1422	100.0%

Home Ownership

Thirty-two respondents did not reply to a question concerning ownership of their residence. Of the 1,392 respondents who supplied an answer, 785 (56.4%) reported that they own their residence, while 607 (43.6%) reported that they rent.

For analytic purposes, type of residence and home ownership were combined to create a new variable. Table 9 on the next page presents this combined variable, omitting respondents who did not answer one or both of the original questions. The largest proportion (39.7%) of residents that replied own single family detached homes, followed by 324 (23.3%) that rent an apartment. The small number of respondents that reported owning or renting a mobile home, owning an apartment, or owning or renting something else (such as a boat) were omitted from the analysis.

Table 9

House Type/ Ownership	Frequency	Percent
Own a single family detached home	552	39.7%
Own an attached home	202	14.5%
Rent a single family detached home	142	10.2%
Rent an attached home	126	9.1%
Rent an apartment	324	23.3%
Other	44	3.2%
Total	1390	100.0%

Home Ownership by City of Residence

As illustrated by Table 10 below, the largest proportion of respondents in all cities except Costa Mesa indicated that they currently own a single family detached home. The largest proportion (39.8%) of respondents in Costa Mesa currently rent an apartment. Over one-half of the respondents in Tustin (52.2%) and the Lake Forest/ Foothill Ranch area (57.1%) indicated that they own a single family detached home. Differences in these proportions by city are statistically significant ($p. < .01$).

Table 10 Home ownership (row) by City of residence (column).

	Costa Mesa	Laguna Woods	Lake Forest/ Foothill Ranch	Newport Beach/ Corona del Mar	Santa Ana	Tustin	Irvine
Own Detached home	50 (23.7%)	33 (38.4%)	72 (57.1%)	77 (39.7%)	91 (36.3%)	105 (52.2%)	111 (44.0%)
Own Attached Home	19 (9.0%)	32 (37.2%)	14 (11.1%)	28 (14.4%)	19 (7.6%)	25 (12.4%)	61 (24.2%)
Rent Detached Home	31 (14.7%)	3 (3.5%)	16 (12.7%)	16 (8.2%)	42 (16.7%)	14 (7.0%)	17 (6.7%)
Rent Attached Home	27 (12.8%)	8 (9.3%)	9 (7.1%)	28 (14.4%)	17 (6.8%)	8 (4.0%)	28 (11.1%)
Rent Apartment	84 (39.8%)	10 (11.6%)	15 (11.9%)	45 (23.2%)	82 (32.7%)	49 (24.4%)	35 (13.9%)
Total	211 (100.0%)	86 (100.0%)	126 (100.0%)	194 (100.0%)	251 (100.0%)	201 (100.0%)	252 (100.0%)

2.0 PESTICIDE USE: OUTDOOR PEST CONTROL

Who Applies Outdoor Pest Control Products

All survey respondents were asked, "Who at your residence applies outdoor pest control products?" As depicted in Table 11 below, the largest proportion of survey respondents (37.0%) indicated that a commercial company, apartment complex or home owners association not directly contracted by them is responsible for outdoor pest control product application.

Table 11

Who applies outdoor products	Frequency	Percent
Yourself	318	22.3%
Another Member of the household	26	1.8%
Commercial Co., Apt. Complex or Home Owner's Association	527	37.0%
Yourself and a pest control company	54	3.8%
Only a pest control company	89	6.3%
No outdoor pest control products are applied	317	22.3%
Other	33	2.3%
Don't know/ No Response/ Refused	60	4.2%
Total	1424	100.0%

For some analyses, the "who applies" classifications above were combined into four categories: Outside application, Home application, Outside and Home application, and No application of outdoor pest control products. Respondents that indicated that a commercial company, apartment complex or home owner's association (n=527) or that only a pest control company (n=89) applied pest control products are labeled "Outside Application". Respondents that indicated that they (n=318) or another member of their household (n=26) are responsible for pest control application are labeled "Home Application". The 54 respondents that indicated that they shared this responsibility with a pest control company were so categorized, as illustrated by Table 12.

For analyses elsewhere in this report, the "who applies" classifications depicted by Table 11 were combined differently. To assist the reader to conceptualize this important variable and to illustrate how respondents were classified, a flow chart is presented on the following page.

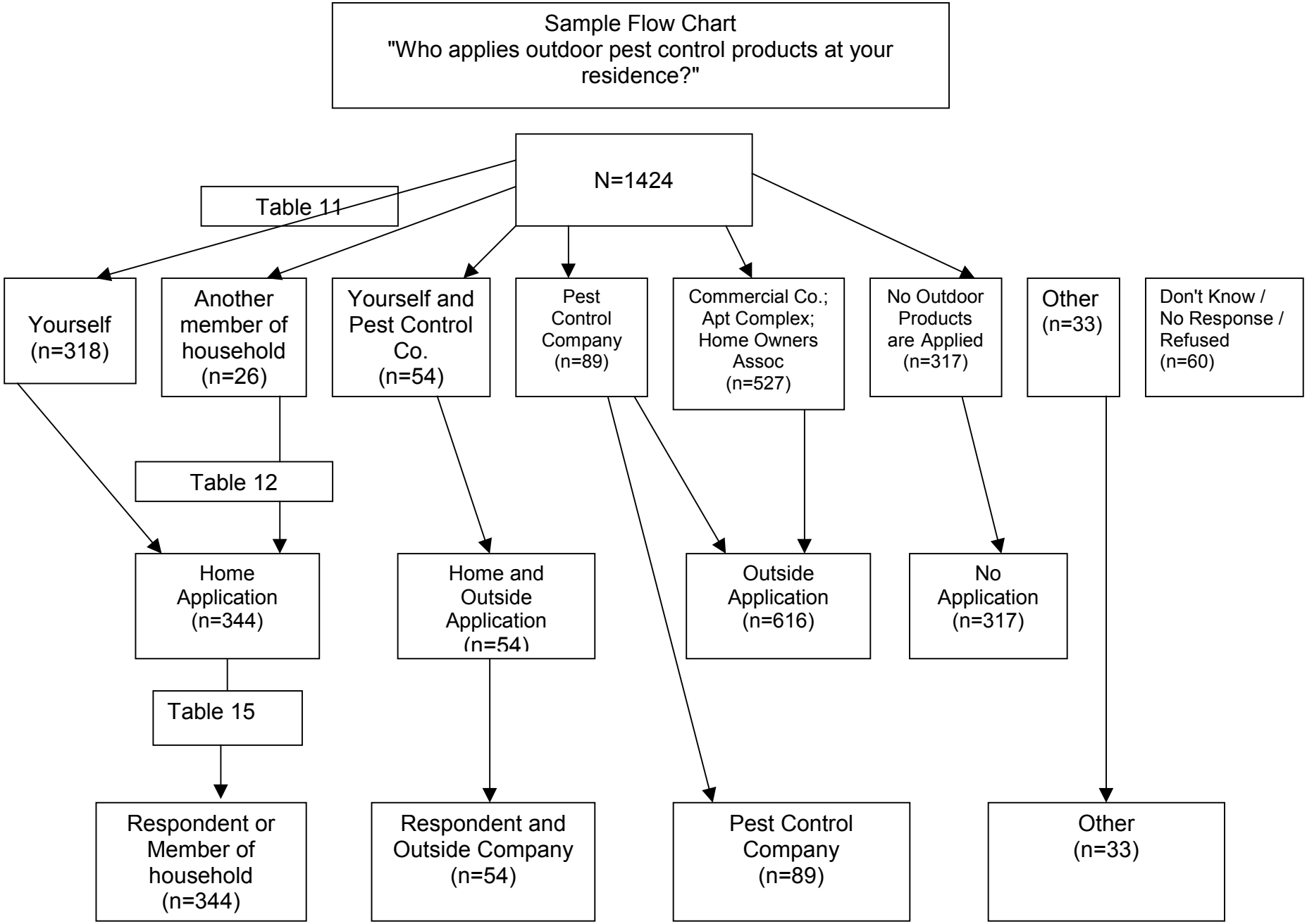

Sample Flow Chart
"Who applies outdoor pest control products at your residence?"
N=1424
Table 11
Yourself (n=318)
Another member of household (n=26)
Yourself and Pest Control Co. (n=54)
Pest Control Company (n=89)
Commercial Co.; Apt Complex; Home Owners Assoc (n=527)
No Outdoor Products are Applied (n=317)
Other (n=33)
Don't Know / No Response / Refused (n=60)
Table 12
Home Application (n=344)
Home and Outside Application (n=54)
Outside Application (n=616)
No Application (n=317)
Table 15
Respondent or Member of household (n=344)
Respondent and Outside Company (n=54)
Pest Control Company (n=89)
Other (n=33)

Table 12

Who applies outdoor products	Frequency	Percent
Outside Company (Commercial Co., Apt. Complex, Homeowners Assoc., Contracted Company)	616	46.3%
Home application (respondent or another member of household)	344	25.8%
Home and Company (Respondent and a pest control company)	54	4.1%
No outdoor pest control products are applied	317	23.8%
Total	1331	100.0%

Who Applies Products and Residence Type/ Ownership

As depicted in Table 13 on the following page, the largest proportion (42.5%) of survey respondents that currently own a single family detached home report that someone within their household applies outdoor pest control products. The largest proportion of residents that own an attached home (61.6%) or that rent an attached home (67.2%) report that an outside company is responsible for product application. Similarly, 215 (75.7%) residents that rent an apartment report that an outside company is responsible for product application. Among survey respondents that rent a single family detached home, the greatest proportion of respondents (44.8%) report no application of products at their residence. The relationship between "Who applies pest control products" and "Residence Type/ Ownership" is statistically significant.

Table 13 Who applies outdoor pest control products (row) by Residence Type/ Ownership (column)

	Own a Single Family Detached Home	Own an Attached Home	Rent a Single Family Detached Home	Rent an Attached Home	Rent an Apartment
Home application	229 (42.5%)	38 (19.2%)	37 (29.6%)	16 (13.8%)	11 (3.9%)
Outside Company	143 (26.5%)	122 (61.6%)	29 (23.2%)	78 (67.2%)	215 (75.7%)
Home and Company	40 (7.4%)	7 (3.5%)	3 (2.4%)	0 (0)	1 (.4%)
No outdoor pest control products are applied	127 (23.6%)	31 (15.7%)	56 (44.8%)	22 (19.0%)	57 (20.1%)
Total	539 (100.0%)	198 (100.0%)	125 (100.0%)	116 (100.0%)	284 (100.0%)

p. < .001

Predicting Who Applies Outdoor Pest Control Products

The development of policy to control the use and disposal of residential pest control products requires an understanding of who actually handles these materials. Variables including the respondent's educational attainment, city of residence, total annual household income, primary language spoken at home, residence type and home ownership are strongly related to each other and to whether an individual in the household applies outdoor pest control products or whether an outside company is hired for that purpose.

To determine which of these variables best predicts pest control product use, a binary logistic regression was performed using "who applies pest control products" as the dependent variable and educational attainment of the respondent, city of residence, total annual household income, primary language spoken at home, residence type and home ownership as independent, or predictor, variables. For this analysis, residents with home and outside application of pest control products (n=54) were combined with residents with only outside application (n=616) to form a combined category with 670 respondents. Again, 344 residents report home application.

The logistic regression analysis indicated that the variable combining type of residence and home ownership (see Table 9) is the only statistically significant predictor. Logistic regression also provides an odds ratio that can be used in this case to interpret the likelihood of having an outside company apply outdoor pest control products. Compared to residents that own a single family detached home, residents that own an attached home are approximately 5.4 times more likely to have an outside company apply outdoor pest control products; residents that rent an attached home are 7.5 times more likely and residents that rent an apartment are approximately 29 times more likely to have an outside company apply outdoor pest control products than residents who own single family detached homes.

How People Identify Outdoor Pests

Following a branching sequence, the 89 respondents who contract solely with an outside company and the 33 respondents who replied "other" in response to the query regarding who applies outdoor pest control products (see Table 11 on page 12), were skipped out of a series of more detailed questions about their use and disposal of outdoor pest control products. Of the remaining 397 respondents that moved through this series of questions, 384 provided valid responses when asked to identify outdoor pest problems.

Table 14 below presents the responses to this question. Percentages are computed based upon valid responses. Since respondents could select more than one option, a total percentage is not provided.

Table 14

Identification of Pest Problems	Frequency (Percent)
Can identify it from experience	341 (88.8%)
Receive help from store personnel	46 (12.0%)
Identify it by book, magazine, or Internet	29 (7.5%)
Guess	18 (4.7%)
Other (Receive a professional diagnosis, neighbors, gardener, personal professional knowledge)	12 (3.1%)

2.1 OUTDOOR PEST PROBLEMS

Although it did not appear so to interviewers or respondents because CATI programming guided the sequence of questions, the survey instrument was quite complicated. Many item sequences "branched" with later questions dependent upon the responses to a preceding question. For example, survey respondents were asked about their outdoor pest problems if they applied pest control products themselves (n=318), if another member of their household (n=26) applied pest control products, if they and an outside company applied pest control products (n=54), or if the application was performed by a pest control company under contract to the respondent (n=89). Responses coded as "other" (n=33) that involved some permutation of these options also continued through a sequence of questions about outdoor pests. Table 15 on the following page reflects a total N (number of qualified respondents) for this series of questions of 519.

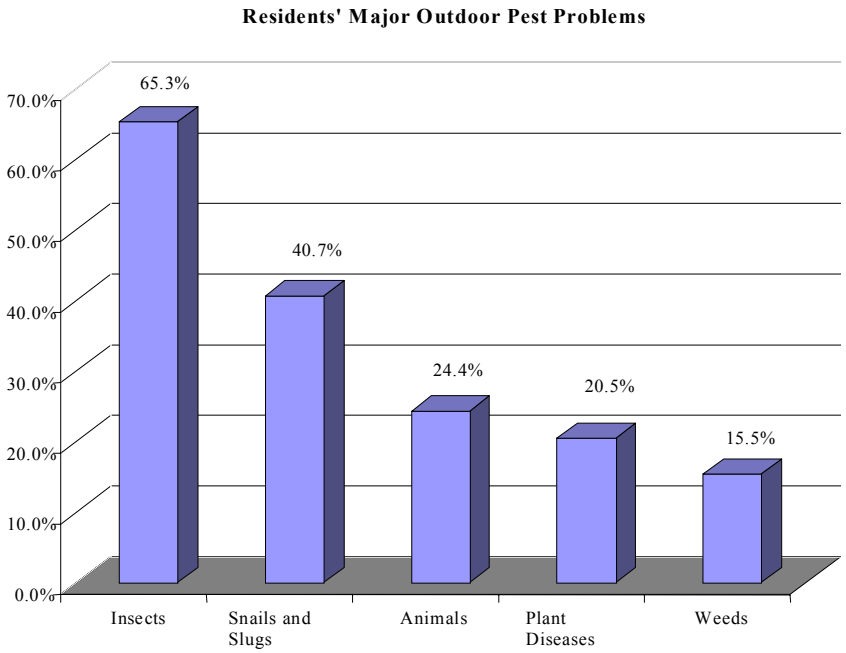
Table 15

Who Applies Outdoor Pest Control Products	Frequency
Respondent or Another Member of the Household	344
Respondent and an Outside Company	54
An Outside Company the Respondent Contracts with	89
[1]Other	32
Total	519

[1] During the pilot test, respondents who indicated "other" in response to the question about who applies outdoor pest control products were skipped out of this series of questions. After the pilot test, the questionnaire was changed to include these respondents. Although 33 respondents indicated "other", only 32 were asked this series of questions, since one respondent completed the survey during the pilot test phase.

Outdoor Pests

Respondents were asked several questions regarding the main outdoor pests they encounter, focusing upon insects, animals, weeds and plant diseases. In this sequence of questions, multiple outdoor pests may have been specified, so percentages do not sum to 100. As depicted by the graph below, 339 of the 519 (65.3%) respondents that meet the criteria in Table 15 above, reported insects to be a major outdoor problem, followed by 210 (40.7%) that identified snails and slugs, and 126 (24.4%) that indicated animals. The lowest proportion of respondents (15.5%) reported that weeds are a "major outdoor problem".



Insects

Of the 519 asked, 339 (65.3%) residents indicated that they consider insects to be a major outdoor problem, 173 (33.3%) do not, and seven (1.4%) could not answer the question. Of the 339 who identified insects as a problem, the highest proportion of respondents (n=268, 79.1%) indicated that they had a problem with ants, 62 (18.3%) named whiteflies, 60 (17.7%) named spiders, and 25 (7.4%) cockroaches. Other responses included crickets, wasps, aphids, termites and flies.

Snails and Slugs

Of the 516 valid responses, 210 respondents (40.7%) indicated that they considered either snails or slugs to be a major outdoor problem.

Animals

On this item, 516 of the 519 respondents who were asked were able to provide a response. Of the 516 valid responses, 126 (24.4%) indicated that they had a problem with animals, such as birds, rabbits, squirrels, gophers, or deer. Of these, 60 respondents (47.6%) indicated that they had a problem with birds, 29 (23.0%) with rodents, 22 (17.5%) with rabbits, 18 (14.3%) indicated they considered gophers to be a major outdoor pest problem, and 17 (13.5%) identified opossums in this regard. Other responses included raccoons, squirrels, and coyotes.

Plant Diseases

Of the 507 valid responses, 104 respondents (20.5%) indicated that plant diseases are a major outdoor problem. Thirty-three respondents (31.7%) misidentified Giant Whitefly filaments as a plant disease, 32 respondents (30.8%) listed mildew or mold. Other responses included black spots, other insects misidentified as diseases, and miscellaneous diseases. Five respondents (4.8%) were unable to identify the diseases.

Weeds

Of the 519 respondents who were asked this question, 79 (15.2%) indicated that weeds are a major outdoor problem, 432 (83.2%) said they were not, and eight (1.5%) did not respond. When asked to specify, the majority of respondents (N=45, 57.0%) were unable to identify the type of weed or grass they considered to be problematic. Of those that could identify the plant, 19 (24.0%) replied that dandelions were a problem around their residence. Other responses included crab grass, Bermuda grass, and clover.

Outdoor Pest Problems and Type and Ownership of Residence

Residence Type/ Ownership was not significantly related to whether respondents reported insects, weeds, plant diseases, or animals to be a major outdoor problem. However, Residence Type/ Ownership was significantly related to whether snails or slugs were considered to be a major outdoor pest problem. As depicted in Table 16, approximately 47% of the respondents who either own a single family home (47.8%) or rent an attached home (47.6%) indicated that they consider snails or slugs to be a major outdoor problem. This decreases to 18 (32.1%) of the residents who own an attached home, 14 (27.5%) who rent a single family detached home, and five (19.2%) respondents that rent an apartment and reported snails or slugs to be a problem.

Table 16

Residence Type/ Ownership	Proportion Reporting Snails or Slugs to be a Major Problem?
Own a single family detached home	162 (47.8)
Own an attached home	18 (32.1%)
Rent a single family detached home	14 (27.5%)
Rent an attached home	10 (47.6%)
Rent an apartment	5 (19.2%)

p. < .01

2.2 PEST CONTROL PRODUCT USE WITHIN THE PAST SIX MONTHS

Of the 397 residents asked, 309 (78.0%) reported that they had used a pest control product at their residence within the past six months, 87 (22.0%) had not. One resident refused to answer the question. The 309 who had used a product within the past six months were asked to indicate how many different products they had used. Of the 306 respondents who could answer the question, almost one-half (n=147, 48.0%) indicated that they had used only one product. One hundred and six (34.6%) had used two, 42 (13.7%) had used three, nine (2.9%) had used four products, one respondent reported having used five products, and one used six different products. Thus, 306 survey respondents used a total of 532 products, but computation of the smaller number of unique products used depended upon subsequent questions.

Pest Control Product Use

The 306 survey respondents who were able to identify the number of different products they had used during the past six months were asked for the name of the product, what they used the product to control, the form of the product they used, and where they purchased it.

Pest Control Product Name

Respondents were asked to provide the name of each different product that they had used during the past six months. If respondents named more than one product, multiple responses were tallied. The total number of products named by respondents is 532; however, the eleven most frequently named products account for 67% of all responses. These results are depicted in Table 17 below. Note that "unknown" is the most frequent response, followed by a form of Raid. Percentages are computed based upon the total of 532 products used by survey respondents.

Table 17

Product Name	Frequency	Percent
Unknown	87	16.3%
Raid, Unknown formulation	80	15.0%
Diazinon, Unknown brand	47	8.8%
Snail Control, Unknown brand	29	5.4%
Ortho Brand, Unknown product	24	4.5%
Ant Spray, Unknown brand	18	3.4%
Unknown Insecticide	18	3.4%
Malathion, Unknown brand	16	3.0%
Black Flag, Unknown formulation	15	2.8%
Insecticidal Soap	12	2.2%
Raid Ant and Roach Spray	10	1.9%

Active Chemical Ingredient in Pest Control Products

The principal investigator matched the active chemical ingredient to the products named by survey respondents. But since much of this information was incomplete, the majority of the products (52.6%) could not be classified according to the active chemical ingredient in the products they used. Again, percentages are computed based on the 532 products named by respondents. Only the seven most frequent responses are reported in Table 18 below. These seven most frequent ingredients account for approximately 83% of the total.

Table 18

Active Chemical Ingredient	Frequency	Percent
Unknown	281	52.8%
Diazinon	56	10.5%
Metaldehyde	44	8.3%
Chlorpyrifos	22	4.1%
Malathion	16	3.0%
Allethrin & Tralomethrin	16	3.0%
Oil	7	1.3%

Target of the Pest Control Product

Almost one-half (47.7%) of the products used by survey respondents during the past six months were used to eliminate ants, followed by 70 (13.1%) products used for snails or slugs. Table 19 on the next page details the nine most frequent pests targeted, accounting for 90% of all responses.

Table 19

Use of Pest Control Products	Frequency	Percent
Ants	254	47.7%
Snails or Slugs	70	13.1%
Insects – Not known or not specified	38	7.1%
Cockroaches	29	5.5%
Hornets or Wasps	27	5.1%
Spiders	20	3.8%
Weeds	18	3.4%
Aphids	14	2.6%
Rodents	11	2.1%

Product Form

Table 20 below details the form of the 532 products used by survey residents during the past six months. Just over one-half (50.4%) of the products were ready-to-use sprays, 126 (23.7%) were concentrated sprays. The "other" responses were live snails that kill brown snails, an ant trap, ant bait, a kind of gel, and stakes that are placed in the ground.

Table 20

Product Form	Frequency	Percent
Ready-to-use spray (includes aerosols)	268	50.4%
Concentrated spray	126	23.7%
Dry granule	104	19.5%
Other	5	.9%
Don't Know or Refused	29	5.5%
Total	532	100.0%

Product Point of Sale: Store Type

As depicted in Table 21 on the next page, respondents indicted that they had purchased 293 (55.1%) of the products at large home supply stores (such as Home Depot). Ninety-six (18.0%) of the products were purchased at a grocery or drug store, 43 (8.1%) at a nursery, 37 (6.9%) at a hardware store, and 26 (4.9%) at a discount department store (such as Target).

Table 21

Point of Pest Control Product Sale	Frequency	Percent
Large Home Supply Store	293	55.1%
Grocery or Drug Store	96	18.0%
Nursery	43	8.1%
Hardware Store	37	6.9%
Discount Department Store	26	4.9%
By Catalog or Internet	1	.2%
Other	7	1.3%
Don't Know	29	5.5%
Total	532	100.0%

Respondents also indicated that they made their purchases at Petco, Trader Joe's, a discount supply store, in Mexico, and a few respondents indicated that the products had been given to them.

Product Point of Sale: Store Name

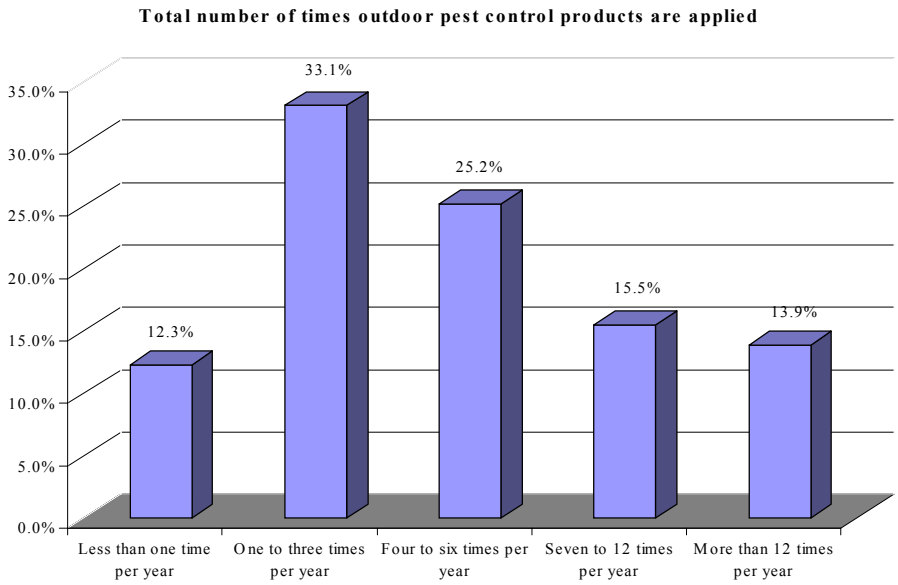
For each store type detailed in Table 21 above, respondents were asked to provide the store name where their purchase was made. Survey respondents named approximately 36 different stores. Table 22 below details the nine most frequent responses, which account for approximately 84% of all stores identified. Almost one-half (49.2%) of the products used during the past six months had been purchased at Home Depot, with an additional 45 (8.5%) of the products purchased at Home Base.

Table 22

Name of Store	Frequency	Percent
Home Depot	262	49.2%
Home Base	45	8.5%
Ralphs	38	7.1%
Ace Hardware	34	6.4%
Armstrong	20	3.8%
Vons	14	2.6%
Target	13	2.4%
Albertson's	11	2.1%
Stater Brothers	11	2.1%

How Often People Apply Pest Control Products

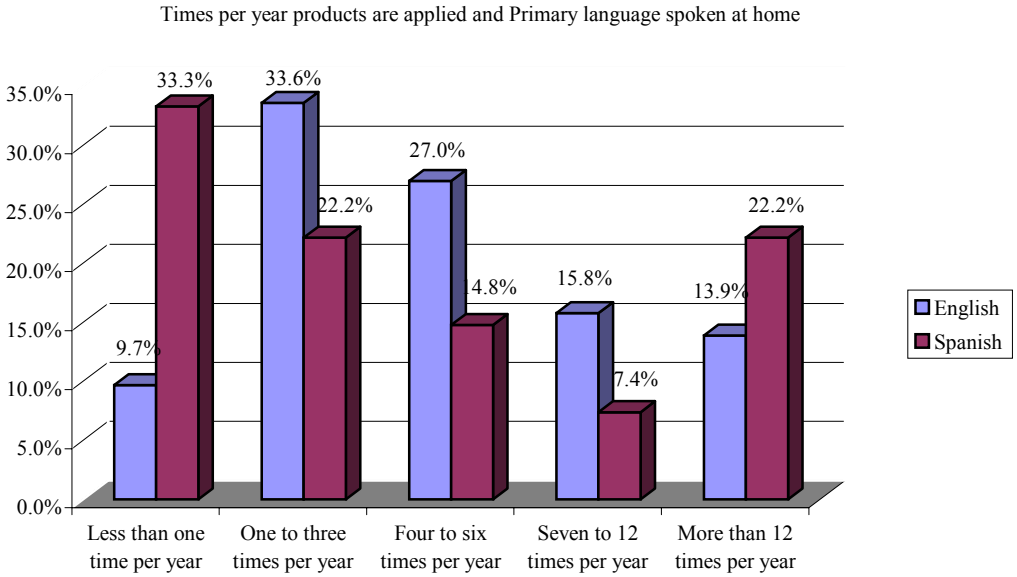
The 397 respondents that apply pest control products at home were asked about the total number of times per year that they apply any of the pest control products that they use. Sixteen respondents either refused to answer or indicated that they did not know. The graph below depicts the distribution of the 381 valid responses.



Approximately one-third (33.1%) of respondents reported applying products between one and three times per year, followed by 96 (25.2%) that apply products between four and six times per year. Fifty-three (13.9%) report applying products more than 12 times per year.

As illustrated by the figure on the follow page, the largest proportion (33.6%) of those that speak Spanish at home apply products less than one time per year; while the corresponding proportion of those that speak English at home in this category (9.7%) is considerably less. Conversely, the largest proportion (33.6%) of respondents that speak English at home report applying products between one to three times per year. Although the relationship between language spoken at home and the frequency of applying pest control products is statistically significant, the results should be interpreted with great caution because so few (n=27) respondents that speak Spanish at home could be used in the analysis.

Appropriate use of the Pearson Chi-Square Test (χ^2), requires that no more than 20% of the cells in the crosstabulation table have expected cell counts less than five. In the analysis depicted by the figure below, 30% of the cells have expected counts less than five. Because the assumption regarding expected cell counts is not met in this analysis, and elsewhere in this report, where applicable, the Yates' Correction (also known as the Continuity Correction) has been calculated to adjust the significance level. Any analysis that is reported to be statistically significant henceforth reflects this adjusted calculation.



Disposal of Outdoor Products Mixed With Water

Respondents were asked what they did with the leftover solution for outdoor products that must be mixed with water prior to use. Of the 397 respondents, 212 (53.4%) indicated that they do not use products that must be mixed with water. Of those that do, the largest proportion of respondents (34.8%) indicated that they only make enough to use and that there is no mixture left over. Of the respondents who had leftover product, 47 (26.8%) reported that they store it for later use. Table 23 on the following page depicts all of the responses, with percentages computed based on 175 valid replies. Since respondents could provide more than one answer, a total percentage is not computed.

Table 23

Disposal of Outdoor Products Mixed with Water	
Only make enough to use, there is none leftover	61 (34.8%)
Store and use later	47 (26.8%)
Reapply to same area until used up	30 (17.1%)
Put in the trash	14 (8.0%)
Pour on the lawn or in another garden area	13 (7.4%)
Take to a hazardous waste disposal site	7 (4.0%)
Pour down the drain or toilet inside the house	6 (3.4%)
Pour down the drain outside your house	2 (1.1%)
Pour in the street or gutter	2 (1.1%)
Apply to other areas	2 (1.1%)
Dilute mixture (respondent did not specify further)	1 (.6%)

Run-Off

One hundred ninety-four of the 392 (49.5%) respondents that provided an answer indicated that water usually runs into the street and/or sidewalk when they water their lawn or garden, while 198 (50.5%) indicated that it did not.

How Do You Choose What Pest Control Products to Use?

The 397 respondents involved with home application of pest control products were read a list of criteria that they might use to determine which products to use. The greatest proportion 69.0%) of respondents indicated that "what the product controls" was a criterion on which they base their selection. This was followed by ease of application (49.7%), safety (48.4%), and a recommendation from someone else (47.0%). The least important factor in determining what product to buy was packaging. All of the responses are presented in Table 24 on the next page. Percentages are computed based on 368 valid responses. A total percent is not included since respondents could select more than one answer.

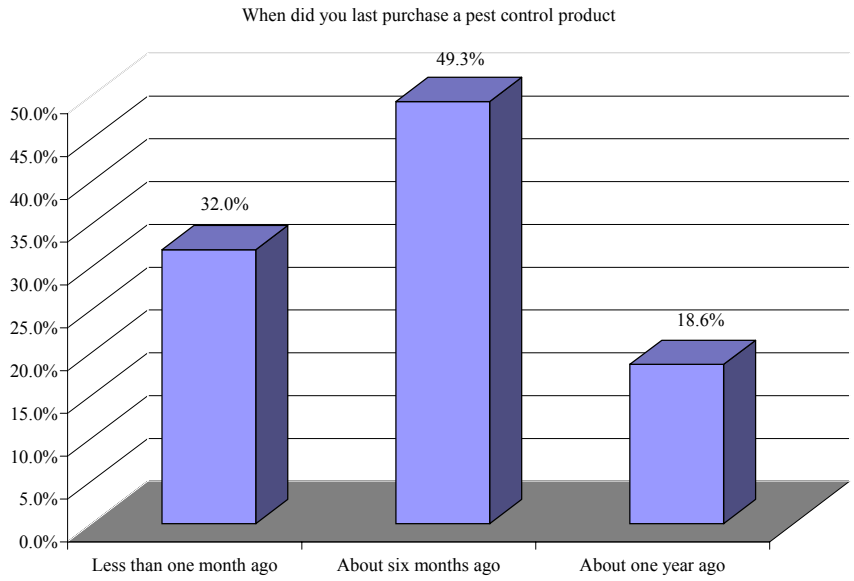
Table 24

Choose Product Based On…	
What it controls	256 (70.1%)
Ease of application	185 (50.7%)
Safety	180 (49.3%)
Recommendation from someone else	174 (47.7%)
How fast it works	158 (43.3%)
Environmental concerns	157 (43.0%)
Clearly written instructions	146 (40.0%)
Cost	119 (32.6%)
Already have at home	116 (31.8%)
How long it will last	112 (30.7%)
Active ingredient	84 (23.0%)
Packaging	47 (12.9%)
Other	15 (4.1%)

Other responses included safety for pets, brand name, past experience with a product, and two respondents who indicated that the personnel they contract with decides what to use.

When Did You Last Purchase a Pest Control Product?

Recall that this survey was conducted in the late summer, early fall of 2000. Approximately 7% of the interviews were completed in August, 86% in September, and 7% in October. Of the 381 valid responses, 122 (32.0%) respondents reported purchasing a pest control product "less than one month ago". For most respondents, this points to a purchase in August, 2000. For the 188 (49.3%) respondents who made their last purchase "about six months ago", this means a purchase between February and April, 2000, with the majority of survey respondents purchasing a product around March. The graph on the following page depicts the "time of purchase" distribution of 381 valid responses.



Product Most Recently Purchased

Respondents were asked to provide the name of the product they had most recently purchased. The fifteen most frequently named products, presented in Table 25 below and on the following page, account for approximately 81% of all of the products named by survey respondents. Percentages are computed based on 397 responses.

Table 25

Product Name	Frequency	Percent
Raid, Unknown formulation	83	20.9%
Unknown	49	12.3%
Ortho Brand, Unknown product	34	8.6%
Diazinon, Unknown brand	30	7.6%
Snail Control, Unknown brand	22	5.5%
Unknown Insecticide	22	5.5%
Ant Spray, Unknown brand	17	4.3%
Black Flag, Unknown formulation	12	3.0%
Spectracide, Unknown product	12	3.0%
Malathion, Unknown brand	10	2.5%
Dursban, Unknown brand	8	2.0%
Grants Ant Stakes	7	1.8%
Round Up	6	1.5%
Raid Ant and Roach Spray	6	1.5%
Non-chemical control	6	1.5%
Total	324	81.5%

Active Chemical Ingredient in Most Recently Purchased Pest Control Product

Again, using information provided by the principal investigator, the active chemical ingredient of each pest control product was identified where possible. As with results presented previously, over one-half (60.5%) of the chemical ingredients could not be identified, since respondents were not able to provide complete information for the product they had last purchased. Percentages are computed based on 397 responses. The seven most frequent ingredients are reported in the table below.

Table 26

Active Chemical Ingredient	Frequency	Percent
Unknown	240	60.5%
Diazinon	34	8.6%
Metaldehyde	30	7.6%
Chlorpyrifos	16	4.0%
Allethrin & Tralomethrin	13	3.3%
Malathion	11	2.8%
Arsenic Trioxide	7	1.8%
Bifenthrin	7	1.8%
Glyphosate	6	1.5%
Non Chemical Control	6	1.5%
Total	370	93.4%

What Pest or Pests Did You Need to Control With This Product?

Respondents could identify up to three pests they intended to control with the most recent product they purchased. Of the 397 survey respondents asked, 384 respondents were able to name the pest or pests they needed to control; these respondents named 467 pests (insects, animals, weeds and plant diseases). As illustrated by Table 27 on the following page, 211 (45.2%) of the products had been used for ants, 51 (10.9%) products were used to control snails or slugs, 29 (6.2%) for whiteflies, 27 (5.8%) for cockroaches, and 23 (4.9%) for hornets or wasps. The thirteen most frequent responses, presented below, account for 89% of the total. Percentages are computed based on the 467 pests identified.

Table 27

What did you use the product for	Frequency	Percent
Ants	211	45.2%
Snails or Slugs	51	10.9%
Whiteflies	29	6.2%
Cockroaches	27	5.8%
Hornets or Wasps	23	4.9%
Spiders	15	3.2%
Weeds	13	2.8%
Insects – Not known or not specified	10	2.1%
Aphids	10	2.1%
Rodents	9	1.9%
Fleas	7	1.5%
Flies	7	1.5%
Termites	6	1.3%

What Do People Read on a Pest Control Product Label?

The 397 survey respondents that apply pest control products at their residence were read a list of items and asked, "Which of these do you read or look at on a pest control product label before buying it?" The highest proportion (82.3%) of respondents indicated that they read or look at the list of pests the product controls, the lowest proportion of respondents look at "what the ingredients are" (30.8%) and "disposal information" (29.1%). Table 28 on the next page details the information on the label read for 367 valid responses.

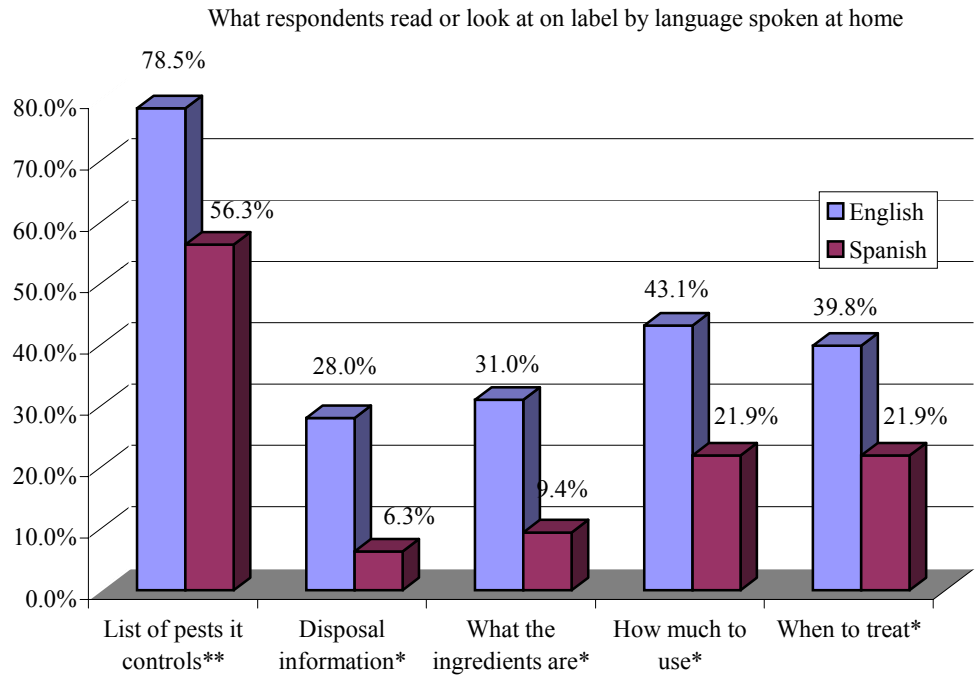
Table 28

Read or Look at on a Label	
List of pests it controls	302 (82.3%)
How to apply	187 (50.9%)
Safety information	181 (49.3%)
Picture of the pest	176 (47.9%)
How much to use	163 (44.4%)
When to treat	150 (40.9%)
What the ingredients are	113 (30.8%)
Disposal information	107 (29.1%)
Other	7 (1.9%)

Other responses included looking for a brand name or a familiar name, environmental concerns, and price.

What Do People Read on a Product Label and Language Spoken at Home

The figure on the following page illustrates the statistically significant associations between what respondents look at on a label before purchasing a pest control product and the language spoken at home. Over three-quarters (78.5%) of English speakers indicated that they read the list of pests a product purportedly controls, compared to 56.3% of the respondents who speak Spanish in their homes. Only two (6.3%) of the 32 Spanish speakers who answered both questions indicated that they read the disposal information, compared to 28% of the English speakers.



* p.<.05 ** p.<.01

How Do You Decide How Much of The Product to Use?

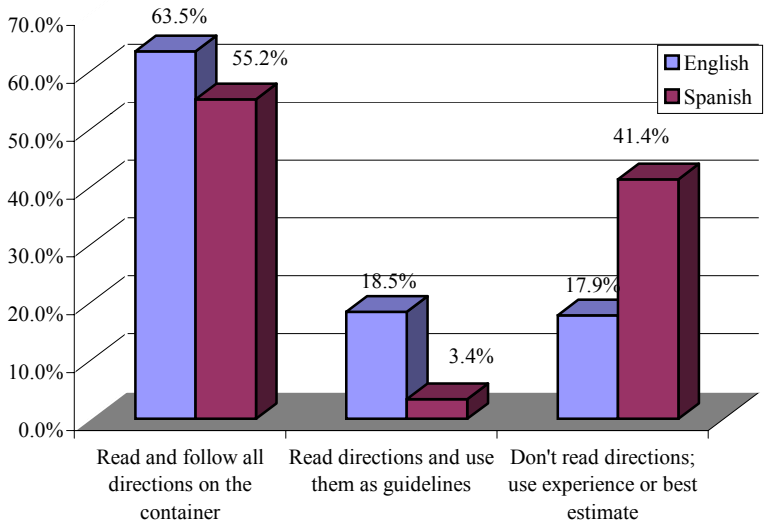
Of the 388 valid responses, the largest proportion of respondents (N=240, 61.9%) indicated that they "read and follow all directions on the container" when deciding how much of a product to use. Seventy-seven (19.8%) indicated that they "don't read the directions, they use experience or best estimate", and 66 (17.0%) indicated that they "read directions on the container and use them as guidelines."

Respondents were also asked if they "measure out" or "estimate" the amount of pest control product to spray or apply. Of the 375 responses, 144 (38.4%) indicated that they measure the amount to be used, while 231 (61.6%) estimate.

How Do You Decide How Much to Use by Language Spoken at Home

As depicted by the figure on the following page, 12 (41.4%) of respondents who speak Spanish in their households indicated that they use experience or their best estimate when they apply pest control products, compared to 59 (17.9%) of those that speak English at home. These results of the analysis between language spoken at home and how respondents decide how much pest control product to use are statistically significant, although again, the number of Spanish speaking persons in this analysis is small so the result must be interpreted with caution.

How do you decide how much of the product to use (row) by Primary language spoken at home (column)



Where Do You Get Your Pest Control Information?

Respondents were asked to specify where they receive pest control information. Respondents answered this open-ended question without prompts of any kind. As illustrated by Table 29 on the following page, the largest proportion (38.4%) indicated that they receive their pest control information from the labels of the products that they purchase. The second most frequent answer was that this information is obtained from store employees (23.5%), followed by word of mouth (17.5%), and advertisements (12.2%). Seventeen respondents were not able to provide a response and two respondents refused to answer the question. The percentages below are based on 378 valid responses. A total percent is not provided since respondents could select more than one response.

Table 29

Source of information	
Product label	145 (38.4%)
Employee at the store where purchased	89 (23.5%)
Word of mouth	66 (17.5%)
Advertisements	46 (12.2%)
Posters at the store where purchased	41 (10.8%)
Newspaper article	34 (9.0%)
Magazine article	29 (7.7%)
Tear sheets at the store where purchased	21 (5.6%)
Other method at the store where purchased	18 (4.8%)
Experience	17 (4.5%)
Garden Fairs or Shows	14 (3.7%)
Internet article	11 (2.9%)
Gardener/ Nursery/ Other store	11 (2.9%)
Classes	6 (1.6%)
Gardening books or magazines	6 (1.6%)
Professional exterminators	6 (1.6%)
University of California Farm Advisor	3 (.8%)
University of California Master Gardener	3 (.8%)
TV Programs	3 (.8%)

Sources of Advertised Information

The 46 respondents that indicated that they receive information from advertisements were asked to specify the source of the advertisements that they had heard or seen. The table below depicts these results. Again, respondents could select more than one category so a total percentage is not provided.

Table 30

Source of Advertisements	
TV	28 (65.1%)
Magazines	16 (37.2%)
Newspaper	14 (32.6%)
Internet	5 (11.6%)
Radio	4 (9.3%)
Store displays	2 (4.6%)
Other (Word of mouth, junk mail/ flyers)	2 (4.6)

Where Do You Get Your Pest Control Information by Language Spoken?

Table 31 below illustrates only the statistically significant relationships between pest control information source and language spoken at home. More than twice the proportion of English speakers than Spanish speakers indicated that they receive pest control information from the labels of the products they purchase. Conversely, almost twice the proportion (40.6%) of Spanish speakers indicated that they get their information from an employee at the store where the product is purchased. In the last item of the table, "Advertisements" the Yates' Correction was calculated to account for one cell with an expected cell count less than five.

Table 31

	Primary Language Spoken at Home	
Information Source	English	Spanish
Product Label*	130 (38.3%)	5 (15.6%)
Employee at the store where purchased**	69 (20.4%)	13 (40.6%)
Advertisements**	36 (10.6%)	9 (28.1%)

* p. < .05 ** p. < .01

Disposal of Pest Control Products

Respondents that apply pest control products at home were asked how they usually dispose of products that they no longer use. Respondents were read a list of six options and asked to select the one that best described their usual disposal practices. An opportunity for respondents to provide an "other" response was also provided. The items that were read to survey respondents are marked with a caret (^) in Table 32, below. Items without a caret were volunteered as "other" responses.

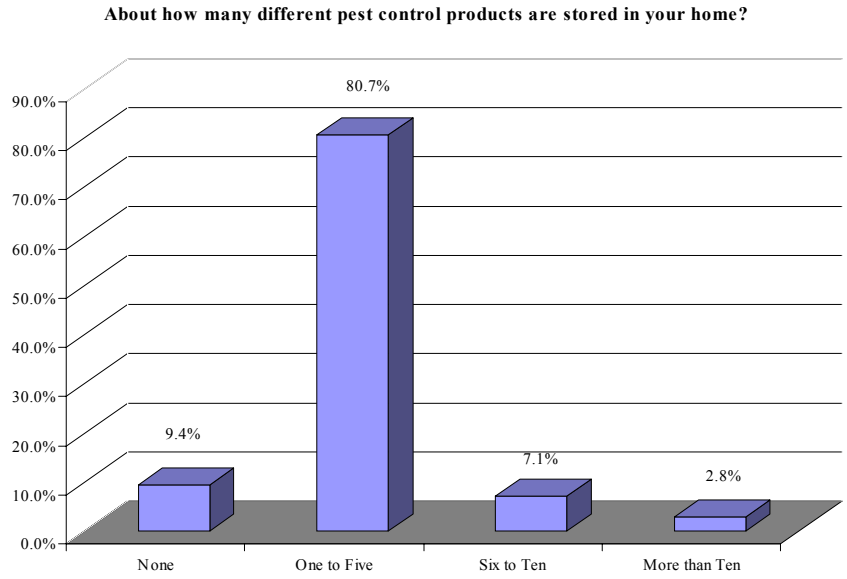
Over one-half (54.5%) of the respondents indicated that they dispose of unused pest control products by throwing them in the trash. Less than one fifth (18.1%) indicated that they take them to a disposal site. A number of responses were not precisely consistent with the question, for instance, some persons reported that they use the entire product (8.5%), store it (3.8%), or store it for later use (3.8%). It is difficult to determine the extent to which the social desirability of a "correct" response (taking a product to a hazardous waste disposal site), and the social undesirability of an "incorrect" response (pouring leftover product in the gutter) influenced these results. Twenty-six survey respondents had no response and six refused to answer the question. Percentages are computed based on the 365 valid replies.

Table 32

	Frequency	Percent
^Put in trash	199	54.5%
^Take to a hazardous waste disposal	66	18.1%
Use it all	31	8.5%
Store	14	3.8%
Store and use later	14	3.8%
^Pour in drain or toilet inside home	8	2.2%
Only make enough to use	8	2.2%
Follow directions on label	7	1.9%
^Pour down drain outside home	5	1.4%
^Give Away	4	1.1%
Put containers in recycle bin	3	.8%
^Pour in the gutter or street	2	.5%
Use it on soil only	2	.5%
Other	2	.5%
Total	365	100.0%

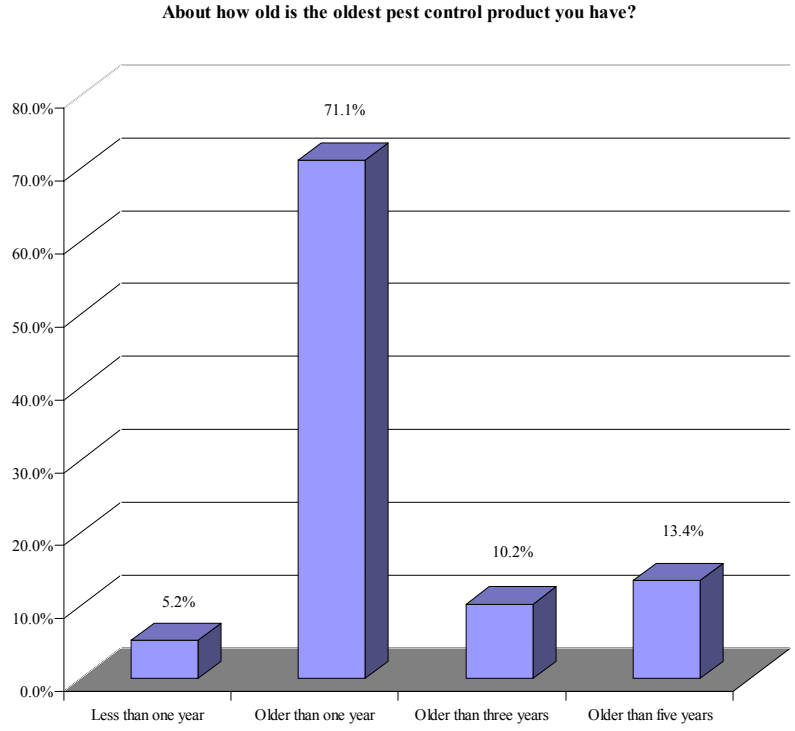
How Many Different Pest Control Products Are Stored in Your Home?

Of the 393 respondents who were able to provide an answer, 37 (9.4%) indicated that no products are currently stored in their home, 317 (80.7%) have between one and five products stored in their home, 28 (7.1%) have between six and ten and 11 (2.8%) have more than ten. The graph on the following page depicts these results.



Age of Oldest Pest Control Product

If a respondent had at least one product in their home, or if they did not know or refused to provide this information, they were asked to provide the age of the oldest product that they have. The 37 respondents who indicated that they did not have any pest control products in their home were not asked this question. The graph below presents the information for the 305 respondents, of the 360 that were asked, who provided a response.



The highest proportion of respondents (N=217, 71.1%) replied that the oldest product was older than one year, 31 (10.2%) reported products older than 3 years, and 41 (13.4%) older than five years. Sixteen respondents (5.2%) said that the oldest product in their home was less than one year old.

Number of Products Stored in Your Home and Age of Oldest Product

As illustrated by Table 33, approximately 76% of the respondents who have between one and five different products stored in their homes indicated that the oldest product was "older than one year." Of the respondents with six or more different products at home, approximately 44% reported that the oldest product is "older than five years". These results are statistically significant, adjusted using Yates' Correction.

Table 33 How Old is the Oldest Product Stored in your Home (row) by Number of Different Products Stored in your Home (column)

	1-5	6-10	More than 10
Older than one year	205 (76.2%)	9 (33.3%)	3 (33.3%)
Older than three years	25 (9.3%)	5 (18.5%)	1 (11.1%)
Older than five years	25 (9.3%)	12 (44.4%)	4 (44.4%)
Less than one year old	14 (5.2%)	1 (3.7%)	1 (11.1%)
Total	269 (100.0%)	27 (100.0%)	9 (100.0%)

$p. < .001$

Name of Oldest Product Stored in Home

Of the 360 respondents asked to provide the name of the oldest product that they had in their homes, 83 (23.1%) replied, "Raid". Eighty-two (22.8%) could not name the oldest product in their home. Unless a product was named by at least four respondents, the results are not included in Table 34. However, the 309 products listed account for 85.8% of the total. Percentages are computed based on 360 respondents.

Table 34

Product Name	Frequency	Percent
Raid, Unknown formulation	83	23.1%
Unknown	82	22.8%
Ortho Brand, Unknown product	32	8.9%
Diazinon, Unknown brand	26	7.2%
Ant Spray, Unknown brand	22	6.1%
Unknown Insecticide	17	4.7%
Black Flag, Unknown formulation	14	3.9%
Snail Control, Unknown brand	10	2.8%
Malathion, Unknown brand	8	2.2%
Spectracide, Unknown product	7	1.9%
Dursban, Unknown brand	4	1.1%
Ortho brand Ant spray	4	1.1%
Total	309	85.8%

Name and Age of Oldest Product Stored in Home

As indicated by Table 35 on the following page, 49 (29.2%) of the respondents that reported that the oldest product in their home was "older than one year", reported that the product was Raid, although they did not specify or did not know what type. Of the respondents with a product "older than three years" or "older than five years" that were able to specify the product, five (19.2%) and seven (20.0%), respectively, also indicated that it was Raid. These results are statistically significant, adjusted using Yates' Correction.

Table 35 Name of the Product (row) by Age of the Oldest Product Stored in Your Home (column)

	Older than one year	Older than three years	Older than five years
Unknown	34 (20.2%)	12 (46.2%)	16 (45.7%)
Raid, unknown formulation	49 (29.2%)	5 (19.2%)	7 (20.0%)
Ant spray, unknown brand	18 (10.7%)	0 (%)	2 (5.7%)
Black Flag, unknown formulation	12 (7.1%)	1 (3.8%)	1 (2.9%)
Diazinon, unknown brand	20 (11.9%)	2 (7.7%)	0 (%)
Ortho brand, unknown product	20 (11.9%)	2 (7.7%)	2 (5.7%)
Snail Control, unknown brand	6 (3.6%)	0 (%)	3 (8.6%)
Unknown insecticide	9 (5.4%)	4 (15.4%)	4 (11.4%)
Total	168 (100.0%)	26 (100.0%)	35 (100.0%)

p. < .05

3.0 PESTICIDE USE: INDOOR PEST CONTROL

All 1,424 respondents, regardless of who at their residence applies outdoor products, were asked who is responsible for indoor pest control at their residence. Of the 1,391 who answered the question, 349 (25.1%) indicated that indoor pest control products were not applied in their household. Over one-half (56.2%) of survey respondents indicated that either themselves or someone else in their household was responsible for indoor pest control. This was followed by 221 (15.9%) respondents who indicated that a commercial company, apartment complex or homeowners association applies pest control products. Table 36 on the following page details these results.

Table 36

Who applies indoor products	Frequency	Percent
Yourself or another member of household	782	56.2%
Commercial Co., Apt. Complex, or Homeowners Assoc.	221	15.9%
No indoor pest control products are applied	349	25.1%
Contracted company	20	1.4%
Other	19	1.3%
Total	1391	100.0%

Other responses include homeowner, landlord or manager, the respondent and an association or apartment complex, and housekeeper.

Disposal of Indoor Products Mixed With Water

All respondents were asked how they dispose of indoor pest control products that must be mixed with water. Most of the respondents (n=1196, 84.0%) indicated that they do not use products mixed with water. An additional 110 (7.7%) either did not know or refused to answer, and three respondents said they did not have a problem with indoor pest control. The remaining responses are illustrated in Table 37 on the following page. Percentages are computed based on the 115 valid responses.

Table 37

Disposal of Indoor Products Mixed with Water	
Store and use later	49 (42.6%)
Put in the trash	32 (27.8%)
Pour down the drain or toilet inside the house	21 (18.3%)
Not responsible for disposal	14 (12.2%)
Uses it all, nothing leftover	11 (9.6%)
Take to a hazardous waste disposal site	9 (7.8%)
Pour on the lawn or in another garden area	8 (7.0%)
Only make enough to use, there is none leftover	6 (5.2%)
Pour down the drain outside your house	3 (2.6%)
Pour in the gutter or street	1 (.9%)

4.0 PEST CONTROL PRODUCT DISPOSAL

Do Respondents Know the Location of a Waste Disposal Site?

All respondents were asked, "Do you happen to know where the hazardous household waste disposal site near you is located?" Of the 1409 that responded, 301 (21.4%) replied that they did, 1,108 (78.6%) did not.

Disposal of Pest Control Products and Knowledge of Disposal Site

Only those respondents classified as "home application" were asked how they usually dispose of pest control products that they no longer use (see Table 33 on page 38). Table 38 on the following page depicts the number and proportion of residents that indicated that they do or do not know where a disposal site is located cross-tabulated with how they usually dispose of pest control products that they no longer use. As depicted in Table 38, 34 (25.2%) of the respondents who know where a disposal site is located indicated that they dispose of products they no longer use by throwing them in the trash. Seven of the 66 respondents (10.6%) that indicated that they take their products to a disposal site indicated later in the survey that they did not know the location of a disposal site. The results are statistically significant, adjusted using Yates' correction. As previously described, the items that were read to survey respondents are marked with a caret (^)

Table 38 "How do you usually dispose of pest control products you no longer use" (row) by "Do you know where a hazardous waste disposal site near you is located" (column)

	Yes	No
^Put in trash	34 (25.2%)	163 (71.5%)
^Take to a hazardous waste disposal site	59 (43.7%)	7 (3.1%)
Use it all	16 (11.9%)	15 (6.6%)
Store/ Store and use later	9 (6.7%)	19 (8.3%)
^Pour in drain or toilet inside home	3 (2.2%)	5 (2.2%)
Only make enough to use	3 (2.2%)	5 (2.2%)
Follow directions on label	2 (1.5%)	5 (2.2%)
^Pour down drain outside home	3 (2.2%)	2 (.9%)
^Give Away	4 (3.0%)	0 (0%)
Put containers in recycle bin	0 (0%)	3 (1.3%)
^Pour in the gutter or street	2 (1.5%)	0 (0%)
Use it on soil only	0 (0%)	2 (.9%)
Other	0 (0%)	2 (.9%)
Total	135 (100.0%)	228 (100.0%)

**P. < .01

^ Choices that were read to survey respondents

C. Conclusions

Ants reined as the primary reason that a resident would apply a pest control product. Interestingly, snail and slugs were also rank as one of the types of pest that a person would most likely apply a pest control product.

Residents who owned a single family home were most likely to apply outdoor pest control products themselves. Other home ownership/type of dwelling combinations were more likely to not apply and outdoor pest control product or else a contracted company would take care of those pest control needs.

Home Depot was reported at the primary point of purchase for pest control products. Other types of stores included grocery and drug stores, and hardware store. Nurseries were not a major retailer for pest control products.

Pesticides were applied often and were kept on hand for that purpose. Approximately one-third of respondents reported applying products between one and three times per year, followed by 25.2% who apply products between four and six times per year. 13.9% report applying products more than 12 times per year. The highest proportion of respondents (71.1%) had at least one pest control product at their residence that was between 1 and 3 years old. Only 5.2% said that the oldest product in their home was less than one year old.

For the most part, persons who applied pest control products did not follow the label directions of calculating the correct amount of the product to use. While 61.9% of the respondents indicated that they "read and follow all directions on the container" when deciding how much of a product to use. However, only 38.4% indicated that they actually measure the amount to be used, while 61.6% estimated. It is not clear for the responses whether the respondents considered the measurement as part of the directions. In fact, they may interrupt the directions very broadly to mean only how (sprayer, spreader, etc.) and where to apply. However, most respondents did not use outdoor pest control products that needed to be mixed with water (53.4%).

The label was used by consumers to determine which pests the product controlled. They rarely read what the active ingredients were. In fact, that was the least important factor in determining which product to purchase. Another source of information used primarily by people whose first language was not English was the store employee. This may be due to the fact that most written information provided is in English.

Disposal of products appears to be problematic. Over one-half (54.5%) of the respondents indicated that they dispose of unused pest control products by throwing them in the trash. Less than one fifth (18.1%) indicated that they take them to a disposal site. This corresponds to the fact that the majority of the respondents did not know the location of a household waste disposal site.

D. Recommendations

Residents in this watershed primarily want to control ants and terrestrial mollusks (snails and slugs). Reduction of pesticide use for these pests would result in a significant overall pesticide reduction. Therefore, promotion of alternatives such as baits and sanitation for ants and habitat modification or use of reduced risk pesticides for mollusks should be encouraged. Additionally, an increase in the awareness of proper disposal of older or unused products would be beneficial to reduce the use of those products which may be environmentally problematic. Finally, improvement of the product labeling to include text in Spanish and highlight proper mixing directions would be beneficial. Alternatively, products may be sold in smaller packages such as "by the 100 square foot" and/or only as ready to use formulations to help mitigate problems caused by over-application or wrong concentration.

III. In-Store and Sales Survey

A. ASSIGNMENT

Locally and throughout the county, recent urban run-off, pesticide use, and water quality issues have generated interest in how the sales and use of pesticides relate to water quality in urban settings. While it is recognized that most pesticides used for in the home are purchased in a retail setting, little more specific qualitative or quantitative data have been available. This study complements the telephone survey examining residential pesticide use in the San Diego Creek Watershed. Its focus is to examine the quantity and type of pesticides sold at the retail level as well as corresponding consumer and store attitudes.

In order to address both the quantitative and qualitative perspectives, it was two components were built into the study. The study was initiated in December 2000 and continued through August 2001. In order to capture data for an entire year, any quantitative data gathered was based on the previous year's sales cycle (January - December 2000). The qualitative findings were based on field observations and phone calls that occurred between February and April, 2001. All findings were also supplemented with field and other checks performed in June and July, 2001.

The primary focus (quantitative) of the study was to gather and review sales data from the stores located within the watershed boundaries (approximately 150 stores). Using this information from a sample of stores and through the use of the Department of Pesticide Regulation's Pesticide Label Database we could then estimate quantities of actual active ingredients purchased by residential consumers. A sample of stores was selected from within the total store population to qualitatively evaluate trends that might enrich and complement strictly quantitative findings.

B. METHODOLOGY

The San Diego Creek Watershed, as defined on USGS maps, encompasses approximately 154 square miles and includes the cities of Costa Mesa, Irvine, Laguna Woods, Lake Forest/Foothill Ranch, Newport Beach, Orange, Santa Ana and Tustin. The survey was designed to address multiple retail channels located within the area. The channels identified ranged from large home supply, discount department stores, grocery and/or drug stores to hardware stores and nurseries. In total, approximately 150 stores representing six (6) retail channels were surveyed.

- Nursery
- Grocery
- Drug
- Hardware
- Discount Department
- Large Home Supply

This portion of the project was initiated in December 2000 after initial results of the residential use survey performed by California State University, Fullerton (CSUF) were summarized. During the early project phase, survey design schedules were established. During this program development period, six sets of store "pairs" were also identified. Pairs of stores were intentionally selected to help capture and compare some of this geographic and demographic variation within the watershed. Each pair consisted on one type of store (i.e., two grocery stores, two home supply stores and two nurseries) but each member of the pair was located in a different city. Care was taken to make sure that members of each of the six store pairs represented non-adjacent cities. Consideration was also given to incorporate coastal and non-coastal; ethnically diverse and more homogenous; as well as recently developed and established communities in the selection. Store pairs selected are listed below. To assure confidentiality, store names are not used in this report.

Table 39 - Pairs by Store Type and City

Pair	Store Type	City	City
1	Nursery	Laguna Hills	Costa Mesa
2	Grocery	Newport Beach	El Toro
3	Drug Store	Corona del Mar	Foothill Ranch
4	Hardware	Irvine	Lake Forest
5	Discount Department	Irvine	Santa Ana
6	Home Supply	Santa Ana	Orange

The stores were visited between the end of January and March, 2001. Initial inquiry to some stores for quantitative data was made as early as December 2000. In addition to store visits, supplemental research via Internet, phone and review of pertinent earlier survey data also took place. To assist in gathering qualitative data, a form was developed to note the number and range of pesticide products offered by manufacturer as well as formulation and size. A copy of the form is included in the Appendix.

A limitation to this portion of the study is that pesticide use and sales vary seasonally and this seasonal factor may reflect a source or error for this study. Most of this study, due to project schedules, occurred during a relatively slow period for pesticide sales. As a result, there were fewer interactions with customers and in some cases, less shelf space devoted to pesticides.

Starting as early as late December and extending through August 2001, retailers were contacted either by letter, phone, site visit or some combination of methods

C. RESULTS

1.0 Quantitative: Overall Retail Data

As established in the Residential Pesticide Use Telephone Survey, and correlated by zip code to the watershed boundaries for the study, approximately 150 stores sell pesticides to consumers for home use in the San Diego Creek Watershed. These stores fall into one of six types of retail channels. For quantitative data, all stores were contacted either in person, by letter, by phone, via e-mail or, more frequently, by some combination of these. To supplement these efforts, we also explored the purchase of data from national market research companies. Samples of the initial contact letter to stores and to market research firms are included in the Appendix. After data was collected it was matched to the DPR database of products and EPA numbers. These matches, correlated to the quantities of product sold, were used to estimate pounds of active ingredients for the sample of stores that provided sales data and then used to extrapolate sales of by active ingredient for the entire watershed.

Data Collection

Collecting actual store sales data was difficult. Smaller, locally controlled stores were more likely to share their sales data. However, we found that they were somewhat casual in tracking sales. In contrast, the larger stores with national sales, which have sophisticated systems to track sales information, were unwilling to share it. Despite our assurances of anonymity and that we were interested only in unit sales, not dollar value, requests to these stores for data were denied based on competitive considerations. For example, in December 2000 Home Depot, which represents 49% of all Points of Purchase for pesticides, originally indicated that they would provide data for this study. However, after eight months of discussions, including a formal letter to Home Depot from the Department of Pesticide Regulation, the request was denied for "reasons of competition" and no data was provided. Additionally, we contacted vendors that supply pesticides to the retail outlets for their sales information and they also refused our requests.

We then explored the option of purchasing national market research data. After preliminary negotiations with several sources, it became evident that this approach would be cost prohibitive. To overcome cost issues, we attempted to partner with the Herbicide and Insecticide Branch, Biological and Economic Analysis Division of the U.S Environmental Protection Agency (EPA) as they were also interested in acquiring this data. Unfortunately, negotiation delays with data providers and data format questions prevented this option from being exercised within this project schedule.

While we could not obtain sales data from the primary retail suppliers of home use pesticides, sales data was successfully obtained from several sources. This included six hardware stores and two nurseries. These findings represent 40% and 20%, respectively, of all hardware stores and nurseries in the watershed. In terms of the 150 store total sample, the findings represent approximately 5% of the total sample.

Data Analysis

Data from hardware stores was provided electronically in MS Excel format but data from the nurseries was not available only in paper form and was entered manually. In all cases, a cross checking of data after it was supplied was required. Supplied product names were incomplete or size information was missing. In general, retail stores track products using in-house vendor codes. In contrast, the DPR database tracks products by product name and EPA registration numbers. The DPR database does not recognize any vendor codes, or even UPC numbers. Because product references in store data were often incomplete and do not include specific physical formulation (e.g., ready to use, granule, concentrate, formula II, ultra, plus) or size information (e.g., one pint, one quart, 32 oz., 5 lbs, etc.), one product reference could yield multiple DPR matches. Ultimately, only one match could be correct. Typically, the only way to determine the "best match" was by revisiting the stores and/or checking manufacturer web sites.

Once the product information was obtained, verified, and matched to the DPR database, active ingredients were calculated in pounds. Active ingredient which are of interest, either due to environmental considerations or high use based on sales sample taken in the watershed are as follows:

Table 40. Pounds of Active Ingredients Based on Sales Sample: Findings Highlights

Active Ingredient	**Total from Sample (8 stores) (lbs.)**
Chlorpyrifos	106.46
Diazinon	1515.46
Metaldehyde	2947.95
Boric Acid	1038.75
Malathion	787.50
Carbaryl	537.03
Clarified Hydrophobic Extract of Neem Oil	9799.74
Petroleum Distillates, Refined	5557.5
Potash Soap	7493.96

Total pesticide sales data are detailed further in the Appendix.

According to sales data, chlorpyrifos and diazinon were did not account for a substantial potion of pesticide sales in nurseries (Appendix F). In these stores, clarified hydrophobic neem oil, petroleum distillates and potash soap were predominant active ingredients in the products sold. However, these sales estimates from nurseries may be low. We were unable to match approximately 20% of the products due to difficulties incomplete information regarding product names, sizes, or formulations.

2.0 Qualitative- Selected Pairs Study

The attitudes and availability of knowledgeable staff as well as the nature of products offered and awareness of customers varied considerably between the six store types. Similarities within store types were strong. Often similarities driven by store type superseded similarities due to location or community characteristics. A matrix identifying stores by type, number of products merchandised, amount of floor space for pesticides and leading products is included in Table 41.

Nurseries

The two nurseries visited were both established local businesses and not associated with any major retail operations. One was an independent retailer and the other was part of a local family of stores. All visits occurred in February, a period of fairly cold and very wet weather, with limited pesticide sales activity. Both nurseries had a good representation of lower health/environmental risk in addition to more traditional choices. Products tended to be grouped by intended use (e.g., insecticides, herbicides, rodenticides, fungicides). Trained nursery professionals (California Certified Nurseryman) were readily available. Some pesticide-related signage was posted and handouts were available at the checkstand. Typically, these featured specials on products and information on product applications. No non-English signage or handouts were available. In both stores, store managers or owners were available to discuss staff qualifications, training and comment on buying patterns. They reported that customers are always encouraged to read labels and try other methods before selecting serious chemical treatments.

Both stores have a regular customer base that is knowledgeable about what the pest problem is and how to treat it. The Costa Mesa store customer base is culturally a relatively homogenous group and fairly mature in age (i.e., 35-70). The Laguna Hills store is frequented by a fairly ethnically diverse clientele and includes a mix of younger and older customers. Best selling products in both nurseries tend to be the horticultural oils and insecticidal soaps. Snail/slug and rose care products also sell well. In general, customers express a preference for “more natural ” products. The stores, however, continue to stock products such as diazinon and malathion because customers do request them. Customers queried on these visits felt that the botanical-based products are safer. A store staff person indicated that the trend has been for nurseries to shift to stocking fewer pesticides and for those that are stocked, to be less toxic products.

Grocery

The two grocery stores visited were both part of the same regional chain. In both cases the store managers on duty indicated that pesticides have a relatively low profile in their overall product offering. As compared to other product categories, dedicated floor space for pesticides was limited and store staff have little training or experience with products. Product offerings are limited and dominated by one national brand (Raid).

Featured items tended to be ready to use ant, flea and roach sprays as well as mice and rat bait formulations. Almost all pesticide products are stocked with the household and cleaning products; the one or two lower health/environmental risk products are located in the floral sections. Store managers indicated product selection is determined by which manufacturers are willing to pay a premium for floor space. No product signage or literature was available. Observed customer buying habits were casual. Purchase decisions were based on "getting the same type that they always get" or "what they had a coupon for."

Drug

Two different major chains were visited. One, a smaller, recently remodeled store, was located in an established beachfront community. The other was a larger and newly constructed store in a still developing inland area. Compared to other product offerings, pesticides in these drug stores seemed to take a secondary position in terms of staff awareness, display visibility and dedicated floor space. Store staff have little training or knowledge of products.

There was considerable difference in the size of the two drug stores and the number of pesticides each had on display. At the small, beachfront store, pesticide offerings were limited and somewhat difficult to find. They were found in the "seasonal products" aisle. Topical applications such as those applied to repel mosquitoes, were the major products. The larger store also has a fairly small pesticide section that was stocked year-round, however, the display expands two to three times its size each year around the end of February. The store manager indicated that this is done to provide space for Christmas merchandise during the winter season when demand for pesticide products is lower.

Hardware

The two stores visited were both part of the same national buying co-op. In addition to being part of the same co-op, they also are under the same ownership. The store is most frequented by women between the ages of 35 and 60.The number and types of products as well as amount of floor space was similar between the stores and was fairly extensive. The product offering in these stores was quite broad, incorporating a range of ready to use sprays, concentrates, granular and bait formulations. The number of non-pesticide control treatments or those considered less toxic was fairly limited and was interspersed with more traditional, pesticides. Signage tended to be restricted to listing product name and price and did not address when or how to use.

Store staff are not given nor are required to have any special pesticide use training. In handling questions, the general policy is to advise customers to read directions or, if time allows, read the directions with the customer. Staffing attitudes and level of knowledge regarding pest control was quite different between the stores. Much of this is a factor of simple variation in experience, personality, areas of interest and training. One staff member interviewed had spent his entire life in the nursery business

and was very familiar with pesticides. He felt most of his customers are unaware for the need to use caution with pesticides. He suggested that it would be very helpful to have handouts on products to not only educate customers but also for staff reference and orientation to the job.

Discount Department Stores

The two discount department stores visited were both in the same national chain. One is located in a newer area of central Orange County, the other in a more mature area of central Orange County. Based on in-store observations, customer base and employee pool in both stores was ethnically diverse. Both stores were visited in February during cold, wet weather. Activity in pesticide sections was limited. One store had almost all products located outdoors. The other had a few products outdoors in the nursery area but the bulk of products were indoors. No staff in either store was readily available to offer assistance and those approached had little knowledge. When the cashier in the garden section in one store was asked where the pesticides were the response was, "What's that?"

It appears that in this particular discount department store chain, pesticide sections are usually placed near the back of the store. A fairly large number of products are stocked. These are dominated by the Ortho label. Other manufacturers displayed included Green Light, Bayer Advanced Garden and Garden Place, which appears to be this store's "exclusive" brand. Others include Bonide, Raid, Spectracide, Miracle Gro and Schultz. "Soft" pesticides and concentrates were intermixed. No special signage or handouts were offered.

Home Supply

The two stores visited were both part of the same large national chain. The regional manager for nursery pesticides described one of the stores as the oldest that the chain had in Orange County and was located in a very established community in north Orange County. The other was located in a slightly less mature area in Central Orange County. As observed by store traffic and staffing, the two stores were similar in terms of the ethnic diversity of staff and customer base. Knowledgeable store staff was available in both stores. An Area Manager for the chain said that the stores offer a class called "Garden 101" periodically throughout the year for Garden Section employees. They also encourage staff to get involved with the California Association of Nurserymen and participate in their training programs.

As part of a corporate chain, both stores merchandise a store proprietary brand, Real Kill. The Real Kill products are very prominently displayed; however, other brands get equal or more floor space and are available in a broad array of ready-to-use, concentrate, granular and bait formulations. According to the staff, Real Kill products sell well but so do many of the national brands. Bayer Advanced Garden, in particular, has been making a good push in the last year. Still in terms of shelf space, the most prominent brand name is Ortho. Other manufacturer and products include Spectracide,

Hot Shot, Raid, Victor, Safer, D-con, Term-out, Grants, Schultz and Round Up. According to sales people, best sellers vary by season with fairly consistent favorites being Term Out and Bayer Advanced Garden Rose and Flower Care. Botanically based blends were not highly visible. The Sun Ultra-Fine insecticidal product had been selling well; however, due to a distribution issue will no longer be carried.

In addition to a better-informed and more available staff than most stores visited (nurseries were the exception), this national chain displayed useful and educational information. Examples include a sign explaining the difference between granulars, concentrates and ready-to-use products. They also had a grid posted that showed the various active ingredients (diazinon, Dursban, permethrin, malathion, Sevin) and what pests they can be used for. Staff reports no special customer awareness/sensitivity to the safe use of pesticides. Most customers "just want something to take care of the problem."

Overall

The "pairs" approach revealed some interesting trends in the sales of pesticides in the San Diego Creek Watershed. Based on this study's findings, similarities in stores tended to be more a function of store type than store location and that there is a wide variation in what the different store types stock.

The hardware, discount department, and home supply store pairs had the largest and most diverse offering of products. These stores also had the largest representation of products that could pose a higher health/environmental risk. Nurseries also had a full range of products available but carried proportionally more of the reduced risk products. Grocery stores had the smallest selection and tended to limit their product offerings to ready to use insecticidal sprays and rodent bait formulations. The pattern in the drug store pair was less apparent. One drug store had a small display similar to what was found in the grocery stores; the other had a similar year round display but expanded it seasonally to include a full array of products. None of the stores segmented less toxic pesticides from others. Rather, products grouped by intended use.

In terms of knowledge of sales people and education efforts, both nurseries visited had well informed nursery professionals readily available. The hardware and home supply stores also had some fairly knowledgeable staff but these people were not necessarily always readily available. In contrast, grocery, drug, and discount department stores have few, if any, knowledgeable staff available to assist with pesticide questions or to make recommendations. Managers in these stores were somewhat detached about the pesticides in general. Other than the nurseries and home supply stores, little educational material was available to advise customers on the process of selecting and or using pesticides. Signage and handouts even in these stores was limited and often dated looking.

All stores reported that pesticide sales tended to slow dramatically in October and do not pick up again until late February or March. At that time, demand for insecticides,

in particular snail/slug, rose care, aphid and whitefly control products increase. This trend was then followed by warm season demand for herbicides. Ant, roach and rodent product purchases were more consistent throughout the year although there was some variation due weather patterns and consequent insect activity.

The companies that consistently occupied the most shelf space in stores visited were Ortho and Raid. Ortho was the dominant manufacturer in the majority of larger stores (hardware, discount department and home supply). Raid was dominant in stores with smaller pesticide emphasis (grocery and drug store). For a summary of store findings please refer to Table 41.

Table 41												
Store Type	**Home Supply**		**Grocery**		**Drug Store**		**Discount Department**		**Hardware**		**Nursery**	
Percent of Market*	**55.1%**		**18.0%**				**4.9%**		**6.9%**		**8.1%**	
City	Santa Ana	Orange	Newport Beach	Lake Forest	Corona del Mar	Foothill Ranch	Santa Ana	Irvine	Irvine	Lake Forest	Laguna Hills	Costa Mesa
# of Products	132	125	36	37	30	20, varies with season; up to 80	77	106	102	102	70	59
Shelf Space (l' x w')	50 x 6		5 x 6		5 x 6	5 x 6, varies by season up to 20 x 6	30 x 6		20 X 6	20 X 6	20 x 6	15 x 6
Product Range	Full range of pesticides		Primarily insecticides, some rodent bait formulas		Primarily insecticides, some rodent bait formulas	Varies from primarily insecticides in winter to full range in summer	Full range of pesticides		Full range of pesticides		Full range of pesticides	
Dominant Brand	Ortho,Spectracide		Raid		Raid,Off	Raid,Off Maxide	Ortho,Greenlight		Proprietary (store name brand),Ortho	Proprietary (store name brand),Ortho Raid	No dominant brand	Master Nursery Ortho
In-store or Proprietary Brand	Real Kill		None		None		Garden Place		Store name		none	Master Nursery
Approx. % "reduced risk" products	Less than 20%		Less than 20%		Less than 20%		Less than 20%		Less than 20%		50%	40-50%
Comments	Some signage; some knowledgeable staff with various levels of experience; Garden 101 classes offered periodically		No signage; Few if any knowledgeable staff		No signage; No knowledgeable staff available		No signage; No knowledgeable staff available		Some signage; No special training but some experienced staff; Customers with questions are referred to product label		Signage; Experienced staff	Signage; All staff, tenured with one of experience take CNN exam;

*Percentages used are from the telephones survey where respondents were asked where they purchased their outdoor pest control products.

D. CONCLUSIONS

1. Collecting accurate retail data is difficult but not necessarily for the reasons anticipated. Initially, it was assumed that the topic, "pesticide sales and implications to water quality" would be threatening to an entity that sells pesticides. As it turned out, there were stores that were reportedly receptive and interested in providing the information but were limited for logistical reasons. These reasons include the fact that small stores do not put an emphasis on tracking this data and the database structure of national stores makes it difficult to extract data on a store by store basis and even more difficult, specific to pesticide products. The majority of large stores did deny requests to supply data for "competitive reasons", and all stores that did provide data did so with the understanding that the information be used confidentially. Pesticide sales, use and their implications environmental issues are sensitive topics.

2. The attitudes and availability of knowledgeable staff, as well as the nature of products offered and awareness of customers, varied considerably among the six Point of Purchase store types. Similarities within store types were strong. In general, similarities in products, availability of knowledgeable store staff and attitudes of customers were characteristic of store type rather than store location or community characteristics.

3. Home Supply stores are the major Point of Purchase for pesticide in the watershed. Reportedly Home Depot represents 49% of that distribution. Based on this study and national results from the U.S. Lawn and Garden Survey (Cappello, 2001), Home Depot also offers the largest and broadest selection of pesticides. Home Depot provides staff training and posts signage on pesticides and pesticide usage; however, staff knowledge on pesticides seems to vary by store and time of visit. Lowes, a competitor to Home Depot opened stores in the watershed during the course of this study and Home Base, another competitor, closed its stores.

4. Of the retailers visited, nurseries have a moderate number of products but offer more lower health/environmental risk products in proportion to the other pest control products. They also tend to be more consistent in terms of knowledgeable, interested staff and customers with some awareness of pesticides. Discount department stores have a large and broad selection of products but little trained staff available for customer assistance. Hardware stores also have a large and broad selection of products. Staff tend to be more available and interested but not necessarily knowledgeable. Drug stores and grocery stores have a fairly narrow selection of pesticides with a heavy concentration of Raid aerosol and ant bait products. Staff in grocery and drug stores typically have no special knowledge or training regarding pesticides. *Consumers* in discount, hardware, drug and grocery are not as selective in purchase decisions as those observed in nurseries.

5. A few products dominate shelf space in the various retail stores. Those are Ortho and Raid. Ortho was particularly dominant in the larger stores (Hardware, Discount Department and Home Supply). Raid was more dominant in grocery and drug stores.

Again, this is the same trend seen nationally where the Ortho product label (from Scotts Company) is the principle brand of pesticide sold in home centers and discount stores (Cappello, 2001). Bayer introduced its Advanced line of insecticides in 2000 and this will likely challenge Ortho's dominance in the home garden market.

6. Store data formats vary tremendously and manufacturers often use similar product names for different formulations. These factors make it difficult to use the stores sales tracking data to match the product to EPA numbers and calculate active ingredients quantities. As a result, the most consistent method to match a product name to EPA registration numbers is in the field. Even then, a match can only be made if the product of interest is on the shelf. We found that some products were discontinued or that the stock had been depleted and not available that day.

E. Recommendations

To date, it is not fully confirmed to what extent pesticides sold for home use impact water quality in the San Diego Creek Watershed. This portion of the study only addresses the amount and formulation of products sold in the watershed, ***not what is applied***. Additional data from the primary retailers of pesticides in the watershed is needed to make a more accurate quantitative assessment of product sales. Additionally, if regular, long term collection and monitoring of pesticide sales are required, harmonization of the DPR database to product label tracking codes would expedite the data collection process.

The following is a summary of recommendations:

1. Home Depot is the largest retailer of pest control products in the watershed. Their data would greatly strengthen any conclusions that might be drawn from the limited data obtained in this study. We encourage a partnership with the EPA in Washington, D.C. (initiated but not completed within this project schedule) be further explored to purchase this data from market research companies.

2. Any future studies for qualitative purposes should be scheduled in stores during late spring, summer or early fall. In this study, in order to meet initial project schedules, stores visits took place in the slowest season for garden activities and pest issues.

3. Resolve the "compatibility gap" between how the DPR pesticide database is structured and how stores track sales. The most obvious approach would be for DPR to incorporate store level UPC codes along with product name and EPA Registration number. This way the product can be matched even if product name and/or size are not available or incomplete.

4. In addition to item #3 above, it would be helpful if the EPA number system and package protocol could be simplified. Currently, the EPA Registration Number and Establishment Number are required on each package. In addition, the current arrangement with both EPA Registration and Establishment numbers on the package makes it is easy to confuse them. According to DPR, the establishment number is

supposed to be removed once the registration application is complete. If so, based on field observations and the frequency of both numbers appearing, this is not happening.

6. Develop a pesticide awareness campaign that promotes best management practices and recognizes stores who promote awareness of pesticides use and hazards to customers. As described in #7 below, in a competitive retail market, stores are looking for opportunities to present value-added services that also make them good citizens. Prioritize outreach efforts to stores with a high volume of total sales, low amount of shelf space devoted to reduced risk products, and those where the customers are casual about which products are purchased.

7. Leverage retail stores' commitment to the environment and community. Many stores have an environmental affairs and/or a community department and want to build a positive image for the stores and be able to present value-added services. For example, one discount store takes great pride in their success as a recycler. Grocery stores promote that their fruits and vegetables are washed and their bags recycled. There is opportunity to expand these "awareness" campaigns, encourage customers to make wise choices and build a corporate image for the retailer.

8. There are several entities in the San Diego Creek Watershed that meet regularly, involve the community and local businesses, have an educational focus and that would be appropriate venues for increasing pesticide awareness and the importance of correct usage. These include the University of California Master Gardeners, Orange County Coastal Coalition, and the Upper Newport Bay Ecological Reserve/Peter and Mary Muth Interpretive Center.

9. Customer training in regard to integrated pest management, safe pesticide use and disposal appears to be lacking. Opportunities to bridge knowledge gaps and correct myths via public education should be explored via radio spots, newspaper articles, and in-store training.

10. Require that better signage be placed near areas where pesticides are sold.

11. Require that labeling include a toll free 800 number for information and make instructions available in more than one language. Also require that labels be printed in a larger font. Few people read directions or ingredients due to their small font size and/or lack of fluency in English.

12. Suggest that stores have a separate section for displaying reduced risk products to make it easier for the consumer to recognize them.

IV. Overall Summary and Recommendations

A telephone survey was conducting in 2000 to determine non-professional use of pesticides in and around homes in the San Diego Creek Watershed. In addition, a product and employee survey of retail stores in the watershed was also conducted. Overall, we found that customers and employees of retail nurseries were the most knowledgeable of pesticide use and application. However, this group only represented a small proportion of the market share. Most consumers purchased their products from large home supply chain stores and depended on label advertising for information regarding their choice of product. The primary reason most consumers purchased a pest control product was for ant control and usually the product was an aerosol formulation. The second pest most likely to be controlled by pesticides was snails or slugs.

Consumers prefer to use products that require the least amount of work to apply, e.g., ready to use sprays and aerosols. This is probably a good thing considering that applicators usually do not measure out the correct amount to apply even if they read the directions. Whitmore et al. (1992) report that less than 50% of U.S. homeowners read the label or follow safety procedures. Choice of which pesticide to purchase was influenced primarily by the list of pests written on the label. The factor that the least amount of people based their decision to purchase a product was the active ingredient. Where the primary language spoken at home was English, consumers obtained most of their pesticide information from the label. However, where the primary language was Spanish, consumers depended on a store employee for pesticide information.

The best predictor of whether a consumer applied an outdoor pest control product themselves or hired a contractor was whether they owned or rented their home combined with whether the home was attached (e.g. apartment or condominium) or detached (e.g. single family home). In general, those that rent an attached home were the most like to have a company perform outdoor pest control and residents own a single family detached home were the least likely to hire out that for type of work. Alternatively, 56% of the total respondents reported that did their own indoor pest control and approximately 17% contracted for it or that the apartment complex or homeowner's association performed it.

There appears to be an information gap regarding disposal of unused pesticide products or old pesticides. Most respondents did not know the location of their local household hazardous waste site and preferred to either store the products they no longer use or put in the trash. Only 18% reported that they took those products to a hazardous waste collection site. Additionally, 71% of the respondents said they had at least one pesticide stored in their home that was one to three years old. About 23% said they had one or more products that were at 3 years old.

The number of pesticide products at a retail store ranged from 20 at a drugstore to 132 at a home supply store. Sales data was extremely difficult and in most cases impossible to obtain. Nurseries and smaller hardware stores cooperated to the fullest extent but nationwide and statewide chains would not provide information citing that it is proprietary, despite our assurances that all information would not be used if a store could

be identified by the data. Nevertheless, we can make some predictions of total pesticide sales based on the consumer responses of where they said they purchased products. Assuming that the sales data from nurseries and hardware stores were representative of overall consumer purchases, we estimate that the total pounds of active ingredient of products containing diazinon, chlorpyrifos, and metaldehyde purchased *in the watershed* in 2000 to be 713, 10083, and 19642 respectively. It is important to note that *this does not necessarily mean that this was the amount applied, only the amount purchased.*

While recommendations for the two components of this study have been previously presented, there appears to be the overriding theme regarding the lack of knowledge regarding pesticide use and disposal on both the consumer and the supplier level. Whether this is due to lack of interest or lack of information is unclear. We are aware of numerous brochures, booklets, and posters designed to educate consumers about pesticides (e.g. U.S. EPA, undated, C.U.R.E.S. undated), yet the implementation is still lacking. Given that, we can argue that these methods of information dissemination are ineffective or perhaps not consistently available. In fact, often one is required to ask for the information by mail or it is placed away from the pesticide sales area, so the consumer never even knows it exists.

At the retail level, we have shown that there is very little training of those servicing the pest control sales area. Consumers need help in selecting the most appropriate method of pest control and the retailer should be able to provide that information. Latimer et al. (1996) goes as far as stating that in order to educate consumers, the sale representatives and others that interact with consumers must first be educated. Additionally, the retailer should provide information about what to do with old chemicals.

Finally, there should be more information that is easily available regarding the locations of the household hazardous waste facilities (HHWF) and times when it is open. In fact, these times should be such that is easiest for a resident to drop off waste. For example, the HHWF in Irvine is open Tuesdays through Saturdays from 9 a.m. to 1 p.m. Additionally, this is the only HHWF in the watershed so it may be difficult for residents in outlying areas to make the special trip to Irvine for that purpose. An alternative would be to have a monthly or bi-monthly “roundup” in each city in the watershed.

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APPENDICES

Appendix A. Pest Control Telephone Survey Questionnaire

Final Pest Control Questionnaire
September, 2000

SHELLO Hello, my name is _____and I'm calling from the Social Science Research Center at California State University, Fullerton. Have I reached [READ RESPONDENT'S TELEPHONE NUMBER]?

INTRO1 We're calling on behalf of the University of California to collect information on the use and disposal of pest control products. This is an important scientific study, not a sales call.

ZIP1 We're contacting households that we think are included in the study area, but may we verify that your zip code is [READ ZIP CODE]
1. CORRECT [SKIPTO ICZIP]
2. INCORRECT

ZIPREAL May we please have your correct zip code?

ZIP CODE>
99998. DK/NR
99999. REFUSED

ICZIP ENTER THE ZIP CODE EXACTLY AS IT SHOWS BELOW
[ZIP CODE WILL SHOW]

ZIP>

ZIPLF [ASK IF ZIPCODE = 92630]
Do you live West of El Toro Rd, in other words on the side toward Lake Forest Drive rather than on the side toward the City of Mission Viejo?
1. YES [SKIPTO HOUSE]
2. NO [NOT QUALIFIED]
7. DK/NR [UNSURE]
9. REFUSED [UNSURE]

ZIPSA1 [ASK IF ZIPCODE = 92703 OR 92704]
Do you live East of Fairview Street, that is, the side toward Bristol Street and Main Street?
1. YES [SKIPTO HOUSE]

2. NO [NOT QUALIFIED]
7. DK/NR [UNSURE]
9. REFUSED [UNSURE]

ZIPCM1 [ASK IF ZIPCODE = 92626]
Do you live North or South of Baker St? North of Baker is the side toward Santa Ana, and South is the side toward Newport Beach.

1. NORTH [CONTINUE]
2. SOUTH [SKIPTO ZIPCM3]
7. DK/NR [UNSURE]
9. REFUSED [UNSURE]

ZIPCM2 Do you live East of Bristol Street? That is, on the side of Bristol toward John Wayne Airport?

1. YES [SKIPTO HOUSE]
2. NO [NOT QUALIFIED]
7. DK/NR [UNSURE]
9. REFUSED [UNSURE]

ZIPCM3 Do you live East of Harbor Boulevard, that is, toward Fairview Rd. and Newport Blvd?

1. YES [SKIPTO HOUSE]
2. NO [NOT QUALIFIED]
7. DK/NR [UNSURE]
9. REFUSED [UNSURE]

ZIPCM4 [ASK IF ZIPCODE = 92627]
Do you live North of 19th Street, that is, the side away from the beach?

1. YES [CONTINUE]
2. NO [SKIPTO ZIPCM6]
7. DK/NR [UNSURE]
9. REFUSED [UNSURE]

ZIPCM5 Do you live East of Newport Blvd, that is on the side toward the Back Bay?

1. YES [SKIPTO HOUSE]
2. NO [NOT QUALIFIED]
7. DK/NR [UNSURE]
9. REFUSED [UNSURE]

ZIPCM6 Do you live East of Monrovia Ave.?

1. YES [CONTINUE]
2. NO [NOT QUALIFIED]
7. DK/NR [UNSURE]
9. REFUSED [UNSURE]

HOUSE The type of residence that you live in is relevant to questions about pest control. Do you live in a…

1. Single family detached home
2. Attached home such as a condo or townhouse
3. Apartment
4. Mobile home
5. OTHER (Specify: _____)
7. DON'T KNOW
9. REFUSED

WHO To gain an understanding of residential pest control practices in Orange County, would you please tell us who at your residence applies outdoor pest control products?

1. Yourself [SKIPTO INTRO2]
2. Another member of your household [CONTINUE]
3. Commercial company, apartment complex or Home-owners Association not directly contracted by you [SKIPTO INTRO2]
4. Yourself and a pest control company that you contract with directly [SKIPTO INTRO2]
5. Only a pest control company that you contract with directly [SKIPTO INTRO2]
6. Other (Please specify), or would you say [SKIPTO INTRO2]
7. No outdoor pest control products are applied at my residence [SAME]

8. DK/NR [SKIPTO INTRO2]
9. REFUSED [SKIPTO INTRO2]

WHO2 May we please speak to that person or to someone who knows about the application of pest control products at your residence?

1. YES [SKIPTO INTRO2]
2. NO [CONTINUE]

CALLBAK1 Can you please tell me when to call back to reach the person that knows about the application of pest control products at your residence?

SCHEDULE CALLBACK

INTRO2 We are conducting a scientific study in Orange County to learn about residents' use of pest control products. This survey is important and it takes less than ten minutes to complete. Your identity and your responses will remain completely anonymous and confidential, and of course, you are free to decline to answer any survey question.
I should also mention that this call may be monitored by my supervisor for quality control purposes only.

Is it all right to ask you these questions now?

1. YES [SKIPTO OFAGE]
2. NO [CONTINUE]

APPT When would be a more convenient time to ask you the survey questions?

SCHEDULE CALLBACK

OFAGE May we please verify that you are eighteen years of age or older?

1. YES [IF WHO = 1, 2, 4, 5, 6, SKIPTO TRANS1;
2. NO IF WHO = 3 OR 6, SKIPTO TRANS2]
7. DK/NR
9. REFUSED

OFAGE2 May we please speak to someone who is over 18, that knows about the
application of pest control products at your residence?

1. YES
2. NO [SCHEDULE CALLBACK]

TRANS1 We'd like to begin by asking you about your MAIN outdoor pest problems.

PRESS '1' TO CONTINUE

Q1 First, are insects a major OUTDOOR problem around your residence? [ANTS, WHITEFLIES, CATERPILLARS, FLIES, APHIDS, SPIDERS, SCALE, SOWBUGS]

1. YES (Specify)
2. NO
7. DK/NR
9. REFUSED

Q2 Are weeds a major problem around your residence? [DANDELION, BERMUDA GRASS, SPURGE, WOODSORREL, CLOVER, WEEDS YOU ARE UNABLE TO IDENTIFY]

1. YES (Specify)
2. NO
7. DK/NR
9. REFUSED

Q3 Are plant diseases a major OUTDOOR problem around your residence? [BLACK SPOTS, MILDEW, DIEBACK]

1. YES (Specify)
2. NO
7. DK/NR
9. REFUSED

Q4 Are snails or slugs a major problem around your residence?

1. YES
2. NO
7. DK/NR

9. REFUSED

Q5 Are birds, rabbits, squirrels, gophers or deer a major problem around your residence?

1. YES (Please specify)
2. NO
7. DK/NR
9. REFUSED

[IF 'WHO' = 5 OR 6, SKIPTO TRANS2]

Q6 How do you know what the outdoor pest problems are?
Would you say that you…
[SELECT ALL THAT APPLY]

1. Can identify it from experience
2. Guess
3. Identify it by book, magazine, or Internet
4. Receive help from store personnel, or
5. Other (Please specify)
6. DK/NR
7. REFUSED
8. EXIT

Q7 In the last 6 months, have you used any OUTDOOR pest control products at your residence?

1. YES
2. NO [SKIPTO Q10]
7. DK/NR [SKIPTO Q10]
9. REFUSED [SKIPTO Q10]

HOWMANY In the last six months, how many different OUTDOOR pest control products have you used at your residence?

NUMBER OF PRODUCTS>
7. DK/NR
9. REFUSED

TRANSNEW First, we're going to ask you for the names of the OUTDOOR pest control products that you've used at your residence. Then we will ask a few questions regarding each product.

PRESS '1' TO CONTINUE

Q8A What is the name of the [FIRST PRODUCT]?
[ACCEPT RESPONSES FOR UP TO SIX PRODUCTS]

PRODUCT 1>

Q8B PRODUCT 2>

Q8C PRODUCT 3>
Q8D PRODUCT 4>
Q8E PRODUCT 5>
Q8F PRODUCT 6>

[ASK Q9A THROUGH Q9C FOR EACH PRODUCT USED]

Q9A What did you use [FIRST PRODUCT] for? (for example, insects, weeds, disease, snails, etc.)

OPN>

Q9B What form of [FIRST PRODUCT] did you use? Was it a…

1. Ready-to-use spray
2. Concentrated spray (must add water)
3. Dry granule
7. DK/NR
9. REFUSED

Q9C Where did you purchase [FIRST PRODUCT]?
[READ RESPONSES ONLY IF NECESSARY]

1. Large home supply store (Specify name of store, e.g. Home Depot)
2. Discount department store (Specify name of store, e.g. Target)
3. Grocery or drug store (Specify name of store)
4. Nursery (Specify name of store)
5. Hardware store (Specify name of store)
6. By catalog or Internet (Specify name of seller)
7. Other (Please specify)
8. DK/NR
9. REFUSED

Q10 Thinking of all the OUTDOOR pest control products you use, what is the total number of times you apply them per year?

1. Less than 1 time per year
2. 1-3 times per year
3. 4-6 times per year
4. 7-12 times per year
5. More than 12 times per year
7. DK/NR
9. REFUSED

Q11 For OUTDOOR pest control products that must be mixed with water before using, what do you do with the leftover solution?
[READ EACH OPTION AND SELECT ALL THAT APPLY]

1. Pour down the drain or toilet inside your house

2. Pour down the drain outside your house
3. Pour in the street or gutter
4. Pour on the lawn or in another garden area
5. Put in the trash
6. Take to a hazardous waste disposal site
7. Store and use later
8. Apply to other areas (Please specify):_____
9. Reapply to same area until used up
10. I only make enough to use, there is no leftover
11. Other (Please specify)
12. DON'T USE ANY PRODUCTS THAT MUST BE MIXED WITH WATER
13. DK/NR
14. REFUSED
15. EXIT

Q12 When watering your lawn or garden, does water usually run into the street and/or sidewalk?

1. YES
2. NO
7. DK/NR
9. REFUSED

Q13 In general, how do you choose what pest control products to use? I'm going to read a list of options. After each one, please tell me if you choose your pest control products based upon that criterion. [READ EACH OPTION AND SELECT ALL THAT APPLY]

1. What it controls
2. Active ingredient
3. Cost
4. Packaging
5. How long it will last
6. How fast it works
7. Safety
8. Recommendation from someone else
9. Environmental concerns
10. Ease of application
11. Clearly written instructions
12. Already have at home
13. Other (Please specify)
14. DK/NR
15. REFUSED
16. EXIT

Q14 When did you last purchase a pest control product?

1. Less than one month ago
2. About 6 months ago
3. About 1 year ago
7. DK/NR
9. REFUSED

Q14A What is the name of the product?

OPN>

Q14B What pest or pests did you need to control?

OPN>

Q15 Which of these do you read or look at on a pest control product label BEFORE buying it?
[READ EACH OPTION AND SELECT ALL THAT APPLY]

1. Picture of the pest
2. List of pests it controls
3. Safety information
4. Disposal information
5. How much to use
6. How to apply
7. When to treat
8. What the ingredients are
9. Other (Please specify)
10. DK/NR
11. REFUSED
12. EXIT

Q16 When applying pest control products, how do you decide how much of the product to use?

1. Read and follow all directions on the container
2. Read directions on container and use them as guidelines
3. Don’t read directions; use experience or best estimate
4. Other (Please specify)
7. DK/NR
9. REFUSED

Q17 Do you measure out the amount of pest control product or do you estimate the amount of pest control product to spray or apply?

1. MEASURE
2. ESTIMATE
7. DK/NR
9. REFUSED

Q18 Where do you get your pest control information?
[READ ONLY IF NECESSARY AND SELECT ALL THAT APPLY]

1. NEWSPAPER ARTICLE
2. MAGAZINE ARTICLE
3. INTERNET ARTICLE
4. PRODUCT LABEL
5. POSTERS AT STORE WHERE PURCHASED
6. TEAR SHEETS AT STORE WHERE PURCHASED
7. EMPLOYEE AT STORE WHERE PURCHASED
8. OTHER METHOD AT STORE WHERE PURCHASED
9. WORD-OF MOUTH
10. ADVERTISEMENTS
11. CLASSES
12. GARDEN FAIRS/SHOWS
13. UNIVERSITY OF CALIFORNIA FARM ADVISOR
14. UNIVERSITY OF CALIFORNIA MASTER GARDENER
15. OTHER (PLEASE SPECIFY:_____)
16. DK/NR
17. REFUSED
18. EXIT

[ASK IF ITEM 10, ADVERTISEMENT, WAS SELECTED ABOVE]
Q19 Where have the advertisements for pest control products that you've heard or seen come from…
[READ ONLY IF NECESSARY AND SELECT ALL THAT APPLY]

1. TV
2. MAGAZINE
3. NEWSPAPER
4. INTERNET
5. OTHER (PLEASE SPECIFY)

6. DK/NR
7. REFUSED

Q20 How do you usually dispose of pest control products that you no longer use?

1. Pour down drain or toilet inside your house
2. Pour down drain outside your house
3. Pour in the gutter or street
4. Put in trash
5. Take to hazardous waste disposal site
6. Give away
7. Other (Please specify)
8. DK/NR
9. REFUSED

Q21 About how many different pest control products are stored in your home?

1. None [SKIPTO TRANS2]
2. 1-5
3. 6-10
4. More than 10
7. DK/NR
9. REFUSED

Q22 About how old is the oldest pest control product you have?

1. Older than 1 year
2. Older than 3 years
3. Older than 5 years
7. DK/NR
9. REFUSED

Q23 What is the name of that product?

OPN>

TRANS2 The next few questions are about pest control inside your residence.

Q24 Who does your INDOOR pest control?

1. Yourself
2. Another member of your household
3. Commercial company, apartment complex or home owners association
4. Other (Please specify), or would you say
5. No indoor pest control products are applied at my residence
7. DK/NR
9. REFUSED

Q25 For INDOOR products that must be mixed with water before using, what do you usually do with the leftover mixture?
[READ EACH OPTION AND SELECT ALL THAT APPLY]

1. Pour down drain or toilet inside your house
2. Pour down drain outside your house
3. Pour in the gutter or street
4. Pour on the lawn or in another garden area
5. Put in trash
6. Take to hazardous household waste disposal site
7. Store and use later
8. Other (Please specify)
9. DON'T USE ANY PRODUCTS THAT MUST BE MIXED WITH WATER
10. DK/NR
11. REFUSED
12. EXIT

Q26 Do you happen to know where the hazardous household waste disposal site near you is located?

1. YES
2. NO
7. DK/NR
9. REFUSED

Q27 Now we'd like to ask some questions regarding your background-- first, what is your age?

AGE> [IF ANSWERED, SKIPTO Q29]
98. DON'T KNOW
99. REFUSED

Q28 In what year were you born?

19__
98. DON'T KNOW
99. REFUSED

Q29 Do you own or rent your home?

1. OWN
2. RENT
7. DK/NR
9. REFUSED

Q30 What is the primary language spoken in the home?

1. ENGLISH
2. SPANISH
3. VIETNAMESE
4. JAPANESE
5. FARSI
6. MANDARIN
7. OTHER (PLEASE SPECIFY)
8. DK/NR
9. REFUSED

CITY What city do you live in?

1. COSTA MESA
2. IRVINE
3. LAGUNA WOODS
4. LAKE FOREST
5. NEWPORT BEACH
6. SANTA ANA
7. TUSTIN
8. OTHER
9. REFUSED

CHILDREN Do you have any children aged zero to five currently living in your residence?

1. YES
2. NO
7. DK/NR
9. REFUSED

Q31 How do you describe your race or ethnicity?

1. Asian (SPECIFY: _____)
2. Black or African American
3. Hispanic or Latino
4. Caucasian or White
5 OTHER (SPECIFY: _____)
7. DON'T KNOW
9. REFUSED

Q32 What was the last grade if school that you completed?

1. Some high school or less
2. High school graduate
3. Some college
4. College graduate
5. Post-graduate degree
7. DK/NR
9. REFUSED

Q33 Lastly, which of the following categories best describes your total household or family income before taxes, from all sources?

1. Less than $15,000
2. $15,000-24,999
3. $25,000-44,999
4. $45,000-69,999
5. $70,000-99,999
6. More than $100,000
7. DK/NR
9. REFUSED

Q34. Are you willing to be contacted by faculty at the University of California to be interviewed in greater detail?

1.	YES	
2.	NO	[SKIPTO CONCLUDE]
7.	DON'T KNOW	[SKIPTO CONCLUDE]
9.	REFUSED	[SKIPTO CONCLUDE]

Q35. At what telephone number do you prefer to be contacted?

PHONE> ###-###-####

Q36 Once again, I assure you that your telephone number and responses to this survey will remain completely confidential.

Q37. And how do you prefer to be identified at that time?

OPN>

CONCLUDE Thank you. That concludes our survey. Your participation is deeply appreciated.

[INTERVIEWER: CODE GENDER, LANGUAGE OF INTERVIEW, LEVEL OF COOPERATION]

Appendix B.

List of Retail Stores

San Diego Creek Watershed

Ace Hardware	3501 W 1st St	Santa Ana, CA	(714) 554-0902
Ace Hardware	14230 Culver Dr	Irvine, CA	(949) 552-5511
Adams True Value	12932 Newport Ave	Tustin, CA	(714) 544-0684
Aki Nursery	2624 Newport	Costa Mesa, CA	(949) 645-5782
Albertson's	13270 Newport Ave	Tustin, CA	(714) 832-8953
Albertson's	2300 Harbor Blvd # C	Costa Mesa, CA	(949) 645-5100
Albertson's	24251 Muirlands Blvd	Lake Forest, CA	(949) 581-1642
Albertson's	3049 E Coast Hwy	Corona Del Mar, CA	(949) 675-8901
Albertson's	3100W Balboa Blvd	Newport Beach, CA	(949) 675-1040
Albertson's	3329 5 Bristol St	Santa Ana, CA	(714) 557-9015
Albertson's	3825 Alton Pkwy	Irvine, CA	(949)476-1922
Albertson's	3931 Irvine Blvd	Irvine, CA	(949) 552-4334
Albertson's	4541 Campus Dr	Irvine, CA	(949) 854-8282
Albertson's	4541 Campus Dr	Irvine, CA	(949) 854-8282
Albertson's	770 5 Harbor Blvd	Santa Ana, CA	(714) 839-5982
Albertson's	9300 Toledo Way	Irvine, CA	(949) 855-9400
Armstrong Garden Ctr	15285 Culver Dr	Irvine, CA	(949) 857-9278
Armstrong Garden Ctr	1829 N Tustin Ave	Santa Ana, CA	(714) 542-4145
Armstrong Garden Ctr	2123 Newport	Costa Mesa, CA	(949) 646-3925
Armstrong Garden Ctr	1500 East Coast Highway	Newport Beach, CA	(949) 644-9510
Arrow Number One	820 N Tustin St	Orange, CA	(714) 532-6793
A-Z Floral & Plantery	3257 Redhill Ave	Santa Ana, CA	(714)542-1111
Brecht Orchid Gardens & Gift	4201 Williwaw Dr	Irvine, CA	(949) 548-2314
Crown Ace Hardware	1024 Irvine Ave	Newport Beach,	(949) 642-1133
Crown Ace Hardware	18102 Culver Dr	Irvine, CA	(949) 786-8100
Crown Ace Hardware	2644 San Miguel Dr	Newport Beach,	(949) 644-8570
Crown Ace Hardware	2666 Harbor Blvd	Costa Mesa, CA	(714) 546-7080
Crown Hardware	21791 Lake Forest	Lake Forest, CA	(949) 588-7644
Crown Hardware Inc	3107 E Coast Hwy	Corona Del	(949) 673-2800
Denton True Value	12932 Newport Ave	Tustin, CA	(714) 544-0684
Drug Emporium	13852 Red Hill Ave	Tustin, CA	(714) 544-4703
Flowerdale Nurseries Inc	2700 Bristol St	Costa Mesa, CA	(714) 754-6661
Green Thumb Intl Nursery	23782 Bridger Rd	El Toro, CA	(949) 837-3040
Hernandez Nursery	405 E Grant St	Santa Ana, CA	(714) 972-1689
Home Base Home	1441 W 17th St	Santa Ana, CA	(714)558-1510
Home Base Home	2120 Barranca Pkwy	Irvine, CA	(949) 752-2390
Home Base Inc	3345 Michelson Dr	Irvine, CA	(949) 442-5000
Home Depot	10801 Garden Grove	Garden Grove, CA	(714) 539-0319
Home Depot	24332 El Tore Rd	Laguna Hills, CA	(949) 598-9171
Home Depot	2782 El Camino Real	Tustin, CA	
Home Depot	3500W Macarthur Blvd	Santa Ana, CA	(714) 966-8551
Home Depot	435 W Katella Ave	Orange, CA	(714) 538-9600
K Mart	1855 N Tustin St	Orange, CA	(714)637-4100
K Mart	2200 Harbor Blvd #	Costa Mesa, CA	(949) 646-7701
K Mart	2505 El Camino Real	Tustin, CA	(714) 731-5510
Laguna Hills Nursery	25290 Jeronimo Rd	Lake Forest, CA	(949) 830-5653
Longs Drugs	1202 Irvine Blvd	Tustin, CA	(714) 505-0844
Longs Drugs	923 Newport Center	Newport Beach,	(949) 729-8035
Longs Drugs	4880 Irvine Blvd	Irvine, CA	(714) 505-1680
Lowes	Tustin		
Master Nursery	2700 Bristol St	Costa Mesa, CA	(714) 754-6661
Master Nursery	2800 N Tustin Ave	Santa Ana, CA	(714) 633-9200
Newport Greenhouses	3350 1/2 Warner	Irvine, CA	(949) 552-9619
Orchard Supply	17200 Brookhurst St	Fountain Valley,	(714) 964-2282
Orchard Supply	27921 La Paz Rd	Laguna Beach, CA	(949) 360-5770
Orchard Supply Hardware	1975 E 17th St	Santa Ana, CA	(714) 835-4440
Pavilions	1000 Bayside Dr	Newport Beach, CA	(949) 760-0975
Pavilions	3433 Via Lido	Newport Beach, CA	(949) 675-3791
Pavilions	4730 Barranca Pkwy	Irvine, CA	(949) 559-6001
Pavilions	4730 Barranca Pkwy	Irvine, CA	(949) 559-6001
Plant Stand	2972 Century P1 #	Costa Mesa, CA	(714) 966-0797

List of Retail Stores

San Diego Creek Watershed

Ralphs Grocery Co	1114 Irvine Blvd	Tustin, CA	(714) 544-1794
Ralphs Grocery Co	13321 Jamboree Rd	Tustin, CA	(714) 544-0491
Ralphs Grocery Co	1411 N Tustin St	Orange, CA	(714) 532-1032
Ralphs Grocery Co	14400 Culver Dr	Irvine, CA	(949) 552-2832
Ralphs Grocery Co	14551 Red Hill Ave	Tustin, CA	(714)731-9021
Ralphs Grocery Co	1523W 17th St	Santa Ana, CA	(714) 542-3964
Ralphs Grocery Co	17801 Santiago Blvd	Orange, CA	(714) 998-0041
Ralphs Grocery Co	18040 Culver Dr	Irvine, CA	(949) 262-0407
Ralphs Grocery Co	21751 Lake Forest Dr	El Toro, CA	(949) 855-1241
Ralphs Grocery Co	23641 Moulton Pkwy	Laguna Hills, CA	(949) 581-9830
Ralphs Grocery Co	2555 Eastbluff Dr	Newport Beach, CA	(949) 644-2060
Ralphs Grocery Co	2660 San Miguel Dr	Newport Beach, CA	(949) 644-7992
Ralphs Grocery Co	26751 Portola Pkwy	Foothill Ranch, CA	(949) 457-9349
Ralphs Grocery Co	26901 Aliso Creek Rd	Aliso Viejo, CA	(949) 362-3727
Ralphs Grocery Co	2741 W Macarthur Blvd	Santa Ana, CA	(714) 751-6255
Ralphs Grocery Co	380 E 17th St	Costa Mesa, CA	(949) 645-8282
Ralphs Grocery Co	5331 University Dr	Irvine, CA	(949) 786-0770
Ralphs Grocery Co	5345 Alton Pkwy	Irvine, CA	(949) 552-0597
Ramsay Rexall Drug	2246 Newport Blvd	Costa Mesa, CA	(949) 646-4614
Rite Aid Pharmacies	13151 Jamboree Rd	Tustin, CA	(714)573-1311
Rite Aid Pharmacies	1406W Edinger	Santa Ana, CA	(714) 546-6093
Rite Aid Pharmacies	3141 ECoast Hwy	Corona Del Mar,	(949) 675-1182
Rite Aid Pharmacies	3875 Alton Pkwy	Irvine, CA	(949) 250-4465
Rite Aid Pharmacies	419 E 1st St	Santa Ana, CA	(714) 543-2832
Rite Aid Pharmacies	630 E 1st St	Tustin, CA	(714) 544-7488
Rite Aid Pharmacies	1610 San Miguel Dr	Newport Beach,	(949) 644-6422
Rite Aid Pharmacies	18112 Culver Dr	Irvine, CA	(949) 786-0151
Rite Aid Pharmacies	3325 5 Bristol St	Santa Ana, CA	(714) 979-4121
Rite Aid Pharmacies	3875 Alton Pkwy	Irvine, CA	(949) 250-4465
Rite Aid Pharmacies	5404 Walnut Ave	Irvine, CA	(949) 552-9266
Rogers Gardens	2301 San Miguel	Corona del Mar	(949)721-2100
Sav-On Drugs	1020 Irvine Ave	Newport Beach,	(949) 642-0122
Sav-On Drugs	1433W 17th St	Santa Ana, CA	(714) 547-5676
Sav-On Drugs	1545W 17th St	Santa Ana, CA	(714) 547-6578
Sav-On Drugs	1750 N Grand Ave	Santa Ana, CA	(714)835-3111
Sav-On Drugs	17642 17th St	Tustin, CA	(714) 832-1850
Sav-On Drugs	2000 E 17th St	Santa Ana, CA	(714) 543-8300
Sav-On Drugs	21761 Lake Forest	El Toro, CA	(949) 855-8307
Sav-On Drugs	228 N Harbor Blvd	Santa Ana, CA	(714) 554-7120
Sav-On Drugs	24271 Muirlands Blvd	El Toro, CA	(949) 472-6016
Sav-On Drugs	24372 Rockfield Blvd	El Toro, CA	(949) 830-5090
Sav-On Drugs	26686 Portola Pkwy	Foothill Ranch, CA	(949) 470-4630
Sav-On Drugs	26891 Aliso Creek	Aliso Viejo, CA	(949) 3604081
Sav-On Drugs	2701 Harbor Blvd	Costa Mesa, CA	(714)438-1110
Sav-On Drugs	671 E 1st St	Tustin, CA	(714) 544-7034
Sav-On Drugs	14330 Culver Dr	Irvine, CA	(949) 559-8129
Sav-On Drugs	1445 5 Main St	Santa Ana, CA	(714) 547-0813
Sav-On Drugs	17625 Harvard Ave # A	Irvine, CA	(949) 261-1558
Sav-On Drugs	3911 S Bristol St	Santa Ana, CA	(714) 556-7183
Sav-On Drugs	5385 Alton Pkwy	Irvine, CA	(949) 733-8226
Sav-On Express	1175 Baker St#B	Costa Mesa, CA	(714) 545-5466
Sav-On Express	1835 Newport Blvd #	Costa Mesa, CA	(949) 722-1750
Sav-On Express	2321 S Bristol St	Santa Ana, CA	(714) 545-1886
Sav-On Pharmacy	770 S Harbor Blvd	Santa Ana, CA	(714) 839-5371
Scala Nursery	3439 W Macarthur	Santa Ana, CA	(714) 557-3404
Stater Bros Markets	1175 Baker St#C	Costa Mesa, CA	(714) 540-7488
Stater Bros Markets	1230 E Mcfadden Ave	Santa Ana, CA	(714) 5434555
Stater Bros Markets	14171 Red HillAve	Tustin, CA	(714)544-1812
Stater Bros Markets	21.80 Newport Blvd	Costa Mesa, CA	(949) 646-2324
Stater Bros Markets	2360 N Tustin Ave	Santa Ana, CA	(714) 543-9034
Stater Bros Markets	24336 El Toro Rd	Laguna Hills, CA	(949) 598-3235

List of Retail Stores

San Diego Creek Watershed

Stater Bros Markets	2630 W Edinger Ave	Santa Ana, CA	(714) 546-9410
Target	1330 E 17th St	Santa Ana, CA	(714) 541-4593
Target	1881 WLincoln	Anaheim, CA	(714) 999-0606
Target	2191 N Tustin St	Orange, CA	(714) 974-2800
Target	24500 Alicia Pkwy	Mission Viejo, CA	(949) 583-1298
Target	26762 Portola	Foothill Ranch, CA	(949) 454-2360
Target	26932 La Paz Rd	Aliso Viejo, CA	(949) 643-0337
Target	3300 5 Bristol St	Santa Ana, CA	(714) 641-4944
Target	3750 Barranca	Irvine, CA	(949) 857-8337
Tustin Meadows Nursery	815 5 Esplanade St	Orange, CA	(714) 771-5529
Vons Co	17662 17th St	Tustin, CA	(714) 832-0883
Vons Co	185 E 17th St	Costa Mesa, CA	(949)548-8911
Vons Co	22475 El Toro Rd	El Toro, CA	(949) 770-2141
Vons Co	24270 El Toro Rd	Laguna Hills, CA	(949) 581-2771
Vons Co	2701 Harbor Blvd # B	Costa Mesa, CA	(714) 751-4270
Vons Co	2701 Harbor Blvd # B	Costa Mesa, CA	(714) 751-4270
Vons Co	3650 5 Bristol St	Santa Ana, CA	(714) 540-0510
Vons Co	4800 Irvine Blvd	Irvine, CA	(714) 838-6534
Vons Co	550 E 1st St	Tustin, CA	(714) 832-9996
Walgreens Drug Store	13348 Newport Ave	Tustin, CA	(714) 505-6021
Walgreens Drug Store	3000 5 Bristol St	Santa Ana, CA	(714) 427-3986
Wal-Mart	2300 N Tustin St	Orange, CA	(714) 998-4473
Wal-Mart	26502 Towne Centre	Foothill Ranch, CA	(949) 588-7923
Wal-Mart	3600 W Mcfadden	Santa Ana, CA	(714) 775-8034
Woodward's Ace	2343 N Tustin Ave	Santa Ana, CA	(714) 541-5268

Appendix C. Sample letter sent to selected retailers in the watershed

March 9, 2001

INTEGRATED
Urban Forestry

23382 Mill Creek Drive
Suite 225
Laguna Hills, California 92653
Tel: 949.588.5050
Fax: 949.588.5058

Sample Letter
Orange County Retail Store
Orange County, CA
Some Zip

RE: Retail Sales, Residential Pesticide Use and Local Water Quality
A Study for a Watershed in Orange County, California

Dear Mr. Herglotz

My firm, Integrated Urban Forestry (IUF), a division of David Evans and Associates (DEA), is assisting the University of California Cooperative Extension and the Department of Pesticide Regulation to perform a survey of residential pesticide sales in Orange County, California. The objective of the study is to identify the amount of pesticide being sold for home use in areas where water drains into the Newport Bay. Retailers we want to be part of the survey include large home supply stores, discount department stores, grocery and/or drug stores, nurseries, and hardware stores.

As a retailer with several stores located within the subject geographic area, your assistance in providing quarterly or annual data on pesticide products sold in this area by these specific stores would be greatly appreciated. *We are not looking for dollar sales, only units sold of each product.* The information will be used only for this study and we will not identify any manufacturer, distributor or store by name, only by type of retailer.

Your cooperation will help us better understand pesticide use at the residential level. Ultimately, your assistance will help to ensure the safe use of pesticides at the residential level and the protection of water quality for the long term.

A list of specific stores for which we are seeking data and an example of how the data could be provided is attached. The actual format you may be able to provide may be different. To meet the project schedule, the goal is to have the data available before the end of March, 2001. Should you have any other questions or need additional information, please do not hesitate to contact me at 949/588-5050 or by email at rtf@deainc.com.

Thank you again for your attention to this request and cooperation with the effort.

Respectfully,

Rosemary Flynn,
Operations Manager, Integrated Urban Forestry
A Division of David Evans and Associates

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Appendix D. Letter from Home Depot denying our request for sales information

3800 W. Chapman Ave • Orange, CA 92868
(714) 940-3500

SENT VIA FAX

August 24, 2001

Mr. John Sanders
Chief
Environmental Monitoring Branch
California Department of Pesticide Regulation
P.O. Box 4015
Sacramento, California 95812-4015

Re: The Home Depot's Response to a Request for Pesticide Sales Data

Dear Mr. Sanders,

The Home Depot received your letter, dated June 11, 2001, on behalf of Integrated Urban Forestry and the University of California's Statewide Integrated Pest Management Program. In your letter, you requested pesticide sales data for five Orange County stores located within the Upper Newport Bay/San Diego Creek Watershed area. After reviewing your request, the Home Depot is unable to provide this information for proprietary reasons.

The company has a strict internal policy of not publicly releasing any sales figures outside of those found in Home Depot's annual report. This policy prohibits the company from generating sales information for individual stores and products. The Home Depot apologizes for any inconvenience caused by this policy.

If you have any questions in regard to this letter, please call me at 714/940-3699.

Sincerely,

Charles Sifuentes

Charles Sifuentes
Public Relations Manager

CC: Rosemary Flynn
Karen Polyakov
Chris Hopkins

USA
Proud Sponsor

Appendix E. Sample product list by store type

Hardware Store

Manuf/Brnd	Prod Name	Size	Formulation
Agr Evo	Finale Weed & Grass Killer	64 oz	Liquid RTU
Agr Evo	Finale Weed & Grass Killer	24 oz	Liquid Spray
Amdro	Fire Ant Bait	6 oz	Granules
Bayer Adv Garden	Rose 1 Flower	5 lb	Liquid
Bayer Adv Garden	Lawn & garden	24 oz	RTU Spray
Bayer Adv Garden	Rose & Flower	24 oz	RTU Spray
Bayer Adv Garden	2-1 Rose & Flower	2 lb	RTU Granules
Bonide	Eight Garden & Home	32 oz	Spray
Combat	Source Roach Kill	42 oz	Bait x12
Combat	Source Ant Kill	.21 oz	Bait x 12
Cooke	Gopher Mix	1 lb	Granules
Copper Brite	Termite Prufe	1 lb	Powder Conc.
Copper Brite	Roach Prufe	1 lb	Powder Conc.
D con	Kills Rats	12 oz	Bait Pellets
D con	Kills Mice	12 oz	Bait
D con	Kills Mice	1.5 oz	Bait
Dr T	Snake Away		
Enforcer	Flea Killer	1 lb	Powder
Enforcer	Four H Fogger	1.5 oz X3	Fogger
Enforcer	Rats/Mouse Bars	8 –20 mg	Blocks
Garden Tech	Sevin	32oz	RTU Spray
Grants	Kills Ants	3.33 oz	10 Stakes
Grants	Kills Ants		4 bars
Grants	Ant/Spider Kill	14 oz	Granules
Green Light	Many Purpose Insect Killer	1 lb	Granules
Hinder	Deer & Rabbit		
Home Pest Control	Orange Guard	128 oz	Water Based foam
JT Easton	Bait Block Rats/Mice	1 lb	8 blocks
JT Easton	Kills House Mice	8 pz	Blocks
Lilly Miller	Slug/Snail	3 lbs	Granules
Lilly Miller	Sys Rose Care	4 lbs	Granules
Maxide	Ant/Roach Spider	18 oz	Spray
Metro	That's It	3 lb	Granules
Metro	That's It	5 lb	Granules
Metro	Bug Bait	42 oz	Granules
Metro	Bug Bait	12 oz	Granules
Metro	Bug Bait	5 lb	Granules
Monsanto	Round UP	128 oz	Liquid RTU
Monsanto	Round UP	32 oz	Liquid Conc
Monsanto	Round UP	16 oz	Liquid RTU
Monsanto	Round UP	24 oz	Liquid RTU
Monsanto	Round UP Sure Shot	16 oz	Spray
Ortho	Bug Geta	2 lb 4 oz	Granules
Ortho	Bug Geta	2 lb 4 oz	Granules
Ortho	Home Defense	1 gal	Liquid Spray

Ortho	Rose Pride Systemic	1 gal	Liquid Spray
Ortho	Tomato & Veg	1 pt 8 oz	Spray
Ortho	Hornet & Wasp	14 oz	Spray
Ortho	Rose Pride Systemic	14 oz	Spray
Ortho	Triox	1 qt	Liquid Conc
Ortho	Brush B Gon	16 oz	Liquid Conc
Ortho	Bug B Gon	32 oz	Lock N Spray Liq
Ortho	Bug B Gon	24 oz	Liquid Spray
Ortho	Weed B gon	32 oz	Spray
Ortho	Orthene Sys	16 oz	Liquid Conc
Ortho	RosePride Orthonox	16 oz	Liquid Conc
Ortho	Diazinon Ultra	32 oz	Water Based Conc
Ortho	Diazinon Granules	1 lb	Granules
Ortho	Sevin	16 oz	Concentrate
Ortho	RosePride Funginex	1 pt	Concentrate
RAID	Yard Guard	17oz	Spray
RAID	Wasp & Hornet	14 oz	Spray
RAID	Ant,Roach	17.5 oz	Spray
RAID	House/Garden	17 oz	Spray
RAID	House/Garden Multibug	11 oz	Spray
RAID	Max Roah & Eggs		Bait Stop
Ro Pell	Dog,Cat, Bird	3.25 lb	Granules
Ro Pell	Dog,Cat, Bird	1 qt	Liquid
Roach Motel	Kills Roaches		Traps 2
Safer	Rose N Flower	32 oz	Spray
Safer	Fruit N Veg	32 oz	Spray
Safer	Insect soap	32 oz	Spray
Safer	Garden fungicide	32 oz	Spray
Spectracide	Bug Stop	1 gal	Spray
Spectracide	Ant Shield	16 oz	Spray
Spectracide	Grass&Weed Killer	1 gal	Spray
Store Brand	Flea & Tick	10 oz	Spray
Store Brand	Wasp & Hornet	14 oz	Spray
Store Brand	Foaming Wasp & Hornet	14 oz	Spray
Store Brand	Ant,Roach & Spider	14 oz	Spray
Store Brand	Indoor Fogger 2	1 lb 2 oz	Fogger
Store Brand	House & Garden Bug	13.5 oz	Spray
Store Brand	Malathion	1 pt	Dilutable Conc
Store Brand	Diazinon	1 pt	Dilutable Conc
Store Brand	Sevin	1 pt	Spray
Store Brand	Flying Insect	11 oz	Spray
Store Brand	Home Insect Control	1 gal	Liquid Spray
Store Brand	Spot Weed Killer	1 pt	Spray
Store Brand	Garden Insect Killer	1 pt	Dilutable Conc
Store Brand	Lawn Weed Killer	1 qt	Dilutable Conc
Store Brand	Sl Diazinon Lawn Insect	10 lbs	Granules
Sun Spray	Ultra Fine Insect Oil	1 qt	Liquid
Term out	Termite/Roach/Ant	13 oz	Spray
Terra	Ant Killer	1 oz	Bait

Vicon	Roach Killing	l lb	Powder
Victor	Poison Free Wasp/Ant	17.5 oz	Spray
Victor	Poison Free Fruit	17.5 oz	Spray
Victor	Poison Free Flying Insect	17.5 oz	Spray
Vikor	Fire Ant Killer	4 lbs	Granules
Worry Free	Snail/Slug	1 lb 4 oz	Bait

Nursery

Manuf/Brnd	Prod Name	Size	Formulation
Amaze	Grass/weed Prev	8 lb	Granules
Amaze	Grass/weed Prev	1.5 lb	Granules
Bayer	Adv Garden Lawn/Gar	10 lbs	Granules
Bayer	Adv Home	24 oz	Spray
Bayer	Lawn & Garden	5 lbs	Liquid
Cooke	Quick Action Gopher Mix	1 lb	Granules
Fountec	Algae Scale Rem.	8 oz	Liquid
Grants	Kills Ants	4 baits	Bait
Green Light	Borer Killer	1 pt	Liquid
Green Light	Sevin	16 oz	Liquid
Green Light	Rose Defense	1 pt	Liquid
Green Light	Rose Defense	1 qt	Liquid
Green Light	Tomato & Veg	1 qt	Liquid
Master Nursery	Pest Fighter Hort. Oil	16 oz	Liquid
Master Nursery	Pest Fighter Hort. Oil	8 oz	Liquid
Master Nursery	Spray Grip	16 oz	Liquid
Master Nursery	Spray Grip	8 oz	Liquid
Master Nursery	Malathion	32 oz	Liquid
Master Nursery	Malathion	8 oz	Liquid
Master Nursery	Tomato & Veg	24 oz	Liquid
Master Nursery	Spray Oil	1 qt	Liquid
Master Nursery	Snail/Slug Insect	2 lbs	Granules
Master Nursery	Snail/Slug Insect	24 oz	Liquid
Master Nursery	Snail/Slug Insect	1 lb	Granules
Master Nursery	Snail/Slug Insect	3 lb	Granules
Master Nursery	Snail/Slug Insect	5 lb	Granules
Master Nursery	Snail/Slug Insect		Pellets
Master Nursery	Broadleaf Weed	16 oz	Liquid
Master Nursery	Spot Weeder	16 oz	Liquid
Maxide	Garden/ Pet dust	4 lbs	Powder
Maxide	Diazinon (Ant)	1 lb	Spray
Maxide	Dandelion/WD	24 oz	Liquid
Monsanto	Roundup	64 oz	Liquid
Monterey	Weed hoe	1 pt	Liquid
Monterey	Grass	8 oz	Liquid
Monterey	post emer	1 pt	Liquid
Monterey	Turflon	.5 pt	Liquid
Monterey	Nutgrass	1 pt	Liquid
Ortho	Hornet/Wasp	15 oz	Spray

Ortho	Rose Pride Insect/Disease	16 oz	Liquid
Ortho	Daconil	16 oz	Liquid
Ortho	RosePride Fungicide	1 pt	Liquid
Ortho	Brush B Gon	16 oz	Liquid
Ortho	Weed B Gon	24 oz	Liquid
Ortho	Grass B Gon	24 oz	Liquid
Safer	Insecticidal Soap	16 oz	Liquid
Safer	Caterpillar Keeper	16 oz	Liquid
Safer	The Pantry Pest	2	Traps
Sluggo	Iron Sulfate	2.5 lb	Granules
Sluggo	Iron Sulfate	10 lbs	Granules
Sluggo	Iron Sulfate	1 lb	Granules
Sure Fire	Snail/Slug	Tape	Tape
Term Out	Termite Roaches	13 oz	Spray
That's It	Snail/Slug	l 1b	Granules
That's It	Snail/Slug	3 lb	Granules
That's It	Snail/Slug	5 lb	Granules
That's It	Snail/Slug	25 lb	Granules
XP-20	Dog/Cat	2 lbs	Granules

Home Supply Store

Manuf/Brnd	Prod Name	Size	Formulation
Bayer Adv Gard	lawn & Garden MultiUse	2 lb	Granules
Bayer Adv Gard	lawn & Garden MultiUse	32 oz	Concentrate
Bayer Adv Gard	lawn & Garden MultiUse	10 lb	Granules
Bayer Adv Gard	Rose & Flowers	24 oz	RTU Spray
Bayer Adv Gard	Rose & Flowers	5 lbs	Granules
Bayer Adv Gard	lawn & Garden MultiUse	10 lb	Granules
Bayer Adv Gard	Weed Killer	24 oz	RTU
Bayer Adv Gard	Weed Killer	24 oz	Concentrate
Combat	Outdoor Ant Stakes	.42 oz	Stakes
Combat	Quick Kill	.49 oz	Bait
Combat	Quick Kill Roach	.42 oz	Bait
Combat	Roach Killer Gel	2.1 oz	Bait
Corrys	Snail/Slug	10 lb	Granules
D Con	Kills Mice	6 oz	Bait
D Con	Kills Rats/Mice	12 oz	Bait
Force F		30 oz	RTU Liquid
GardenTech	Sevin	16 oz	Concentrate
Grants	Kills Ants	3.33 oz	Bait - 10 ea
Greensweep	Weed & Feed	1 qt	RTU
Hot Shot	Fogger	1 lb 2 oz	Fogger
Hot Shot	Spider Killer	11 oz	Spray
Hot Shot	Flying Insect	15 oz	Spray
Hot Shot	Ultimate --- Killer	.74 oz	
Miracle Gro	Weed prevent & Feed	6 lb 2 oz	Granules
Monsanto	Round Up	1 gal	RTU
Monsanto	Round Up	24 oz	RTU

Monsanto	Round Up	64 oz	Concentrate
Monterey	Oxalis killer	1 qt	Concentrate
Monterey	Monterey Weed Hoe	1 qt	Concentrate
Ortho	Home Defense	1 gal	RTU
Ortho	Bug B Gon	1 gal	RTU
Ortho	Home Defense hi power	15 oz	Fogger - 3 x .5 oz
Ortho	Hornet/Wasp	15 oz	Spray
Ortho	Home Defense	15 oz	Spray
Ortho	Bug B Gon Conc	32 oz	Concentrate
Ortho	Diazinon Soil/Fert	10 lb	Granules
Ortho	Diazinon	32 oz	Liquid Conc
Ortho	Bug B Gon	24 oz	RTU
Ortho	Volck Oil	16 oz	Concentrate
Ortho	Malathion 50 Plus	32 oz	Concentrate
Ortho	Malathion 50 Plus	16 oz	Concentrate
Ortho	Rose & Flowers	24 oz	RTU
Ortho	Fungrer	16 oz	Concentrate
Ortho	Orthonix Insect	16 oz	Concentrate
Ortho	Orthene System	16 oz	Concentrate
Ortho	Daconil	32 oz	Liquid Conc
Ortho	Doconil	16 oz	Concentrate
Ortho	Isolix	16 oz	Concentrate
Ortho	Weed B Gon	1 gal	RTU
Ortho	Weed B gon	32 oz	Concentrate
Ortho	Weed B Gon	32 oz	Concentrate
Ortho	Weed B Gon	24 oz	RTU
Ortho	Triox	32 oz	Concentrate
Ortho	Weed B Gon	16 oz	Concentrate
Ortho	Weed B Gon	24 oz	RTU
Ortho	Grass B Gon	24 oz	RTU
Ortho	Brush B Gon	16 oz	Concentrate
Ortho	Brush B Gon	24 oz	RTU
Ortho	Weed B Gon	32 oz	Concentrate
Ortho	Bug --- Plus	3 lb	Granules
Ortho	Bug --- Plus	5 lb	Granules
RAID	Flea Killer Plus	16 oz	Spray
RAID	Ant/Roach Outdoor	17.5 oz	Spray
RAID	Fumigator	1 lb 2 oz	Foggers - 3
RAID	Home/Garden Multi Bug	11 oz	Spray
Real Kill	Grass/Weed	1 gal	RTU
Real Kill	Flea Fogger	10 oz	Fogger
Real Kill	Home Insec Control	1 gal	RTU
Real Kill	Ant/Roach Spray	17.5 oz	Spray
Real Kill	Wasp/Hornet	17.5 oz	Spray
Real Kill	Indoor Fogger	36 oz	Fogger 6-6 oz
Real Kill	Rat Killer Place	6 oz	Pak 8- .75oz
Real Kill	Mouse Killer Place Pak	4.5 oz	Pak 6- .75 oz
Real Kill	Rat & Mouse Killer Pellets	10 oz	Pellets
Real Kill	Rat & Mouse Bars	6 oz	Bars - 12 - .5 oz

Real Kill	Mult Purpose Insect Killers	1 qt	Spray Conc
Real Kill	Malathion Spray	1 qt	Spray Conc
Real Kill	Diazinon	1 qt	Spray Conc
Real Kill	Multi Purp Conc	1 qt	Liquid Conc
Real Kill	Diazinon Conc	1 qt	Liquid Conc
Real Kill	Diazinon Granules	1 lab	Granules
Repel	Dog/Cat	2 lb	
Safer	Garden Fungicide	32 oz	RTU
Safer	Rose & Flowers	32 oz	Rtu
Safer	Yard & Garden	32 oz	RTU
Safer	Caterpiller Killer	8 oz	Concentrate
Shultz	Houseplant/Garden	24 oz	Concentrate
Shultz	Insect Spray	12 oz	RTU
Spectracide	Ant Shield	2 lb	Granules
Spectracide	Ant Shield	16 oz	Spray
Spectracide	Tomato/Veg Spray	24 oz	Spray
Spectracide	Termite	5 oz	Stakes
Spectracide	Tomato/Veg Spray	1 gal	Concentrate
Spectracide	Tomato/Veg Spray	1 qt	Concentrate
Spectracide	Grass & Weed	48 oz	Concentrate
Spectracide	Immunox Plus	1 pt	Spray Conc
Spectracide	Contact Insect	20 oz	Spray Conc
Spectracide	Residual Insc	20 oz	Spray Conc
Spectracide	Broadleaf weed	1 qt	Spray Conc
Spectracide	Turf/Ornamental Fungicide	2 qt	Spray Conc
Spectracide	10/ Pyrothin	1 qt	Spray Conc
Spectracide	Wasp/Hornet	18 oz	Spray
Spectracide	Time Release Insc	72 oz	Fogger
Spectracide	Mouse/rat	1 lb 2 oz	Granules
Spectracide	Ant Bait Stakes	3.36 oz	bait
Spectracide	Diazinon 4 E	1 qt	Liquid Conc
Spectracide	Non Selective herb	1 gal	Liquid Conc
Sungro	Killer (weed)	1 gal	Concentrate
Sunrise/Sunset	Pest Oil	1 qt	Liquid RTU
Term Out	Kills Termites	13 oz	Spray
Victor	Poison Free Wasp/Hornet	17.5 oz	Spray
Victor	Poison Free Flying Insect	17.5 oz	Spray
Victor	Roach Killing Powder	1 lb	Powder
Victor	Poison Free Ant/Roach	17.5 oz	Spray
Vigora	Snail/Slug	5 lb	Granules
Vigora	Snail/Slug	25 lb	Granules
Vigora	Lawn Weed	15 lb	Granules
Wilco	Gopher Killer	1 lb	Granules
Wilco	Ground Squirel bait	4 lb	Granules
Zep	Flea Spray	1 gal	Spray
Zep	Flea Powder	2 lb	Granules
Zep	Rat & Mouse	25 grams	Granules
Zep	Wasp	16 oz	Spray

Grocery Store

Manuf/Brnd	Prod Name	Size	Formulation
Combat	Quick Kill Ant	.21 oz	Bait (6)
Combat	Quick Kill Lg Roach	.49 oz	Bait (8)
Combat	Quick Kill Roach form	.59 oz	Bait (12)
Combat	Roach Control	.59 oz	Bar - 12
Combat	Roach Prevention	.49 oz	Bar (8)
D Con	Traps Mice	2 traps	bait
D Con	Kills Mice	1.5 oz	bait
D Con	Kills Mice I Rats	12 oz	4 traps
Grants	Kills Ants	3.33 oz	10 stakes
OFF	Citronella Bucket		Can
OFF	Skintfanastic	3 oz	Cream
OFF	Magic Color Skin	6 oz	Lotion
OFF	Unscented	6 oz	spray
RAID	Max Roach	.63 oz	Bait (12)
RAID	Max Roach Eggs	.63 oz	Bait (12)
RAID	Max Roach Sm	.63 oz	Bait (12)
RAID	Ant Plus	.24 oz	Bait (4)
RAID	Ant	.24 oz	Bait (4)
RAID	Double Cntrl Ant Bait	.28 oz	Bait
RAID	Ant & Insect	17.5 oz	Spray
RAID	Ant & Roach Cntry Fresh	12 oz	Spray
RAID	Ant & Roach 0/Door Fresh	12 oz	Spray
RAID	Roach	14oz	Spray
RAID	Ant & Roach Cntrl Fresh	17 oz	Spray
RAID	Ant & Roach 0/Door Fres	17.5 oz	Spray
RAID	Ant & Roach unscent	17.5 oz	Spray
RAID	ConcFogger	1.5 oz	Fogger
RAID	Roaches Fumigator	1.5 oz	Fum (3 pk)
RAID	Max Deep Roach Fogger	6.3 oz	3 pk Fogger
RAID	Max lg Roach	0.7 oz	bait
RAID	FleaFogger	15 oz	3 pk Fogger
RAID	Flying Insect 0/Door	15 oz	Spray
RAID	Wasp/Hornet	14 oz	Spray
RAID	House/Garden/MultiBug	11 oz	Spray
RAID	Flea Killer	16 oz	Spray
RAID	Flea Killer Plus	16 oz	Spray
Roach Motel	Pest Free	Box	Trap

Drug Store

Manuf/Brnd	Prod Name	Size	Formulation
Bayer Adv Home	Home Pest Cntrl I/O	24 oz	RTU
Bayer Adv Home	Home Pest Cntrl I/O	1 gal	RTU
Black Flag	Roach & Ant -Pine	17.5 oz	Spray
Black Flag	Roach & Ant -Spring	17.5 oz	Spray
Currys	Slug & Snail Bait	2 lb 4 oz	Granules
Currys	Slug & Snail Bait	2 lb 4 oz	Pellets

D Con	Mouse Pruff II Kills Mice	1.5 oz	Bait
D Con	Kills Mice/Rats	12 oz	Bait
D con	Kills Rats	12 oz	Bait (4)
Dexol	Home Insect Killer	1 gal	RTU
Dexol	Sys Insectcide Rose	5 lb	Granules
Garden Tech	Sevin	32oz	RIU
Garden Tech	Sevin 5	1.5 lb	Dust
Grants	Kills Ants	3.33 oz	10 stakes
Grants	Kills Ants	1.33 oz	Bait (4)
Grants	Liquid Ant Killer Bait	2 oz	Liquid
Grants	Repels Dogs & Cats	2 lb	Granules
Grants	Ant & Spider Killer	14 oz	Granules
Green Light	Rose Defense	1 qt	RTU
Greenview	Preen Prevent Weeds	2 lb	Granules
Hot Shot	Roach & Ant	17.5 oz	Spray
Hot Shot	Roach & Ant Killer Z	17.5 oz	Spray
Last Bite	Snail & Slug Killer	2.25 lb	Pellets
Maxide	Ant,Roach, Spider	18 oz	Spray
Maxide	Diazinon Insect Killer	1 lb	Granules
Maxide	Diazinon Insect Killer	24 oz	RTU
Maxide	Dandilion & Broadleaf	24 oz	RTU
Maxide	HornetWaspYlw JacketiS oz	15 oz	RTU
Maxide	Home Pest Insect	1 gal	RTU
Monsanto	Weed & Grass RoundUp24 oz		RTU
OFF	Skinfantastic	6 oz	lotion
OFF	Yard & Deck Repellent	16 oz	Spray
OFF	Unscented Spray	6oz	Spray
OFF	Deep Woods	6 oz	Spray
OFF	Skintastic w/Sunscrn	3oz	Cream
OFF	Skintastic w/Aloe	6 oz	Spray
OFF	Skintastic for Kids	6 oz	Spray
OFF	Skintastic Magic Color	6 oz	Spray
Ortho	Weed B Gon	24 oz	RTU Spray
Ortho	Rose & Flwr Insect	24 oz	RTU Spray
Ortho	Bug B Gon	24 oz	RTU Spray
Ortho	Rose Pride insect disease	14 oz	Spray
RAID	Ant/Roach Cntry Fresh	17.5 oz	Spray
RAID	Roach & Ant unscented	17.5 oz	Spray
RAID	Ant/Roach Outdoor	17.5 oz	Spray
RAID	Ant unscented	17.5 oz	Spray
RAID	Flying Insect	15 oz	Spray
RAID	House & garden	11 oz	Spray
RAID	Wasp Hornet killer	14 oz	Spray
RAID	Max Conc Deep Roach	4.5 oz	Fogger
RAID	Max Roach & Ant	14 oz	Spray
RAID	Flea Killer Plus	16 oz	Spray
RAID	Double Cntrl Ant Bait	.25 oz	Bait (4)
RAID	Raid Ant Baits Plus	.24 oz	Bait (4)
RAID	Ant Bait	.24 oz	Bait (4)

RAID	Fumigator	3 pk	Fumigator
Raid	Flea Killer Plus	16 oz	Dust/Gran
Roach Motel			
Round UP	Weed/Grass Conc	16 oz	Liquid Conc
Round UP	Weed/Grass Conc	32 oz	Liquid Conc
Schultz	Houseplants Insect	24 oz	RTU Spray
Schultz	Expert Gardener Insect	24 oz	RTU Spray
Schultz	White Fly Mealy Bug	12 oz	RTU Spray
Security Brand	Finale Weed & Grass Killer	24 oz	RTU Spray
Sluggo	Kills Snails/Slugs	1 lb	Granules
Spectracide	Immunox + aphids	14 oz	Spray
Store Brand	Roach Control Sys	.84 oz	12 trays
Store Brand	Ant Control Sys	.355 oz	4 trays
Terro	Ant Dust	16 oz	Dust
Terro	Liquid Ant Baits	2.2 oz	Liquid
Term Out	Kill Termite,Ant, Roach	13 oz	Spray
Zap a Roach	Boric Acid	1 lb	Powder

Discount Dept. Store

Manuf/Brnd	Prod Name	Size	Formulation
Bayer Adv Gard	Lawn & Garden Multi	2 lb	RTU Granules
Bayer Adv Gard	Weed killer	24 oz	Spray
Bayer Adv Gard	Lawn & Gard Mult Insect	32 oz	Spray
Bayer Adv Gard	Rose & Flower Care	5 lbs	RTU Granules
Bonide	Slug & Snail	32 oz	RTU Liquid
Bonide	Eight Insect Control	32 oz	RTU Spray
Bonide	Rose & Flower Care	32 oz	RTU Spray
Bonide	Fung Oil	32 oz	Spray
Garden Place	Ant Flea & Tick	10 lb	Granules
Garden Place	Diazinon	10 lb	Granules
Garden Place	Home & Insect Control	1 gal	Liquid
Garden Place	Snail & Slug	2.25 lb	Liquid
Garden Place	Grass & Weed Killer	1 gal	Liquid
Garden Place	Grass & Weed Killer	1 pt	Concentrate
Garden Place	Wasp & Hornet	17.5 oz	Spray
Greenlight	Broadleaf Weed prev	10 lb	Granules
Greenlight	Amaze Grass Weed Prev	4 lb	Granules
Greenlight	Wipe Out Broadleaf	1 gal	RTU Liquid
Greenlight	Wipe Out Broadleaf	1 qt	RTU Liquid
Greenlight	Conquest Insecticide	1 qt	Spray Conc
Greenlight	Rose Defense	1 qt	RTU Spray
Greenlight	Rate & mouse bait	4.5 oz	Bait (3)
Greenlight	Dog/Cat Repellant	1.5 lb	Granules
Greenlight	MSMA Crabgrass Killer	1 pt	Concentrate
Greenlight	Diazinon Gran	1 lb	Granules
Miracle Grow	Garden Weed Prevent	5 lbs	Granules
Monsanto	Round Up	32 oz	Liquid Conc
Monsanto	Round Up	16 oz	Liquid Conc

Monsanto	Round Up	24 oz	RTU Spray
Monsanto	Round Up	1 gal	RTU Spray
Monsanto	Round Up	64 oz	RTU Spray
Monsanto	Round Up	64 oz	RTU Spray
Ortho	Home Defense Spray	1 gal	Spray Liquid
Ortho	Pull N Spray Home Def	1.33 gal	Spray Liquid
Ortho	Home Defense	24 oz	Spray Liquid
Ortho	Bug B Gon	1 gal	Spray Liquid
Ortho	Bug B Gon	1/2 Gal	Spray Liquid
Ortho	Bug B Gon	32 oz	Spray Liquid
Ortho	Bug B Gon Lock n Spray	32 oz	Spray Liquid
Ortho	Daconil	16 oz	Concentrate
Ortho	Daconil Ultra	16 oz	Concentrate
Ortho	Bug Geta	2 lb 4 oz	Granules
Ortho	Rose Pride Triple Action	14 oz	Spray
Ortho	Rose Pride orthonex	14 oz	Spray
Ortho	Home Defense Hi Power	15 oz	Fogger (3)
Ortho	Diazinon Ultra	32 oz	Concentrate
Ortho	Ortho KIor Soil Insect	32 oz	Concentrate
Ortho	Bug B Gon	32 oz	Concentrate
Ortho	Diazinon Gran	1 lb	Granules
Ortho	Brush B Gon	19 oz	Spray
Ortho	Weed B Gon	24 oz	Spray
Ortho	Weed B Gon Crabgrass	16 oz	RTU
Ortho	Weed B Gon Chickweed	16 oz	Concentrate
Ortho	Hornet & Wasp	15 oz	Spray
Ortho	Home Defense	15 oz	Spray
Ortho	Diazinon	10 lb	Granules
Ortho	Ant Stop	16 oz	Spray
Ortho	Dursban lock n spray		Spray
Ortho	Ant Stop Killer Bait		Bait
Schultz	Insect Spray	12 oz	Spray
Schultz	Fungicide	12 oz	Spray
Schultz	Insect Spray	15 oz	Spray
Spectracide	Grass & Weed Killer	1 qt	Liquid Spray
Spectracide	Grass & Weed Killer	40 oz	Liquid Refill
Spectracide	Bug Stop Multi Purp conc	32 oz	Spray Conc
Spectracide	Ant Shield	2 lb	Granules
Spectracide	Bug Stop In/Out	32 oz	Spray
Victor	Roach Powder (Boric Acid)	1 lb	Powder
Victor	Wasp & Hornet	17.5 oz	Spray
Victor	Ant & Roach Poison Free	17.5 oz	Spray

Appendix F. Total amount of pesticide by active ingredient sold by the 8 stores that provided sales data.

Pesticide active ingredient by hardware vendors	Total ai (lb) from 6 stores surveyed	Extrapolated ai (lb) for all hardware stores in watershed*
2,4-D, DIMETHYLAMINE SALT	28.99	72.48
ACEPHATE	14.45	36.13
ACIFLUORFEN, SODIUM SALT	0.23	0.58
ALLETHRIN	0.44	1.10
ARSENIC TRIOXIDE	0.45	1.13
AVERMECTIN	0.02	0.05
BENOMYL	0.31	0.78
BIFENTHRIN	2.21	5.53
BORAX	2.73	6.82
BORIC ACID	415.50	1038.75
BROMADIOLONE	0.00	0.00
CARBARYL	103.13	257.83
CHLOROPHACINONE	0.01	0.02
CHLORPYRIFOS	38.29	95.00
CYFLUTHRIN	0.10	0.25
CYPERMETHRIN	1.05	2.62
D-ALLETHRIN	0.14	0.34
DDVP	0.11	0.26
DDVP, OTHER RELATED	0.01	0.01
DEET	10.95	27.38
DEET, OTHER RELATED	0.58	1.44
DELTAMETHRIN	0.16	0.40
DIAZINON	551.35	1378.36
DICAMBA, DIMETHYLAMINE SALT	0.85	2.13
DIPHACINONE	0.00	0.00
DIQUAT DIBROMIDE	3.62	9.04
DISODIUM OCTABORATE TETRAHYDRATE	48.02	120.05
DISULFOTON	8.56	21.40
DODECYL AMMONIUM METHANEARSONATE	3.76	9.40
D-TRANS ALLETHRIN	1.25	3.12
FENBUTATIN-OXIDE	2.66	6.66
FIPRONIL	0.01	0.03
FLUAZIFOP-BUTYL	0.14	0.35
GLUFOSINATE-AMMONIUM	2.31	5.78
GLYPHOSATE, ISOPROPYLAMINE SALT	153.36	383.41
HYDRAMETHYLNON	0.11	0.26
IMIDACLOPRID	0.01	0.03
IMIPROTHRIN	1.05	2.62
IRON PHOSPHATE	1.94	4.84
ISOPARAFFINIC HYDROCARBONS	440.32	1100.79
LIMONENE	64.15	160.37
MALATHION	230.00	575.00

MCPP, DIMETHYLAMINE SALT	26.75	66.87
METALDEHYDE	1135.36	2838.41
N-OCTYL BICYCLOHEPTENE DICARBOXIMIDE	3.42	8.54
OCTYLAMMONIUM METHANEARSONATE	3.76	9.40
OLEIC ACID, POTASSIUM SALT	8.92	22.29
PERMETHRIN	3.59	8.97
PETROLEUM DISTILLATES	85.15	212.88
PETROLEUM DISTILLATES, REFINED	164.01	410.02
PETROLEUM OIL, UNCLASSIFIED	172.66	431.65
PHENOTHRIN	0.90	2.26
PIPERONYL BUTOXIDE	4.16	10.40
PIPERONYL BUTOXIDE, OTHER RELATED	0.75	1.88
POTASH SOAP	35.48	88.71
PROMETON	2.23	5.58
PROPOXUR	3.23	8.09
PYRETHRINS	1.56	3.90
RESMETHRIN	0.57	2.26
ROTENONE	0.27	0.66
SULFUR	75.60	189.00
TETRAMETHRIN	0.82	2.05
TRALOMETHRIN	0.53	1.32
TRICLOPYR, TRIETHYLAMINE SALT	1.68	4.20
TRIFLURALIN	0.22	0.55
TRIFORINE	18.53	46.33
WARFARIN	0.08	0.19
XYLENE RANGE AROMATIC SOLVENT	8.25	20.63

*Total ai sold for hardware stores is estimated from extrapolating the data from 6 hardware stores in the watershed.
Six hardware stores represent 40% of all hardware stores in the watershed that sell pesticides. Therefore, total estimated ai sold in by hardware stores in the watershed is estimated by dividing the ai by 0.4.

Pesticide active ingredient by nursery vendors	Total ai (lb) from 2 stores in watershed	Extrapolated ai (lb) for all nursery vendors in the watershed*
2,4-D	1.09	5.45
2,4-D, DIETHANOLAMINE SALT	0.12	0.60
2,4-D, DIMETHYLAMINE SALT	5.52	27.60
ACEPHATE	30.18	150.90
ALKYL (60%C14, 30%C16, 5%C12, 5%C18) DIMETHYLBENZYL AMMONIUM CHLORIDE	26.02	130.11
ALKYL (68%C12, 32%C14) DIMETHYLETHYLBENZYL AMMONIUM CHLORIDE	24.01	120.03
AMMONIUM TALL OIL FATTY ACID SOAP	0.31	1.53
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, SEROTYPE 3A,3B	4.12	20.58
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, STRAIN EG2371	1.50	7.50
BACILLUS THURINGIENSIS, VAR. KURSTAKI DELTA ENDOTOXINS CRY 1A(C) AND CRY 1C (GENETICALLY ENGINEERED) ENCAPSULATED IN PSEUDOMONA	1.92	9.60
BENEFIN	1.60	7.98
BENOMYL	3.50	17.50
BENTAZON, SODIUM SALT	5.28	26.40
BIFENTHRIN	0.00	0.02
BROMADIOLONE	0.00	0.01
CALCIUM ACID METHANEARSONATE	2.47	12.33
CARBARYL	55.84	279.20
CHLOROPHACINONE	0.00	0.01
CHLOROTHALONIL	3.55	17.76
CHLORPYRIFOS	2.29	11.46
CLARIFIED HYDROPHOBIC EXTRACT OF NEEM OIL	1959.95	9799.74
COPPER SULFATE (BASIC)	11.76	58.80
CYFLUTHRIN	3.35	16.73
DIAZINON	27.44	137.20
DICAMBA	0.10	0.50
DICAMBA, DIMETHYLAMINE SALT	0.33	1.67
DICOFOL	0.36	1.80
DISULFOTON	14.80	74.00
DODECYL AMMONIUM METHANEARSONATE	1.92	9.60
D-TRANS ALLETHRIN	0.07	0.34
ENDOSULFAN	2.20	10.98
ESFENVALERATE	0.13	0.65
ETHEPHON	0.47	2.34
FENBUTATIN-OXIDE	1.58	7.88
FLUAZIFOP-BUTYL	0.44	2.19
FOSETYL-AL	4.80	24.00
GLYPHOSATE, ISOPROPYLAMINE SALT	42.54	212.69
HYDRAMETHYLNON	0.72	3.60
IMAZAPYR, ISOPROPYLAMINE SALT	0.04	0.19

IMIDACLOPRID	3.92	19.61
IRON PHOSPHATE	207.62	1038.10
LIME-SULFUR	12.02	60.12
MAGNESIUM CHLORIDE	19.58	97.92
MALATHION	42.50	212.50
MCPA, DIMETHYLAMINE SALT	0.03	0.13
MCPP	0.48	2.38
MCPP, DIETHANOLAMINE SALT	0.13	0.65
MCPP, DIMETHYLAMINE SALT	7.58	37.89
METALDEHYDE	21.91	109.54
METHYL NONYL KETONE	2.94	14.71
METHYL NONYL KETONE, OTHER RELATED	0.16	0.81
MSMA	32.74	163.72
NAA, ETHYL ESTER	0.19	0.95
N-DIALKYL (60%C14, 30%C16, 5%C12, 5%C18) METHYL BENZYL AMMONIUM CHLORIDE	0.38	1.92
OCTYLAMMONIUM METHANEARSONATE	1.92	9.60
OLEIC ACID, POTASSIUM SALT	5.48	27.39
ORYZALIN	9.27	46.36
PERMETHRIN	0.06	0.30
PETROLEUM DISTILLATES	4.72	23.60
PETROLEUM DISTILLATES, AROMATIC	0.33	1.65
PETROLEUM DISTILLATES, REFINED	1029.50	5147.48
PETROLEUM HYDROCARBONS	0.75	3.76
PETROLEUM OIL, UNCLASSIFIED	61.92	309.60
PHENOTHRIN	0.05	0.23
PIPERONYL BUTOXIDE	1.05	5.24
PIPERONYL BUTOXIDE, OTHER RELATED	0.26	1.31
POTASH SOAP	1481.05	7405.25
PROPOXUR	0.37	1.87
PYRETHRINS	0.38	1.92
RESMETHRIN	0.30	1.52
RESMETHRIN, OTHER RELATED	0.00	0.02
SETHOXYDIM	2.16	10.80
SULFUR	36.33	181.65
TRIADIMEFON	0.16	0.79
TRICLOPYR, BUTOXYETHYL ESTER	14.78	73.92
TRICLOPYR, TRIETHYLAMINE SALT	6.65	33.26
TRIFORINE	15.75	78.75
XYLENE RANGE AROMATIC SOLVENT	41.59	207.95

*Total ai sold for nuseries is estimated from extrapolating the data from 2 nurseries in the watershed. Two nurseries represent 20% of all nurseries in the watershed that sell pesticides. Therefore, total estimated ai sold in by nurseries in the watershed is estimated by dividing the ai by 0.2.

Total ai sold extrapolated for watershed*

Ingredient	Total ai (lb) for all stores surveyed	Extrapolated ai (lb) for all non-commercial sales in watershed
2,4-D	5.45	36.30
2,4-D, DIETHANOLAMINE SALT	0.60	4.03
2,4-D, DIMETHYLAMINE SALT	100.08	667.19
ACEPHATE	187.03	1246.88
ACIFLUORFEN, SODIUM SALT	0.58	3.84
ALKYL (60%C14, 30%C16, 5%C12, 5%C18) DIMETHYLBENZYL AMMONIUM CHLORIDE	130.11	867.38
ALKYL (68%C12, 32%C14) DIMETHYLETHYLBENZYL AMMONIUM CHLORIDE	120.03	800.18
ALLETHRIN	1.10	7.35
AMMONIUM TALL OIL FATTY ACID SOAP	1.53	10.23
ARSENIC TRIOXIDE	1.13	7.53
AVERMECTIN	0.05	0.34
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, SEROTYPE 3A,3B	20.58	137.23
BACILLUS THURINGIENSIS (BERLINER), SUBSP. KURSTAKI, STRAIN EG2371	7.50	50.00
BACILLUS THURINGIENSIS, VAR. KURSTAKI DELTA ENDOTOXINS CRY 1A(C) AND CRY 1C (GENETICALLY ENGINEERED) ENCAPSULATED IN PSEUDOMONA	9.60	64.00
BENEFIN	7.98	53.17
BENOMYL	18.28	121.88
BENTAZON, SODIUM SALT	26.40	176.00
BIFENTHRIN	5.55	37.00
BORAX	6.82	45.45
BORIC ACID	1038.75	6925.02
BROMADIOLONE	0.01	0.04
CALCIUM ACID METHANEARSONATE	12.33	82.20
CARBARYL	537.03	3580.23
CHLOROPHACINONE	0.04	0.24
CHLOROTHALONIL	17.76	118.40
CHLORPYRIFOS	106.46	709.75
CLARIFIED HYDROPHOBIC EXTRACT OF NEEM OIL	9799.74	65331.60
COPPER SULFATE (BASIC)	58.80	392.00
CYFLUTHRIN	16.98	113.18
CYPERMETHRIN	2.62	17.50
D-ALLETHRIN	0.34	2.25
DDVP	0.26	1.75
DDVP, OTHER RELATED	0.01	0.09
DEET	27.38	182.52
DEET, OTHER RELATED	1.44	9.61
DELTAMETHRIN	0.40	2.67

DIAZINON	1515.56	10103.75
DICAMBA	0.50	3.30
DICAMBA, DIMETHYLAMINE SALT	3.80	25.37
DICOFOL	1.80	12.00
DIPHACINONE	0.00	0.03
DIQUAT DIBROMIDE	9.04	60.30
DISODIUM OCTABORATE TETRAHYDRATE	120.05	800.33
DISULFOTON	95.40	636.00
DODECYL AMMONIUM METHANEARSONATE	19.00	126.67
D-TRANS ALLETHRIN	3.45	23.02
ENDOSULFAN	10.98	73.20
ESFENVALERATE	0.65	4.30
ETHEPHON	2.34	15.60
FENBUTATIN-OXIDE	14.54	96.91
FIPRONIL	0.03	0.23
FLUAZIFOP-BUTYL	2.54	16.91
FOSETYL-AL	24.00	160.00
GLUFOSINATE-AMMONIUM	5.78	38.53
GLYPHOSATE, ISOPROPYLAMINE SALT	596.10	3973.98
HYDRAMETHYLNON	3.86	25.76
IMAZAPYR, ISOPROPYLAMINE SALT	0.19	1.28
IMIDACLOPRID	19.64	130.94
IMIPROTHRIN	2.62	17.50
IRON PHOSPHATE	1042.95	6952.98
ISOPARAFFINIC HYDROCARBONS	1100.79	7338.63
LIME-SULFUR	60.12	400.80
LIMONENE	160.37	1069.13
MAGNESIUM CHLORIDE	97.92	652.80
MALATHION	787.50	5250.00
MCPA, DIMETHYLAMINE SALT	0.13	0.89
MCPP	2.38	15.84
MCPP, DIETHANOLAMINE SALT	0.65	4.31
MCPP, DIMETHYLAMINE SALT	104.75	698.35
METALDEHYDE	2947.95	19652.99
METHYL NONYL KETONE	14.71	98.08
METHYL NONYL KETONE, OTHER RELATED	0.81	5.40
MSMA	163.72	1091.47
NAA, ETHYL ESTER	0.95	6.33
N-DIALKYL (60%C14, 30%C16, 5%C12, 5%C18) METHYL BENZYL AMMONIUM CHLORIDE	1.92	12.80
N-OCTYL BICYCLOHEPTENE DICARBOXIMIDE	8.54	56.93
OCTYLAMMONIUM METHANEARSONATE	19.00	126.67
OLEIC ACID, POTASSIUM SALT	49.68	331.18
ORYZALIN	46.36	309.03
PERMETHRIN	9.27	61.83
PETROLEUM DISTILLATES	236.48	1576.52
PETROLEUM DISTILLATES, AROMATIC	1.65	11.00
PETROLEUM DISTILLATES, REFINED	5557.50	37050.00
PETROLEUM HYDROCARBONS	3.76	25.07

PETROLEUM OIL, UNCLASSIFIED	741.25	4941.67
PHENOTHRIN	2.49	16.58
PIPERONYL BUTOXIDE	15.65	104.32
PIPERONYL BUTOXIDE, OTHER RELATED	3.19	21.26
POTASH SOAP	7493.96	49959.70
PROMETON	5.58	37.20
PROPOXUR	9.95	66.36
PYRETHRINS	5.82	38.80
RESMETHRIN	3.78	25.22
RESMETHRIN, OTHER RELATED	0.02	0.13
ROTENONE	0.66	4.42
SETHOXYDIM	10.80	72.00
SULFUR	370.65	2471.00
TRALOMETHRIN	3.37	22.45
TRIADIMEFON	0.79	5.28
TRICLOPYR, BUTOXYETHYL ESTER	73.92	492.80
TRICLOPYR, TRIETHYLAMINE SALT	37.46	249.73
TRIFLURALIN	0.55	3.68
TRIFORINE	125.08	833.88
WARFARIN	0.19	1.26
XYLENE RANGE AROMATIC SOLVENT	228.58	1523.89

*Nursery and hardware stores combined are assumed to account for 15% of all pesticide sales in the watershed, based on the Residential Telephone Survey.
Therefore, the extrapolated figure for total ai in the watershed is derived by dividing the sum of the extrapolated values for the hardware and nursery stores by 0.15.