



Beyond Information. Intelligence.

Consulting

Database Marketing

*Economic & Social Impact
Studies*

Research

Training

SMS

1042 Fort Street Mall
Suite 200
Honolulu, HI 96813
Ph: (808) 537-3356
Toll Free (877) 535-5767
Fax: (808) 537-2686
E-mail: info@smshawaii.com
Website: www.smshawaii.com

HOUSING POLICY STUDY, 2006: TECHNICAL REPORT

Prepared for the:

**Hawaii Housing Finance and Development Corporation and
Housing Officers/Administrators for Honolulu, Maui,
Hawaii, and Kauai Counties**

SMS Affiliations and Associations:

Alan Barker Associates
Warren Dastrup – Kauai Affiliate
Experian
International Survey Research
Solutions Pacific, LLC
3i Marketing & Communications

**Prepared by:
SMS Research & Marketing Services, Inc.
February, 2007**

CONTENTS

INTRODUCTION	1
PROJECT STRUCTURE	1
HAWAII HOUSING INVENTORY REPORT	3
HAWAII RENTAL REVIEW	4
HAWAII HOUSING PRODUCTION DATA	10
COUNTY PRODUCTION SCHEDULES	10
PRODUCERS SURVEY	10
HAWAII HOUSING DEMAND SURVEY	12
METHODS	12
HAWAII HOUSING DEMAND MODEL	17
MODEL RESTRUCTURING, 2006	17
APPENDIX.....	21
APPENDIX 1: DEMAND SURVEY INSTRUMENT	22
APPENDIX 2: RECONCILIATION WITH U.S. CENSUS DATA	31

LIST OF TABLES

Table 1. Demand Survey Sample Results, 2006	14
Table A-1. Total Housing Units, 1990-2006	36
Table A-2. Occupied Units	36
Table A-3. Owner Occupied Units	36
Table A-4. Homeownership Rates, 1999 to 2006	37

LIST OF FIGURES

Figure A-1. State of Hawaii Tax Map Key Zones, 2003	5
Figure A-2. Oahu Tax Map Key Zones, 2003	6
Figure A-3. Maui County Tax Map Key Zones, 2003	7
Figure A-4. Hawaii County Tax Map Key Zones, 2003	8
Figure A-5. Kauai County Tax Map Key Zones, 2003	9
Figure B-1. Total Housing Units, 1990 to 2006	33
Figure B-2. Occupied Units, 1990 to 2006	34
Figure B-3. Owner Occupied Units, 1990 to 2006	34
Figure B-4. Ownership, 1990 to 2006	35

INTRODUCTION

The objective of the Hawaii Housing Policy Study Update (HPS), 2006 was to add new and timely information to that gathered in previous studies and to continue the development of the Study as a comprehensive housing planning tool. In past Housing Policy Studies, results have slowly evolved toward the latter goal. The original housing study in 1992 produced the first comprehensive set of data related to housing issues in Hawaii. The 1997 study updated that information, and added an analysis of rental housing costs in the State. In 2000, a set of items selected from the Housing Demand Survey of 1997 was administered to a large sample of Hawaii households in order to help in reconciling HPS data and Census estimates. The 2003 Study updated the information once again and added an evaluation of the housing needs of the elderly, the risk of homelessness in Hawaii households, and two surveys to examine awareness of and interest in the Section 8 Housing Voucher Program. In 2006, the Study was expanded to include an analysis of housing production data over the last five years.

Two other changes to the Housing Policy Study were implemented in 2006. First, the time schedule, which was loosely organized around five-year updates, was formalized to include major updates every three years, with interim updates on an annual basis. Second, the housing model was radically restructured in response to the needs of housing analysts in Hawaii. The new housing model is more comprehensive and therefore more complex. To render it usable by a broader group of housing planners, the model received additional front-end programming.

PROJECT STRUCTURE

The Housing Policy Study, 2006 has five parts:

1. **A Housing Stock Inventory:** An inventory of all housing units in the State at the end of 2004. In 2006, the inventory was used to develop a long-range model of housing production to serve as input to the housing model.
2. **Rental Housing Study:** A study of rental unit advertisements, prices, and characteristics from January 2003 through November 2006. The rent study was also institutionalized to produce trackable data for the future.
3. **Production Data:** A review of County data on scheduled housing unit production and a set of interviews with housing producers to develop more reliable estimates of short-run housing production and to better understand issues related to housing development.
4. **Demand Survey:** A statewide survey of adults in 4,997 households to measure current housing conditions, expectations to move to a new unit, new unit preferences, financial qualifications for purchase or rent, and demographic characteristics of household members.

5. Housing Model: A model of Hawaii housing conditions, prices, and sales, that permits forecasting of housing unit needs by income group through the year 2030.

In the following pages, these project elements are discussed in greater detail. Results of the HPS 2006 are reported in the document entitled Hawaii Housing Policy Study, 2006, and several short reports on special topics including homelessness, housing needs of senior citizens, and housing needs of Native Hawaiians.

HAWAII HOUSING INVENTORY REPORT

An extensive analysis of Hawaii's existing housing stock was performed to provide a comprehensive data set and to identify housing production patterns. A database was developed from a number of sources including Hawaii Information Service's Research TMK database, state and county government agencies, residential real estate property management companies, the military, and Hawaii's various universities, community colleges and resident high schools.

The project analyzed over 400,000 single family, multi-family and apartment residential units. Six distinct housing types have been summarized – single family¹, condominium², apartment³, military⁴, student housing⁵, and cooperative⁶. The data describe total inventory for the year ending 2004. Where they are identified, vacation rentals and units otherwise unavailable to the local housing market have been eliminated from the inventory. Not all multi-family units converted to visitor accommodations, and not all single-family units converted to bed-and-breakfasts, are known. As a result, the inventory may include some of these types of units.

Property characteristics such as land area, living area, number of bedrooms, year built, tenure (fee simple or leasehold), and owner occupied or tenant occupied were compiled and analyzed. The information has been summarized for the state as a whole, for each county, and for each tax map key zone within each county.

Please note that the definition for county and island are identical in this report, except as follows: data for the islands of Lanai and Molokai are included as zones 4 and 5 in the Maui County charts and tables. The City & County of Honolulu and the Island of Oahu are synonymous, as are Hawaii County and Hawaii Island, and Kauai County and the island of Kauai.

-
- ¹ Includes detached units intended for single family occupancy. Excludes single family units under the condominium ownership regime.
 - ² Includes all housing units registered under a condominium ownership regime, whether single family detached, or multi-family attached units.
 - ³ Includes all non-condominium, non-cooperative multi-family units, apartments, multiplex, duplex, etc. In 2006, we believe we have removed all building counts from this list and replaced them with unit counts.
 - ⁴ In 2006, the "military" category includes only housing units. Prior to 2006, the category includes some barracks bed spaces.
 - ⁵ Student housing or dormitories were added to the TMK inventory from reports by educational institutions of the number of units they currently operate. Units intended for faculty use are included here. In 2006, we are certain that all dorm units are housing units and not bed spaces.
 - ⁶ Includes all multi-family apartments that are owned as cooperatives.

HAWAII RENTAL REVIEW

In order to perform a thorough review of Hawaii's current rental housing market, a comprehensive data set was constructed to identify current and historical rental availability, rental rates and other trends. For each island, information including location, rent rate, bedrooms, property type, furnished or unfurnished, was gathered from current and historical rental advertisements for each island. Please note that the data presented in this report reflects only market rental rates; no affordable (subsidized) rents have been included in this report except where published in the classified advertisements. Database entries also excluded rentals wanted, vacation rentals, rentals to share, property management, rooms for rent, and all commercial properties.

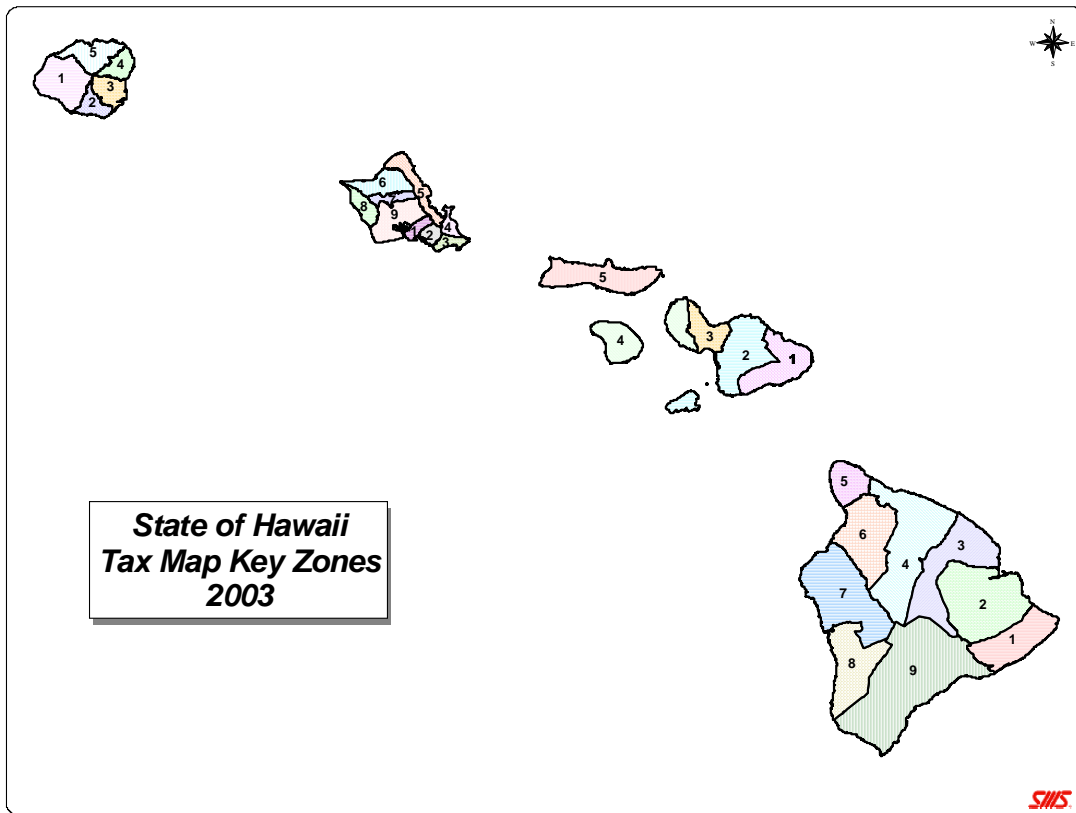
A three-period rolling average of rent rate was used in reporting rent data. This reduces the volatility of the rent data series. Data cover years through 2006⁷. The need to generate moving averages makes it imperative to have full-year data in order to generate appropriate comparisons.

The databases have been categorized by geographic location. Rental area definitions were created using either newspaper classifications or logical geographical areas. See Figures A-1 through A-4 on the following pages for rental area definitions. Lanai, Molokai, East Maui, Kauai's West Side, and other areas not defined on these maps were not included in the report because of very small numbers of advertisements collected. These data are included in countywide averages.

The Oahu rental database was collected from the Honolulu Advertiser's mid-month Sunday classified advertisements for rentals of houses, apartments (including both apartment building units and condominium units) and townhouses. For the purposes of this review, the Oahu rental database was filtered to include advertisements for three- and four-bedroom houses and studio, one-, two-, and three-bedroom apartments. The neighbor island rental database was constructed from the mid-month Sunday Classified ads from the major newspapers for each island. Sources include the Maui News, West Hawaii Today, the Hawaii Tribune Herald and The Garden Island. The database contains information from advertisements for two-, three-, and four-bedroom houses and studio, one- and two-bedroom apartments. In addition, from the Maui News, studio and one-bedroom houses were categorized together as "cottage" since they constitute a significant part of Maui's rental market.

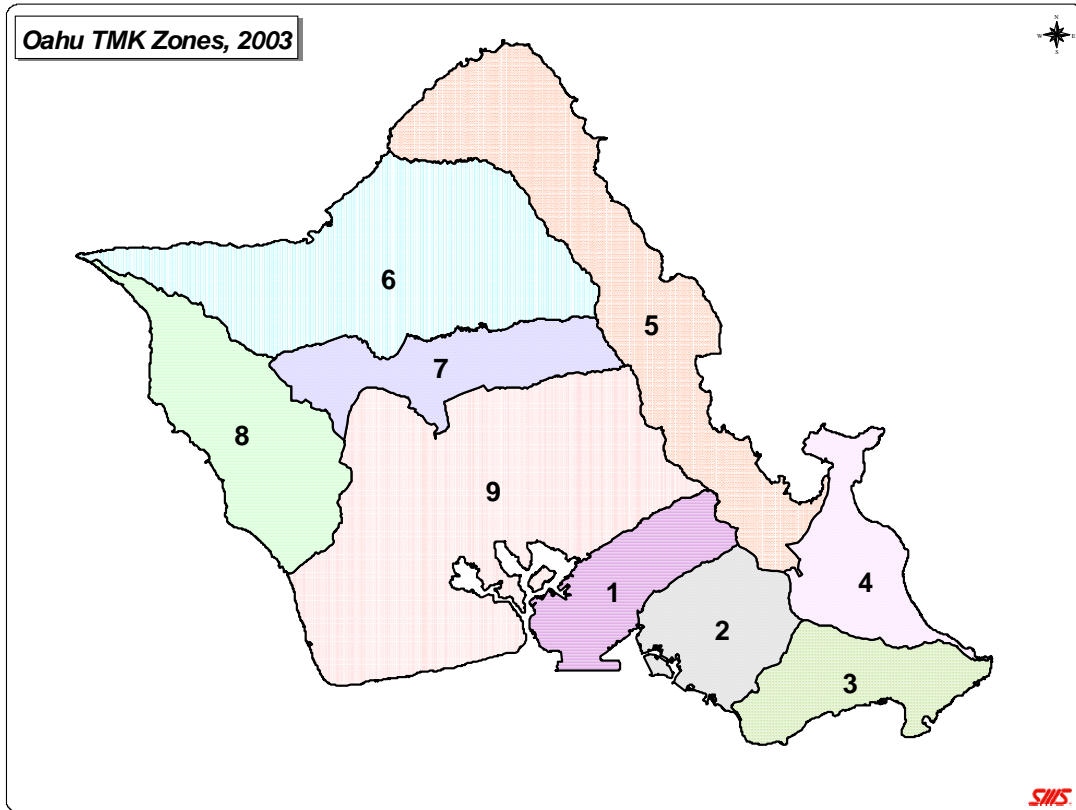
⁷ The most recent data collected were for November, 2006.

Figure A-1. State of Hawaii Tax Map Key Zones, 2003



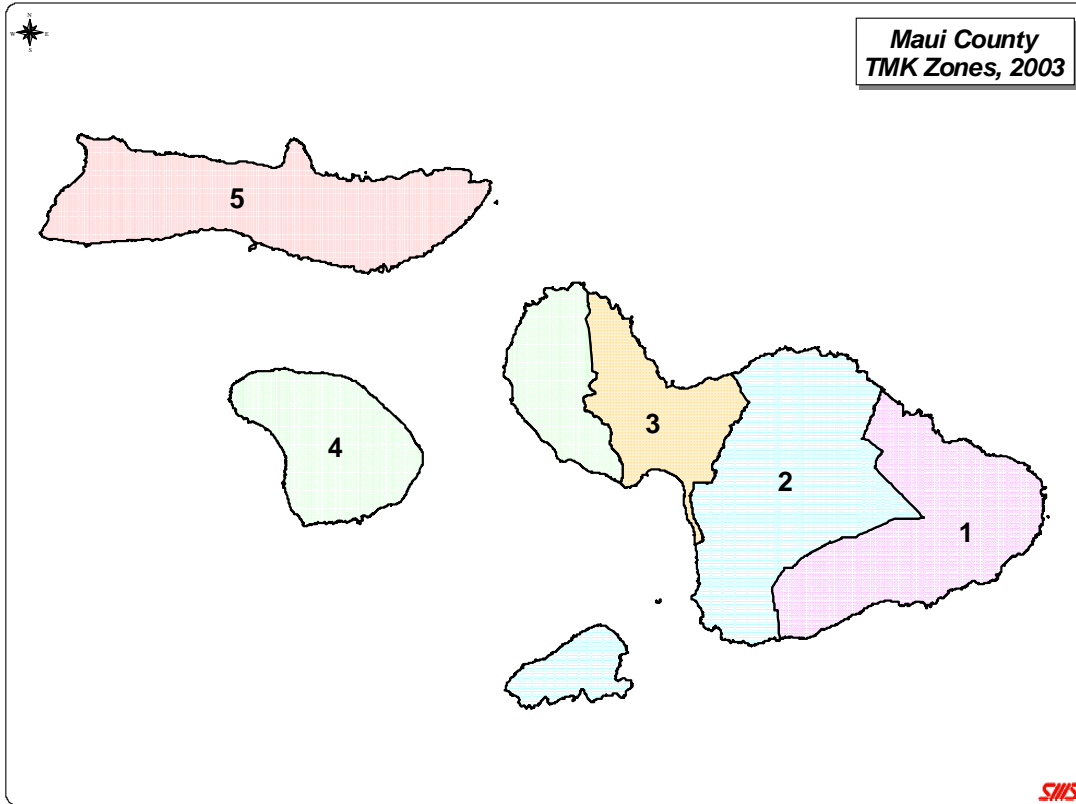
Source: Hawaii Housing Policy Study, 2003 prepared August, 2003.

Figure A-2. Oahu Tax Map Key Zones, 2003



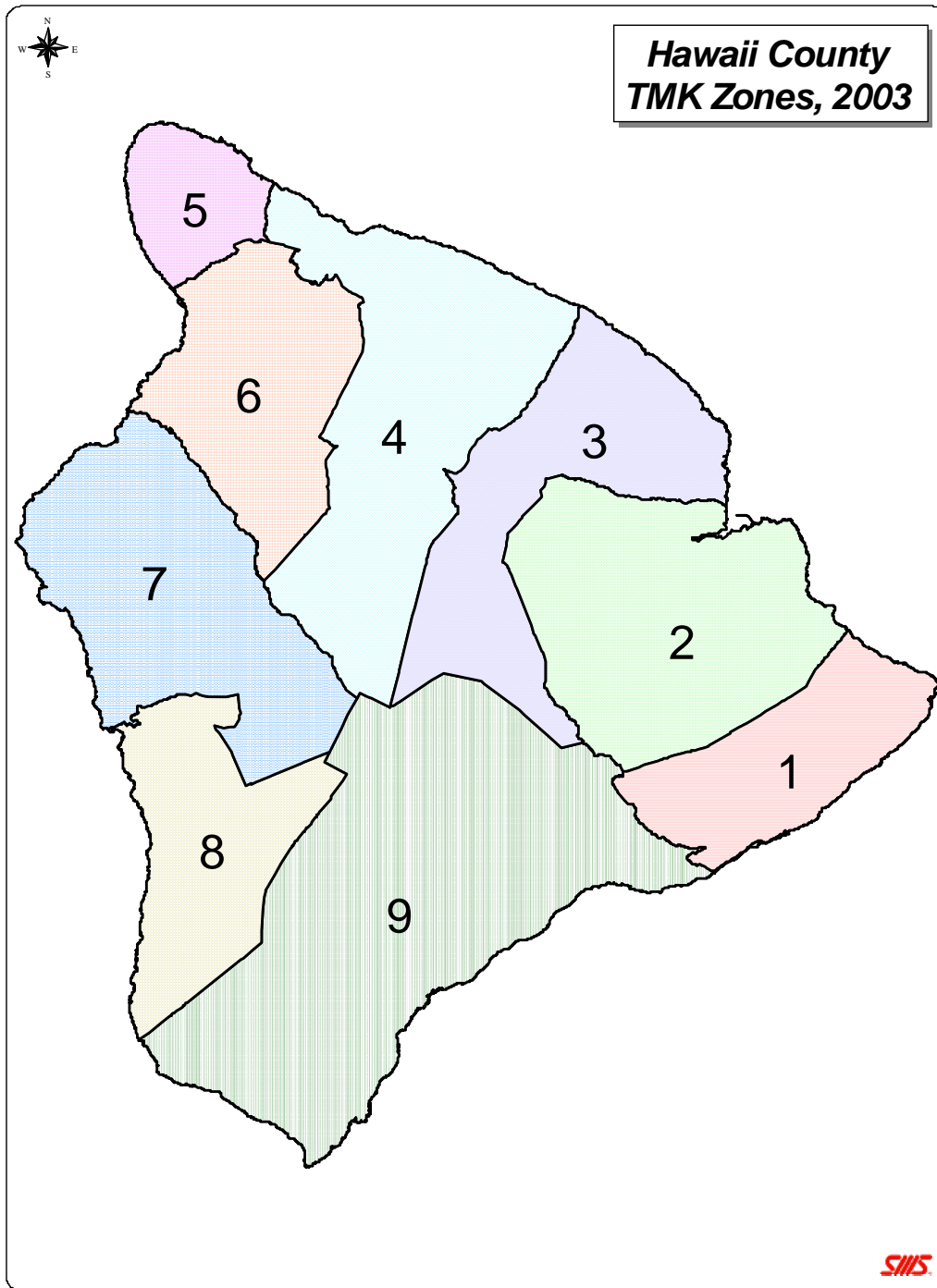
Source: Hawaii Housing Policy Study, 2003 prepared August, 2003.

Figure A-3. Maui County Tax Map Key Zones, 2003



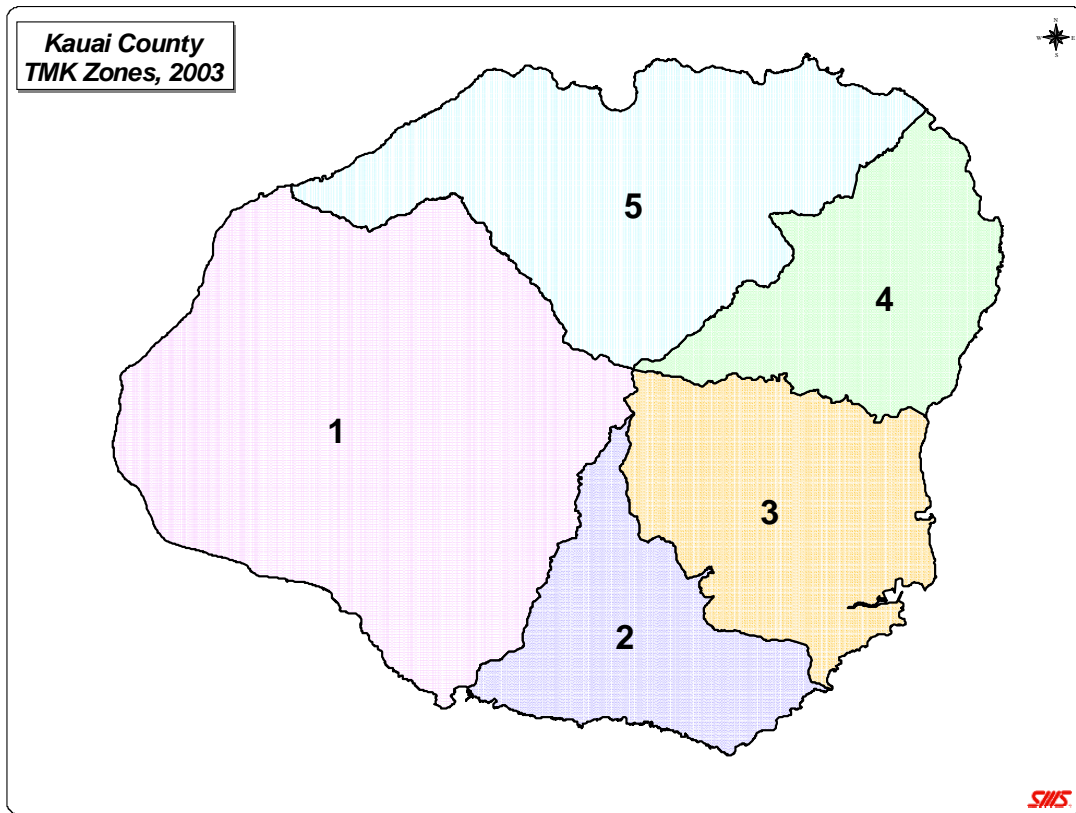
Source: Hawaii Housing Policy Study, 2003 prepared August, 2003.

Figure A-4. Hawaii County Tax Map Key Zones, 2003



Source: Hawaii Housing Policy Study, 2003 prepared August, 2003.

Figure A-5. Kauai County Tax Map Key Zones, 2003



Source: Hawaii Housing Policy Study, 2003 prepared August, 2003.

HAWAII HOUSING PRODUCTION DATA

The purpose of the production data component of the Housing Policy Study Update 2006 was to gather data on scheduled housing production across the State. The intent was to use those data to produce more realistic year-by-year production estimates for the near term for the Hawaii Housing Model. Secondary objectives included arriving at an understanding of how production estimates were developed and to gather producers' reactions to the current market situation in Hawaii as it will affect their actions in the next several years.

COUNTY PRODUCTION SCHEDULES

SMS gathered housing production schedules for all four counties. These schedules were developed in a very similar (though not identical) manner. Figures were not necessarily reported in the same way. In the City and County of Honolulu, detailed schedules of major housing projects are available and updated each year. They include the project name, expected number of units, position in the processing queue, and other useful information. Our observation was that the schedules reflected the best of all possible worlds. The County agreed. The City and County of Honolulu Planning department produces its own estimates of the actual number of units they expect to be produced each year until 2030. These estimates are notably lower than estimates based on the developer's schedule. The City's estimates are very close to those SMS produced from the Hawaii Housing Model.

The County of Maui has an excellent list of housing construction projects scheduled for the next several years. They include a designation "committed" which indicates that the project has all major land use permits and is likely to be completed as scheduled or at least in the next 15 years. This information was used to determine the timeframe of Maui developments.

The County of Kauai shared with us a list of all affordable housing development projects for the County. Numbers were high, and there were none who felt that the County might fall short of that list. The County was unable to produce a list of all scheduled developments with their position in the production queue by the time of this publication. It is unclear when these lists will become available.

Interviews were conducted with planners at each county to gain insight regarding the local environment and factors that impact planned developments. Executives at SMS conducted the interviews via telephone. The information provided by county planners aided in the development of the Producers Survey. Detailed descriptions of these interviews can be found in the Hawaii Housing Production Data Report.

PRODUCERS SURVEY

The original intent was to conduct a survey of all or a large sample of housing developers and builders in 2006. The survey was intended to gather data on producers' expectations with respect to the scheduled development lists gathered from the Counties. That effort was unsuccessful for several reasons. First, it was difficult to develop a comprehensive list of producers. Many of them are listed on official documents according to the name of the LLC established to oversee each development. Those LLCs do not have easily accessible

addresses, contact persons or telephone numbers. After many months of effort, we are not yet certain the list is comprehensive.

Second, the contact persons are difficult to locate and often unable to share the information required. Our informal assessment is respondents were more likely to be unavailable, rather than unwilling to cooperate.

Third, the City and County of Honolulu requested that we not contact developers. They survey developers annually, and asked that we not bother them so as to insure a better response on their next survey. We agreed to forego the survey in return for copies of the City's latest housing unit production estimates.

In the end, we settled for a set of informal conversations, similar to those conducted with county planners, with a smaller list of housing producers. The purpose of this investigation was to gather some over-the-top views on the prospects for development over the next several years. Without asking them for specifics on any given development, we gathered their impressions and expectations for the coming years. Those findings are reported in the Hawaii Housing Production Data Report.

HAWAII HOUSING DEMAND SURVEY

This study was conducted as an update to the Hawaii Housing Policy Study. The research design was developed to match past survey content, sampling method, data collection and data processing procedures as closely as possible. There were several important differences initiated for the 2006 study: (1) the survey content was streamlined and the instrument was a bit shorter than in previous years; (2) the sample was considerably larger than in 1992 and 1997, and somewhat more complex in design; and (3) additional measures were included to evaluate risk of homelessness, elderly housing needs and issues related to sustainable housing.

METHODS

Survey Instrument

SMS Research designed the survey instrument with input from the Hawaii Housing Finance and Development Corporation (HHFDC), County Housing Agencies, the Department of Hawaiian Home Lands, the Office of Hawaiian Affairs, the Executive Office on Aging, and private sector housing interests across the state. The reviewers suggested several changes in content, and most of those changes were incorporated in the final survey instrument. The final version of the survey instrument is shown in the Appendix A.

Each County was divided into several sub-areas for the survey. These geographic survey areas may not correspond exactly to those used in 1992, 1997, 2003, but are very similar. The sample sizes for the geographic subdivisions survey were sufficient to produce results that are statistically accurate within plus-or-minus five percentage points at the 95 percent confidence level.

Twenty-five pre-test surveys were conducted among Hawaii households using the same methodology as were employed for the actual survey. The purpose of the pre-test was to determine whether survey items were understandable to the general public, included the most appropriate response options, and were arranged in the proper order for effective inquiry. Some minor changes to the survey content were made as a result of the pretest. These are reflected in the survey instrument as shown in the Appendix.

Sampling

The population for this survey included all residents living in the State of Hawaii in non-institutionalized housing units with working telephone service at the time of the study. The Random Digit Dialing (RDD) method was used to obtain the sample. RDD samples have several advantages that have caused RDD to become the standard method of sampling for telephone research. The RDD method procedures include simple random samples with optimum precision, and allows for coverage of unlisted phone numbers and numbers that were assigned or reassigned since the most recent telephone directory was published.

The sampling method featured a disproportionate selection procedure. The RDD sampling frame was stratified by geography comparable to districts selected by each county agency participating in the study. Districts differed greatly from one county to another. There were five districts on the Hawaii Island (Kau/South Kona, North Kona, North Hawaii, North and South Hilo, Puna), Oahu (Leeward Oahu, Central Oahu, Windward Oahu, PUC Honolulu, East Honolulu) and Kauai (Kekaha, Hanalei/Kilauea, Koloa, Lihue, Kapaa). Maui County had the largest number of districts with five on the island of Maui (Hana, Makawao/Pukalani/Kula, Paia/Haiku, Kihei/Makena, Wailuku/Kahului, West Maui) and one each for Molokai and Lanai.

The disproportionate sample was designed to produce equal sampling precision for these districts. The number of households in each district in 2006 was estimated by SMS Research and sample sizes were selected to produce standard errors of the proportion of plus-or-minus five percentage points at the 95 percent confidence level, with $p = .50$. The sample design is shown in Table 1.

Interviewer Selection and Training

SMS Research was responsible for the selection, training, and supervision of all interviewers assigned to this project. Regardless of background or experience, all interviewers were specially trained to conduct the housing survey interviews. The training session included: a review of general telephone interviewing procedures; a question-by-question review of the survey instrument; on-screen CATI training; and a question-and-answer session to make sure that interviewers had all problems handled before beginning work on the survey. During the fielding of the survey, there were frequent, short debriefing sessions in which interviewers could bring up any additional questions or issues and have them addressed by the project manager.

Data Collection

Survey data were collected in September, October, and November 2006. All interviews were conducted from the SMS Honolulu Calling Center. The center is equipped with a state-of-the-art computer assisted telephone interviewing (CATI) system that was used for this project. The system provides for rigorous control of sampling, disposition of all calls dialed, and survey administration. Calls were placed between the hours of 12:00 PM and 9:00 PM on weekdays and 10:00 AM and 9:00 PM on weekends. An unlimited callback procedure was employed. In practice, some numbers were re-dialed as many as eight times in order to complete interviews.

SMS produced the household estimates prior to completion of the housing stock inventory based on Census 2000 and American Community Survey 2005 data. Error estimates for districts are standard error of the proportion expressed in percentage points at the 95 percent confidence level. Error estimates for counties and state are weighted error estimates. Error estimates for counties and districts are shown in Table 1.

A professional supervisor was present at all times during the fielding process. In addition, a call monitor was responsible for monitoring calls as they were made. Interviews were monitored on a rotating basis to ensure that procedures were being followed. The monitoring is done through the CATI computer system and neither the interviewer nor the caller is aware that monitoring is taking place. Monitors follow the course of the interview and watch the choices being recorded as the respondent answers. If any discrepancies from procedures are noted, the call monitor conducts a short re-training session with the interviewer to assure that inter-coder reliability is maintained.

Table 1. Demand Survey Sample Results, 2006

Geographic Area	Households 2006	Household Sample		Elderly Sample		Homeless-at-Risk Sample	
		Sample Size	Margin of Error	Sample Size	Margin of Error	Sample Size	Margin of Error
Total	435,818	4,997	1.38	4,997	1.38	4,997	1.38
City & County of Honolulu	303,149	1,405	2.61	1,405	2.61	1,405	2.61
Primary Urban Center	137,130	287	5.78	287	5.78	287	5.78
Central Oahu	79,420	282	5.83	282	5.83	282	5.83
East Honolulu	14,144	277	5.83	277	5.83	277	5.83
Leeward	30,478	279	5.84	279	5.84	279	5.84
Windward	41,978	280	5.84	280	5.84	280	5.84
County of Hawaii	61,213	1,102	2.93	1,102	2.93	1,102	2.93
South Kona-Ka' u	4,757	221	6.44	221	6.44	221	6.44
Puna	12,870	220	6.55	220	6.55	220	6.55
North & South Hilo	20,260	223	6.53	223	6.53	223	6.53
North Hawaii	9,795	216	6.59	216	6.59	216	6.59
North Kona	13,530	222	6.52	222	6.52	222	6.52
County of Maui	49,484	1,449	2.54	1,449	2.54	1,449	2.54
Island of Maui	45,550	907	3.22	907	3.22	907	3.22
East Maui	670	122	8.03	122	8.03	122	8.03
Makawao, Kula	10,558	171	7.43	171	7.43	171	7.43
Wailuku-Kahului	14,508	159	7.73	159	7.73	159	7.73
Paia-Haiku	4,296	154	7.76	154	7.76	154	7.76
Kihei-Makena	8,597	155	7.80	155	7.80	155	7.80
West Maui	6,923	146	8.03	146	8.03	146	8.03
Island of Molikai	2,618	333	5.02	333	5.02	333	5.02
Island of Lanai	1,316	209	6.22	209	6.22	209	6.22
Kauai	21,971	1,041	2.96	1,041	2.96	1,041	2.96
North Kauai	9,472	413	4.72	413	4.72	413	4.72
Kawaihau	6,832	209	6.67	209	6.67	209	6.67
Hanalei	2,640	204	6.59	204	6.59	204	6.59
Lihue	4,362	217	6.49	217	6.49	217	6.49
Waimea, Koloa	8,137	411	4.71	411	4.71	411	4.71
Waimea	5,990	201	6.80	201	6.80	201	6.80
Koloa	2,147	210	6.42	210	6.42	210	6.42

Data Processing

The CATI system is programmed to conduct certain types of data editing as the interview is being conducted. Out-of-range codes are not allowed and contingencies are enforced. Following the fielding process, data files are reviewed and edited for internal consistency and other possible errors that may have passed the automatic editing routines. Edited data are then coded by professional staff who assign numeric codes to open-ended items, and sort and check verbatim responses.

Weighting and Balancing of Demand Survey Data

The sampling plan for the Housing Policy Demand Survey 2006 was based on a two-stage sample in which district samples were disproportionate and households within districts were selected proportionate to their distribution in each district. Because the district samples were disproportionate, sample weights are required to bring samples into correspondence with the populations for islands, counties, and the State as a whole.

The estimates for the number of households in each sample district were developed by SMS as part of the Hawaii Population Model used to weight and balance all survey data based on disproportionate samples. As part of the Model, SMS produced population and household estimates every year since 1990. Those estimates are based on US Census data for 1990 and 2000, with projections through 2010. The household numbers for all districts used in the Housing Policy Demand Survey Update, 2006 are shown in Table 1.

It should be noted here that analysis was conducted to identify any serious non-response bias in the 2006 demand survey data. We were particularly interested in bias that might have been introduced in household income estimates from the survey. Although it is not possible to check survey estimates of household income against current data, the income distribution obtained from the demand survey was very similar to that estimated by the US Census for 2005⁸. It was determined that there was no need to statistically adjust household income this year. Further analysis on non-response bias showed that the demand survey contained a disproportionately high number of homeowners.

The weighting scheme used for the housing demand survey in 2006 was based on the number of households by district, the size of household, and the tenure of the homeowner. The disproportionate sample design assured equal precision by district, but left an unbalanced sample by district. The survey results in a biased sample by household size. Specifically, survey data underrepresented smaller household sizes. This bias is relatively common in telephone surveys, and requires statistical adjustment. Larger households are more likely to have someone home to answer the phone, and thus more likely to finish the survey than smaller households.

Weights were constructed by dividing the population estimates by the sample counts on a cell-by-cell basis. Weights were applied in all analyses conducted based on the demand survey data. The result was to statistically adjust the weighting scheme used for the housing demand survey so that the data weighs to the number of households by district, the size of household, and unit tenure.

⁸ Source: American Community Survey 2005

Data Tabulations

A. Comparison of 1992, 1997, 2003 and 2006 demand survey data.

The data on current housing conditions, preferences for new units, qualifications for ownership and rental, and demographic characteristics of households were collected in the same manner in all three years. Results are also reported in the same format. With few exceptions, it is possible to compare results for 1992, 1997, 2003 and 2006 in great detail. The full range of comparisons will require comparing data in this report with the tabulations in *The Hawaii Housing Policy Study, 1992*, *The Hawaii Housing Policy Update, 1997*, and *The Hawaii Housing Policy Update, 2003*. The 1997 report also produced summary tables of the most important information in the study. This year's report provides those tables for 1992, 1997, 2003, 2006. Data include:

1. Housing unit condition
2. Housing costs for current units
3. Household composition and crowding
4. Shelter-to-income ratios
5. Intention to move
6. Tenancy preferences
7. Housing unit preferences for renters and buyers
8. Preferred locations of new units for owners and renters
9. Affordable housing costs for new units
10. Financial profiles of potential buyers and renters in all counties
11. Interest in sustainable housing

B. 2006 survey results by County.

This subsection presents the 2006 demand survey results for the state as a whole and for each of the four counties. In general, the material on current housing conditions is presented first, followed by housing preferences. The affordability data is next, and the final tables present demographic characteristics of survey respondents.

C. 2006 survey results for districts within counties.

This subsection presents the same data as described above, separately for each county. Within each county's section, demand survey results are shown for the following geographic districts:

- Honolulu:** Primary Urban Center, Central Oahu, East Honolulu, Leeward Oahu, and Windward Oahu
- Maui:** Hana, Makawao-Pukalani-Kula, Paia-Haiku, Kihei-Makena, Wailuku-Kahului, West Maui, Lanai, Molokai
- Hawaii:** South Kona to Ka`u (census tracts 212, 213), Puna (census tracts 210, 211), North and South Hilo (census tracts 201-209, 221), North Hawaii (Hamakua, North and South Kohala) (census tracts 217-220), North Kona (census tracts 214-216)
- Kauai:** Waimea, Koloa, Lihue, Kawaihau, Hanalei

HAWAII HOUSING DEMAND MODEL

From the start, the Hawaii Housing Policy Study has included a model of Hawaii's housing market intended to summarize the findings of the study and support projection of current demand and unit needs into the future. The model has become a central focus of the study over the years and has been updated each time the study was conducted. As housing planners became familiar with each new model iteration, their expectations grew. By 2003 it was apparent that the original model structure was insufficient to answer the growing number of questions planners put forth. It was decided to maintain the basic structure in 2003, but to redesign the model in 2006.

MODEL RESTRUCTURING, 2006

The 2006 Hawaii Housing Model was completely redesigned. Information from the housing inventory and the housing demand surveys are combined with basic population and economic series in a multi-faceted model designed to simulate the structure of Hawaii's housing market and to produce a forecast of housing units needed through the year 2030. The foundation of the model includes considerably more statistical information than in the past, and the level of information generated from the model is several times larger than the previous model.

New Foundation Data

The foundation variables for the former Hawaii Housing Model were the population of Hawaii (taken from DBEDT and Census estimates) and the number of housing units in the State (taken from the Housing Inventory). The new housing model adds several important data series to the foundation data as noted below:

- Total housing units in the State; single family and multi-family units
- Market rent data for single family and multi-family units, including:
 - Percent of households that rent
 - Number of single family and multi-family rental monthly ads (supply)
 - Median single family and multi-family rents (value)
- Single family and multi-family new construction estimates
- Affordability calculated from HUD income guidelines each year for each county
- Visitor unit estimates, including:
 - New construction
 - Units that enter visitor plant (used as hotel rooms)
 - Units lost to visitor industry (when tourism is strong)
- Housing resale estimates for single family and multi-family units, including:
 - Number of units on market
 - Excess inventory
 - Number of resales

All of the data series listed above have been gathered for each county. The Hawaii Housing Model can be used to develop estimates for the State as a whole or for each individual County. SMS will be responsible for updating all of these data annually.

New Calculations

Several important variables from the old Hawaii Housing Model are also included in the new model. In the past, these have been gathered from diverse sources and entered separately. That resulted in a certain amount of “play” in the model which could affect results in ways we did not intend. In the new Housing Model, these elements are calculated internally and checked against external sources. The procedure provides for smoother and more reliable forecasts. The newly calculated variables include:

- **Affordability Ratios:** The ratio of the housing price affordable to a household with a median family income to the median sales price in a given year.
- **Population and Households:** Estimates are now for the housed population only, and for the empirical number of households in the State. In the past, the number of households was calculated by dividing population by the average households size. The new estimate is a more accurate indication of household formation.
- **Vacancy Rates:** Vacancy rates for past models were a blanket estimate of five percent per year. The new model uses empirical estimates of vacancies in each county.
- **Household Income:** Household income is a new addition to the model.
- **Prices and Sales:** Formerly, housing prices and sales were gathered for separate sources.

New Model Structure

Between 1992 and 2003 the Hawaii Housing Model was a relatively straightforward population model. It assumed that the demand for new housing units was a linear function of the number of people in Hawaii and the number of housing units. Modules were developed to estimate the number of households from raw population estimates and the number of housing units available to the resident market from housing inventories and estimated numbers of units withheld from the market. The difference between the two was calculated as a surplus or deficit in housing units available to the resident housing market.

The new Hawaii Housing Market is basically a supply and demand model. It simulates the effects of income and affordability on supply and demand on prices, rents, etc., based on past market performance. The model is driven by affordability ratios that change in response to supply (the availability of units affordable to buyers in different income categories) and demand (the change in number of households and household income).

New Functionality

Unlike the old model, the new Hawaii Housing Model is not a static model. It is dynamic, and allows for several types of what-if analysis. The model was designed to be user-friendly, and allows the user to customize numerous parameters. Safeguards are built into the model to assure that important data are not compromised by user manipulations. Specifically, three types or levels of user manipulations are available.

1. **Parameters Changes:** The model is programmed with an easy-to-use set of interactive drop-down menus for conducting what-if analysis by changing the values of model parameters such as income growth rates, population growth rates, interest rates, and new construction. Users may change one or more parameters and re-estimate the model. If parameters are set outside of reasonable bounds, a warning notice is displayed. The programming language itself cannot be affected by these parameter changes and users need not worry about damaging the model software.
2. **Customizable Parameters:** The more experienced user may wish to change entire sets of parameters such as household income, population, interest rates, or new construction. For this set of operations, entire sets of data, which combine starting levels, growth rates and growth curves are available to the user to change as needed. This procedure requires some brief training, but provides substantial latitude for developing model solutions to fit client needs.
3. **Model Changes or Additions:** Users with more knowledge of programming may wish to make substantial changes to the model design or add capacity or functionality to the model itself. Most users will want to contact SMS for this kind of work. For those who wish to try it themselves, unlocked versions of the model are available to Consortium members.

Unlike previous models, the new Hawaii Housing Model provides a more comprehensive forecasting ability. It is possible, for instance, to use the model to estimate what the next housing price run-up will look like. Although the model is not designed to predict exactly what will happen and when, it shows a rough approximation of what supply and demand forces do to the housing market.

The new model also comes with a caveat. Like all forecasting models, future projections depend heavily on the past behavior of the key data series -- the Hawaii housing market. Since the early eighties, Hawaii's housing market has witnessed three price run-ups, interspersed with adjustment periods. It is quite likely, then, that any manipulation of the model parameters may change the shape and character of the next priced run up, but will not eliminate them as features of the market trend. There are no data to suggest that a run-up will not occur in the future, or that the next run-up will not be followed by an adjustment period.

Technical Specifications

The Hawaii Housing Model was developed using Microsoft Excel™. The decision was made by Consortium members to forego migrating to more complex modeling languages in order to assure that the model could be operated by a broad range of planners using commonly available hardware and software. Although this imposes some limitations on functionality, it seems worth the price. The model is available to all members of the Consortium and requires a standard PC with at least 256 megs of RAM and about 20 megs of storage space. Of course the user would need a reasonably recent version of Excel.

The model was built up from a set of custom built user-defined functions (macros) in Excel. This allows for more complexity and options in the calculations. The specifics of the calculations will not be described here, but the calculations simulate the effects of inputs on supply and demand, prices, and affordability. The model also simulates the conditions that cause a price run-up, like the one that occurred from 2003-2006, and the effects of the run-up.

APPENDIX

APPENDIX 1: DEMAND SURVEY INSTRUMENT

Housing Policy Study Survey 2006

Prepared: August, 2006

[Record Gender, Do Not Ask]

- 1 Male
- 2 Female

First, I have some questions about the home you live in now. How many bedrooms are there in your home?

How many bathrooms are there in your home?

Not including bedrooms and bathrooms, how many other rooms are in your house?

Is your home a single-family house, a townhouse, a condo, a co-op or an apartment?

- 1 Single Family House
- 2 Townhouse
- 3 Condominium [Condo]
- 4 Duplex/Multiplex
- 5 Apartment
- 6 Co-op
- 7 Other [specify]
- 8 Don't know

How long have you lived in your current home?

- 1 Years
- 2 Months
- 3 Weeks
- 4 Days

Is the place you live in now rented or is it owned by someone who lives in your household?

- 1 Own
- 2 Rent
- 3 Occupy without Payment
- 9 Refused

When you were looking for a house, where did you find the home you bought?

- 1 Real Estate Agent
- 2 Internet / Web Site (Specify Name of Site)
- 3 Yard Sign
- 4 Friend, Neighbor or Relative
- 5 Home Builder or their Agent
- 6 Honolulu Advertiser
- 7 Star Bulletin
- 8 Other Newspaper (Specify Name)
- 9 Knew the Seller
- 10 Home Book or Magazine
- 11 Other (Specify)
- 77 Don't Know/ Don't Recall
- 99 Refused

When you were looking for a place to rent, where did you find the home you live in now?

- 1 Rental Agency
- 2 Craig's List
- 3 Rent.Com
- 4 Apartments.com
- 5 Other Website (Specify Name)
- 6 "For Rent" Sign on Property
- 7 Honolulu Advertiser
- 8 Star Bulletin
- 9 Other Newspaper (Specify Name)
- 10 Knew the Landlord
- 11 Friend, Relative or Neighbor
- 12 Rental Book or Magazine
- 13 Other (Specify)
- 77 Don't Know/ Don't Recall
- 99 Refused

Is the home owned as fee-simple or is it leasehold?

- 1 Fee-Simple
- 2 Leasehold
- 3 Don't Know
- 9 Refused

What is your best estimate of the market value of your home?

- 1 Less than \$150,000
- 2 \$150,000 to \$200,000
- 3 \$200,000 to \$250,000
- 4 \$250,000 to \$350,000
- 5 \$350,000 to \$500,000
- 6 \$500,000 to \$750,000
- 7 \$750,000 to \$1 million
- 8 \$1 million to \$1.5 million
- 9 \$1.5 million to \$2 million
- 10 More than \$2 million
- 77 Don't Know
- 99 Refused

How much is the total monthly mortgage for your home, including any utility payments, maintenance fees or parking? Is it...

- 1 Less than \$200
- 2 \$200 to \$499
- 3 \$500 to \$799
- 4 \$800 to \$1,099
- 5 \$1,100 to \$1,399
- 6 \$1,400 to \$1,699
- 7 \$1,700 to \$1,999
- 8 \$2,000 to \$3,000
- 9 More than \$3,000

- 10 Or already paid for?
- 77 Don't Know
- 99 Refused

How much is the total monthly rent for your home, including any utility payments, maintenance fees or parking? Is it...

- 1 Less than \$200
- 2 \$200 to \$499
- 3 \$500 to \$799
- 4 \$800 to \$1,099
- 5 \$1,100 to \$1,399
- 6 \$1,400 to \$1,699
- 7 \$1,700 to \$1,999
- 8 \$2,000 to \$3,000
- 9 More than \$3,000
- 10 Or already paid for?
- 77 Don't Know
- 99 Refused

For the following questions, the word "home" means any type of home - either a house, condo, apartment, or townhouse. About how old is your home?

[Under 1 Year = 0], [Don't Know=777]
[Refused = 999]

Do you think it is...

- 1 Less than 10 years old
- 2 10 to 20 years old
- 3 Or more than 20 years old
- 7 Don't Know

Would you say that your home is too small, about the right size, or too large for the number of people who lived there now?

- 1 Too small
- 2 About the right size
- 3 Too large

Would you say the physical condition of your home is...

- 1 Excellent
- 2 Satisfactory
- 3 Fair
- 4 Or Poor?
- 7 Don't Know

When is the soonest that you would probably move to another home?

- 1 Less than 6 months
- 2 6 months to a year
- 3 1 to 2 years
- 4 3 years
- 5 4 to 5 years
- 6 6 to 10 years
- 7 Over 10 years
- 8 Probably Never
- 9 Don't Know

And why is it that you don't think you'll ever move? When you do move, do you expect to stay on the same island, move to a different island, or move out of the state?

- 1 Stay on the same island
- 2 Move to a different island
- 3 Out of state
- 7 Don't Know

What are the major reasons that you will be moving out of Hawaii?

- 1 Mentioned Housing as a Reason
- 2 Did not mention anything about Housing
- 7 Don't Know

Do you think you will buy or rent your next home?

- 1 Buying
- 2 Renting
- 3 Moving in with relative, friends
- 4 Other
- 7 Don't Know

Are you pretty certain that you will buy, or do you think you might rent instead?

- 1 Sure to buy
- 2 Might rent
- 7 Don't Know

What are the main reasons you may not buy a place?

- 1 Too Expensive
- 2 Won't Stay Long Enough
- 3 Don't Want to Buy, Prefer to Rent
- 4 It's Up to Someone Else
- 5 Might Buy, but Probably Not
- 6 Can't Afford the Down Payment
- 7 Can't Qualify for the Loan
- 8 Can't Afford the Monthly Payment
- 9 Worried about Job Security
- 10 Think Market is Bad Right Now
- 11 Other [Specify]
- 12 Don't Know
- 13 Refused

If there were homes available that you could afford, would you want to buy one?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

If you buy your next home do you think you will buy it leasehold or fee simple?

- 1 Leasehold
- 2 Fee simple
- 7 Don't Know
- 9 Refused

Would you consider buying a leasehold home if a fee simple home was not available in your price range?

- 1 Yes
- 2 Depends
- 3 No
- 7 Don't Know
- 9 Refused

What does it depend on?

In the next set of questions we're going to talk a little bit about different ways that the county is considering to make more affordable housing available for people now and in years to come. In general, do you support the idea of affordable housing?

- 1 Yes
- 2 Depends
- 3 No
- 7 Don't Know
- 9 Refused

One of the new kinds of housing being considered is a lease that is used to make sure affordable homes stay in the affordable market. I'd like to check and see how you feel about each part of this program.

Earlier you said that you didn't think you'd want to buy a leasehold property. Would you consider buying leasehold if there was no monthly payment for the lease, that is the lease payment is zero forever?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Would you consider buying leasehold if the lease term was 60 years and renewable?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Would you consider buying leasehold if it meant there was no down payment needed to buy the home?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Would you consider buying leasehold if you could pass the home on to your heirs, and they started off with a new 60 year lease?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

OK, if all that were true for all leasehold properties, that is they had a 60 year lease, with no lease payment, you could pass to your heirs, and no down payment was required-- Do you think you would buy your next home leasehold or fee simple?

- 1 Leasehold
- 2 Fee Simple
- 3 Willing to consider leasehold
- 7 Don't Know
- 9 Refused

About how much money do you have in savings that you could use for a down payment? Do not include equity in your house and money from relatives.

- 1 Less than \$500
- 2 \$500 to \$999
- 3 \$1,000 to \$1,999
- 4 \$2,000 to \$2,999
- 5 \$3,000 to \$3,999
- 6 \$4,000 to \$4,999
- 7 \$5,000 or more
- 8 Don't Know
- 9 Refused

About how much do you think you would be able to pay as a down payment? Include money from relatives, or from the equity in property you would sell.

- 1 None
- 2 \$5,000 to \$14,999
- 3 \$15,000 to \$24,999
- 4 \$25,000 to \$39,999
- 5 \$40,000 to \$59,999
- 6 \$60,000 to \$99,999
- 7 \$100,000 or more
- 8 Don't Know
- 9 Refused

Do you think the amount of debt your family has right now would be a problem for you in terms of qualifying for a mortgage?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Would you have to sell your current residence to buy a new home?

- 1 Would have to sell
- 2 Would not have to sell
- 7 Not sure
- 9 Refused

If you buy a home about how much would you be able to afford to pay each month for all housing costs?

- 1 Less than \$200
- 2 \$200 to \$499
- 3 \$500 to \$799
- 4 \$800 to \$1,099

- 5 \$1,100 to \$1,399
- 6 \$1,400 to \$1,699
- 7 \$1,700 to \$1,999
- 8 \$2,000 to \$2,999
- 9 \$3,000 to \$3,999
- 10 \$4,000 or more
- 77 Don't Know
- 99 Refused

Do you think you will move to a single family house, a townhouse or a condo?

- 1 Single Family House
- 2 Townhouse
- 3 Condominium [Condo]
- 4 Apartment
- 5 Other [Specify]
- 7 Don't Know

Okay, so you most likely WON'T be buying your next home. Let me ask you a few questions about the home you probably WILL move to.

If you were to rent your next home, how much can you afford to pay each month for all housing costs, including utilities, maintenance fees, and parking?

- 1 Less than \$200
- 2 \$200 to \$499
- 3 \$500 to \$799
- 4 \$800 to \$1,099
- 5 \$1,100 to \$1,399
- 6 \$1,400 to \$1,699
- 7 \$1,700 to \$1,999
- 8 \$2,000 to \$2,999
- 9 \$3,000 or more
- 77 Don't Know
- 99 Refused

The next home you move to – Will that most likely be a single family house, a townhouse, a condo or an apartment?

- 1 Single Family House
- 2 Townhouse
- 3 Condominium [Condo]
- 4 Apartment
- 5 Other [Specify]
- 7 Don't Know

If you can't find a house in your price range, would you be willing to move to a townhouse or a condo?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

In your area, there may be a new type of housing developed that would help to keep affordable homes available to people. It's called co-operative housing. I'd like to check and see how you feel about this type of housing.

Co-operative housing is usually a multi family building in which all residents own the whole building and the land. Instead of buying an individual unit, you own shares in a corporation with the other owners. Although you don't own the actual unit, you have sole right to live there as long as you like and you receive all of the tax benefits that go along with home ownership.

Would you consider buying a co-op such as this?

- 1 Yes
- 2 No
- 3 Depends
- 7 Don't Know
- 9 Refused

Would you consider buying in a co-op if you could not find a standard unit in your price range?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

In these types of buildings, the monthly payments are typically lower than a normal 15 or 30 year mortgage. Would you consider buying a co-op such as this if the monthly payments were lower than a standard 15 or 30 year mortgage?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

One feature of co-operative housing is that the monthly payments on your mortgage are usually lower than what you would pay for a 15 or 30 year mortgage on a normal property.

One way to keep new co-op developments affordable for future buyers is to limit how much the price increases over time. This means there would be a limit on the amount you could sell for.

If you were considering buying in a co-op such as this, would the limit on the amount your property will increase in value be an important issue to you?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Would the limit be a really important issue to you, or just something to consider?

- 1 Really important
- 2 Just something to consider
- 7 Don't Know
- 9 Refused

So, would you say that you would not consider buying in a co-op if there was a limit on the amount your property would increase in value?

- 1 Yes, deal breaker
- 2 Important but not a deal breaker
- 7 Don't Know
- 9 Refused

In these types of co-operative buildings, owners can only sell their shares back to the corporation, not on the open market.

Would the fact that you can't sell your property on the open market be an important issue to you if you were thinking about buying a co-op?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Would selling only to the co-op be a really important issue to you, or just something to consider?

- 1 Really important
- 2 Just something to consider
- 7 Don't Know
- 9 Refused

So, would you say that you would not consider buying in a co-op if you could only sell your property back to the corporation?

- 1 Yes, deal breaker
- 2 Important but not a deal breaker
- 7 Don't Know
- 9 Refused

If you had your choice, in what area would you live?

Are there any other areas where you would be willing to live? Any others?

How many bedrooms would you like to have in your new home?

- 0 None - studio
- 1 one
- 2 two
- 3 three
- 4 four
- 5 five or more
- 7 Don't Know
- 9 Refused

What is the smallest number of bedrooms you can live with?

- 1 one
- 2 two
- 3 three

- 4 four
- 5 five or more
- 7 Don't Know
- 9 Refused

How many bathrooms would you like to have in your new home? What is the smallest number of bathrooms you can live with?

- 1 one or one and a half
- 2 two
- 3 two and a half
- 4 three
- 5 four
- 6 five or more
- 7 Don't Know
- 9 Refused

What is the smallest home you would be willing to live in? Please give your answer in terms of square feet.

- 1 About 800 square feet
- 2 800 to 999 square feet
- 3 1,000 to 1,199 square feet
- 4 1,200 to 1,499 square feet
- 5 1,500 to 1,999 square feet
- 6 2,000 or more square feet
- 7 Don't Know
- 9 Refused

In your next home will there be any need for...?

- 1 Ramps
- 2 Railings
- 3 Wheelchair modifications
- 4 Bathroom grab bars
- 5 shower seat
- 6 emergency call device system (to summon help)
- 7 None Of These
- 9 Refused

Is there anyone in your household 60 years or older who needs help with personal care or life management as a result of physical, mental or emotional limitation?

- 1 Yes
- 2 No (60+ HH Members do not need Help)
- 3 No one in Household is 60+
- 7 Don't Know
- 9 Refused

What kind of assistance do they need? Do any of them need assistance with activities like eating, bathing, getting dressed, getting in or out of bed, or getting to the toilet?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

And do any of them need assistance with heavy chores like cleaning inside the oven, waxing the floor or doing yard work?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

And how about with activities like preparing meals, taking medications, making phone calls or managing money?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

How about assistance with light chores, such as doing the laundry, housecleaning, changing the linens, or emptying the trash?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

What about transportation, for example being escorted when going outside the house or getting rides to doctors' appointments?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Other than the ones I've just mentioned, are there any other types of assistance that these individuals need?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

What other types of assistance do they need? Are you currently employed full-time, outside your home, for pay?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Besides you, how many other adults in your household are currently employed full-time outside the home for pay?

- 0 None
- 1 One
- 2 Two
- 3 Three
- 4 Four
- 5 Five
- 6 Six or more
- 7 Don't Know
- 9 Refused

And how long does it take for you to get to work each day?

What is the zipcode where the other adults work?

Would you like to move closer to work, stay about the same distance, or move farther away from work?

- 1 Move closer
- 2 Stay the same
- 3 Move farther
- 4 Doesn't matter to me
- 7 Don't Know
- 9 Refused

If you found exactly the right house at exactly the right price, but it was in ____, would you move there? If you already live in that area you can just tell me so.

- 1 Yes, would move
- 2 No, would not move
- 3 Already live in that area
- 7 Don't Know
- 9 Refused

If you moved to _____ would you keep your job and commute, or would you try to find a job closer to your new home?

- 1 Stay at same job
- 2 Find a closer job
- 3 Already live in that area
- 7 Don't Know
- 9 Refused

Now I have some questions for statistical purposes. Including yourself, how many people live in your household?

- 1 one
- 2 two
- 3 three
- 4 four
- 5 five
- 6 six
- 7 seven
- 8 eight
- 9 nine
- 10 ten
- 11 eleven
- 12 twelve
- 13 thirteen
- 14 fourteen or more
- 77 Don't Know
- 99 Refused

What was your age at your last birthday?

- 1 Under 18 years
- 2 18 to 21
- 3 22 to 34
- 4 35 to 59
- 5 60 or older
- 7 Don't Know
- 9 Refused

You said that you are over 60 - are you...?

- 1 Under 62 or
- 2 62 or older?
- 9 Refused

Of the ____ people in your household, how many are...?

- 1 under 18 years of age
- 2 18 to 21
- 3 22 to 34
- 4 35 to 59
- 5 60 or older

Are any of the people in your household 62 years of age or older?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

The people in your household -- are they ALL related to you either by blood, marriage or adoption, or are there some living in your household who are NOT related to you at all?

- 1 ALL are related to me
- 2 Only SOME are related to me
- 3 NONE are related to me
- 7 Don't Know
- 9 Refused

How many generations of your family live in your household?

- 1 One generation
- 2 Two generations
- 3 Three or more generations
- 7 Don't Know
- 9 Refused

Are the unrelated individuals a family themselves, or are they single individuals?

- 1 A family or families
- 2 Single individuals
- 3 Both
- 7 Don't Know
- 9 Refused

We're also studying issues such as employment and homelessness so I have a couple of questions about those issues.

Have you or any member of your household ever been homeless in the past 10 years?

1. Yes
2. No
3. DON'T KNOW/REFUSED

[IF SO] In what years?

1. 1996 to 1999
2. 2000 to 2002
3. 2003
4. 2004
5. 2005
6. 2006
7. DON'T KNOW/REFUSED

What was the longest stretch of time, in months, that you or your family were homeless?

[ENTER 999 FOR DON'T KNOW/REFUSED]

If your family suddenly lost your source of income, how many months do you think you'd be able to continue living in your home?

[FOREVER = 97; DON'T KNOW = 99]

What would you do if you or your family were forced to move out of your home and had no place to live?

1. Move in with someone else
2. Seek help from public or private agency
3. Move to mainland
4. Move somewhere else in Hawaii
5. Camp out on beach, in park, etc.
6. Be homeless
7. Just look for another place
8. Other
9. Don't know
10. Refused

Is there anyone living in your household, besides you, who might buy or rent in the next three years -- that is, so you would be in two different households instead of one?

- 1 Yes - someone might move out
- 2 No
- 7 Don't Know
- 9 Refused

Do you think their next home will be in Hawaii or out of state?

- 1 In Hawaii
- 2 Out of state
- 3 Some will live in Hawaii, some move out of state (mix)
- 7 Don't Know
- 9 Refused

You said you were not currently employed. Are you...?

- 1 Unemployed and looking for work
- 2 Retired
- 3 A student
- 4 A Homemaker
- 5 Other
- 7 Don't Know
- 9 Refused

Is there anybody in your household on active duty in the military?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Is anybody in your household disabled?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

How long have you lived in Hawaii?

- 1 Less than one year
- 2 1 to 5 years
- 3 6 to 10 years
- 4 11 to 20 years
- 5 more than 20 years, NOT lifetime
- 6 All my life
- 7 Don't Know
- 9 Refused

Where did you live before you moved to Hawaii?

What is your mother's ethnic background?

- 1 Caucasian
- 2 Black or African - American
- 3 Hawaiian or Part-Hawaiian
- 4 Japanese
- 5 Chinese
- 6 Filipino
- 7 Korean
- 8 Vietnamese
- 9 Asian Indian
- 10 Other Asian
- 11 Guamanian or Chamorro
- 12 Samoan
- 13 Other Pacific Islander
- 14 American Indian or Alaska Native
- 15 Mixed, Not Hawaiian
- 16 Other [Specify]
- 17 Don't Know
- 18 Refused

What is your father's ethnic background?

- 1 Caucasian
- 2 Black or African - American
- 3 Hawaiian or Part-Hawaiian
- 4 Japanese
- 5 Chinese
- 6 Filipino
- 7 Korean
- 8 Vietnamese
- 9 Asian Indian
- 10 Other Asian
- 11 Guamanian or Chamorro
- 12 Samoan
- 13 Other Pacific Islander
- 14 American Indian or Alaska Native
- 15 Mixed, Not Hawaiian
- 16 Other [Specify]
- 17 Don't Know
- 18 Refused

Are you 50% or more Hawaiian?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

How many other people in your household are any part Hawaiian?

How many other people in your household are 50% or more Hawaiian?

Are you on the DHHL waiting list for Hawaiian Homestead land?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Is anyone (else) in your household on the DHHL waiting list for Hawaiian Homestead Land?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Are you living on Hawaiian Homestead land right now?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

Do you live in Hawaii all year round, or do you spend part of the year somewhere else?

- 1 All year in Hawaii
- 2 Part of year someplace else
- 7 Don't Know
- 9 Refused

Where do you live when you're not in Hawaii?

What was the total 2005 income, before taxes, for all members of your household. Was it...?

- 1 Less than \$15,000
- 2 \$15,000 to \$24,999
- 3 \$25,000 to \$29,999
- 4 \$30,000 to \$34,999
- 5 \$35,000 to \$39,999
- 6 \$40,000 to \$44,999
- 7 \$45,000 to \$49,999
- 8 \$50,000 to \$59,999
- 9 \$60,000 to \$74,999
- 10 \$75,000 to \$99,999
- 11 \$100,000 to \$124,999
- 12 \$125,000 to \$150,000
- 13 More than \$150,000
- 77 Don't Know
- 99 Refused

Is your annual income above or below

- 1 Above
- 2 Below
- 7 Don't Know
- 9 Refused

[Seniors only] Would you consider buying an affordable housing unit designed specifically for senior citizens?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

What does it depend on?

Would you consider buying a senior citizen unit if it were in a multi-family unit, a multiplex or condo apartment unit?

- 1 Yes
- 2 No
- 7 Don't Know
- 9 Refused

What if the unit were in a specially designed apartment complex that assured young families, singles, and senior citizens lived together in the same building? Would you want to buy there or not?

- 1 Yes
- 2 Not sure, would have to know more about it
- 3 Maybe
- 4 No
- 7 Don't Know
- 9 Refused

[All Respondents] What is the zipcode where you live?

What is the zipcode at your place of work?

APPENDIX 2: RECONCILIATION WITH U.S. CENSUS DATA

Since 1992, the Hawaii Housing Policy Study has produced counts and estimates that differ from one data source to another. Counts of housing units, owners and renters, vacancy rates, and other statistics were slightly different for US Census estimates, the Tax Map Key system, survey data, and other sources. The differences were seldom substantial but always vexing. Since 2003, an attempt has been made to reconcile some of the more important differences. This section presents the results of that effort.

In the tables to follow we present the final counts of population, housing stock, households or occupied housing units, owner occupied units, and homeownership rates. They are the figures upon which all analyses have been based, and they are presented for the State as a whole and for each individual county. They are presented without comment, intended for the use of each reader, analyst, or planner.

In the analysis component for the 2006 HPS, all figures except the Housing Stock Inventory data were brought under the same counts as shown in the tables to follow. Thus reconciliation, per se, is no longer required. The HPS numbers agree exactly with those of past decennial Censuses and American Community Surveys conducted between 2001 and 2005. In the future, we intended to maintain that same correspondence, thereby eliminating the need for reconciliation.

Housing Inventory

The housing inventory data reported for HPS 2006⁹ are counts of housing units taken from property tax records. The inventory data are quite different from other data used in HPS 2006, and users should be very careful in making comparisons across datasets. The major definition issues with the Inventory results are listed below:

1. Years: Inventory data, although reported for the year of the survey, are notably different from year to year. For 2006, the inventory data reflect Hawaii data through December 31, 2004. The 2003 data cover the period through December 31, 2001, except for Maui and Kauai Counties, which were only up to date through December 1999. In point of fact, the exact dates were only roughly recorded due to some problems with data entry that occurred between 2000 and 2002. Data for 1997 reflect inventory through December 31, 1996. The exact dates for the 1992 data were not recorded.
2. Condominium Units: Condominium status was determined as a characteristic of the contract under which the property last changed hands. All condominiums are owned, not all are owner occupied.
3. Apartments: Apartment units are identified in several steps. The TMK system identifies multi-family units on specific plots, including multiple multi-family buildings on a single plot. The number of units per building is often not recorded. Special listings are prepared and SMS supplies number of units and other building characteristics for each one. Procedures for establishing the number of units per building were improved in 2006. Thus the exact change in number of units

⁹ Hawaii Housing Policy Study, 2006, Data Tabulations, Section IV, Inventory Tabulations.

between 2003 and 2006 is unknown from these data. In the years to come, these data will be more accurate and also comparable across years.

4. **Military Units:** Military units include all housing units (except barracks units) controlled by the United States Armed Services within the State of Hawaii. These include single-family units, multi-family units, and duplexes; on- or off-base. In 2006, the method for estimating the number of military units was improved. As a result, the total number of military units in Hawaii was dramatically decreased. We discovered that before 2006, the count included counts of the number of persons housed rather than housing unit counts. In the future, military unit estimates will be more accurate and comparable across years.
5. **Dormitory Units:** Dormitory units include all housing units owned by an academic or educational institution (a school). In 2006, the method for estimating dormitory units was improved. Two changes were made. First, two schools had been supplying bed spaces rather than housing units. All figures now included units only. Second, figures for 2003 and earlier did not include secondary schools' dorm units. The 2006 figures include units owned by all schools.

The inventory data are the only hard data available in Hawaii on housing stock. Further improvements are anticipated in the next several years that will further improve our knowledge of the housing market product.

Intercensal Housing Unit Estimates

In 1992 and 1997, population and housing unit estimates were based on growth rates prior to the study year. Special population modeling routines were developed each year to estimate population size in intercensal years and a year prior to the official DBEDT estimates. Hawaii population growth rates decreased steadily throughout the nineties and did not reach projected levels for 2000. Population estimates for each County were again estimates for 2003. Once again the estimates were too high, having relied on growth rates projected in 2000. In 2006, the population models are notably improved, and actual counts are coming in very close to projections.

The population estimates shown in the master report have been updated to 2006. Note that the figures for 1992, 1997, and 2003 will not match the figures reported in those years.

The figures reported here for total housing units, occupied housing units, owner-occupied unit and homeownership rates, have all been adjusted to match official census numbers for 1990, 2000, 2002, 2003, 2004, and 2005. With the exception of the 2006 estimates, these figures can be expected to remain stable over the next decade.

Survey Estimates for Home Ownership

Comparing home ownership rates for survey data and US Census estimates for intercensal years, it is clear that the telephone survey overestimates home ownership. In 2003, the survey estimate for home ownership may have been off by as much as five to six points. In 2006, Demand Survey data were statistically adjusted to reflect household home ownership rates

across the State. The process of adding a correction for home ownership will be continued in future surveys.

Non-Resident Housing Units

The findings of HHPS 2003 suggest that the number of non-resident housing units in Hawaii will be an increasing concern in the present decade. Neither HHPS data nor the inventory provides any information on non-resident units. The Census provides data for 2000 as shown in the reconciliation tables. According to those data, the number of seasonal units in Hawaii rose from 12,876 in 1990 to 26,943 in 2000. Local data on increases in home sales and rental availability suggest that the number of non-resident units is increasing at an increasing rate.

Figure B-1. Total Housing Units, 1990 to 2006

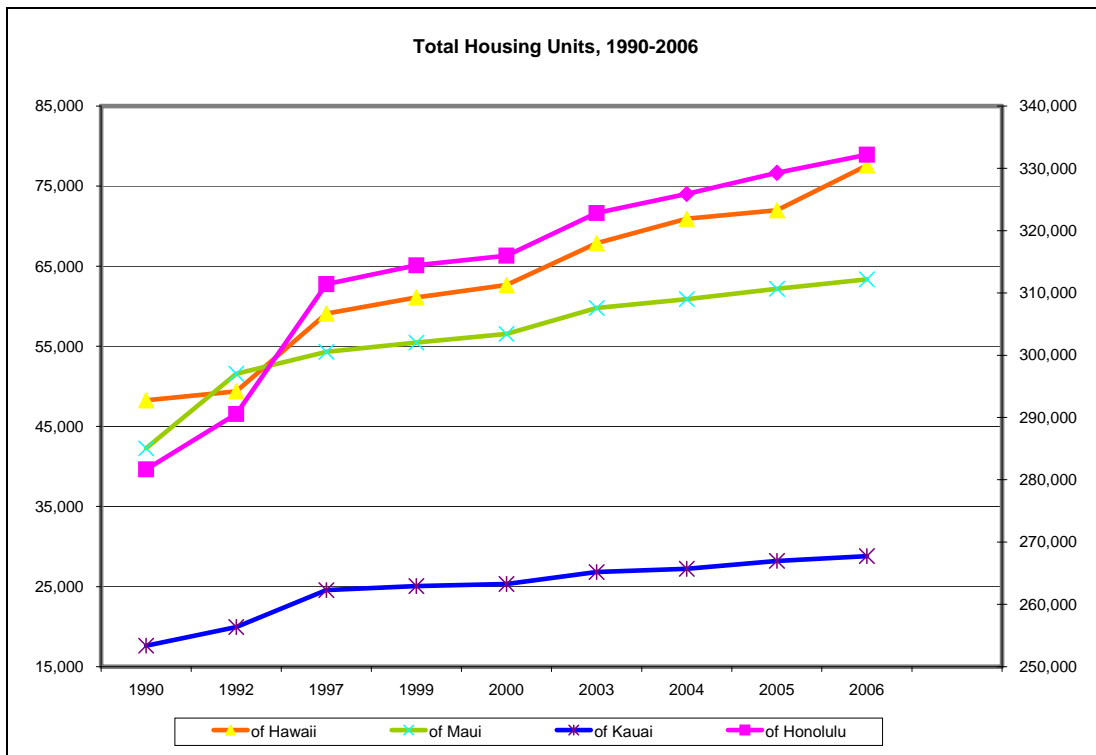


Figure B-2. Occupied Units, 1990 to 2006

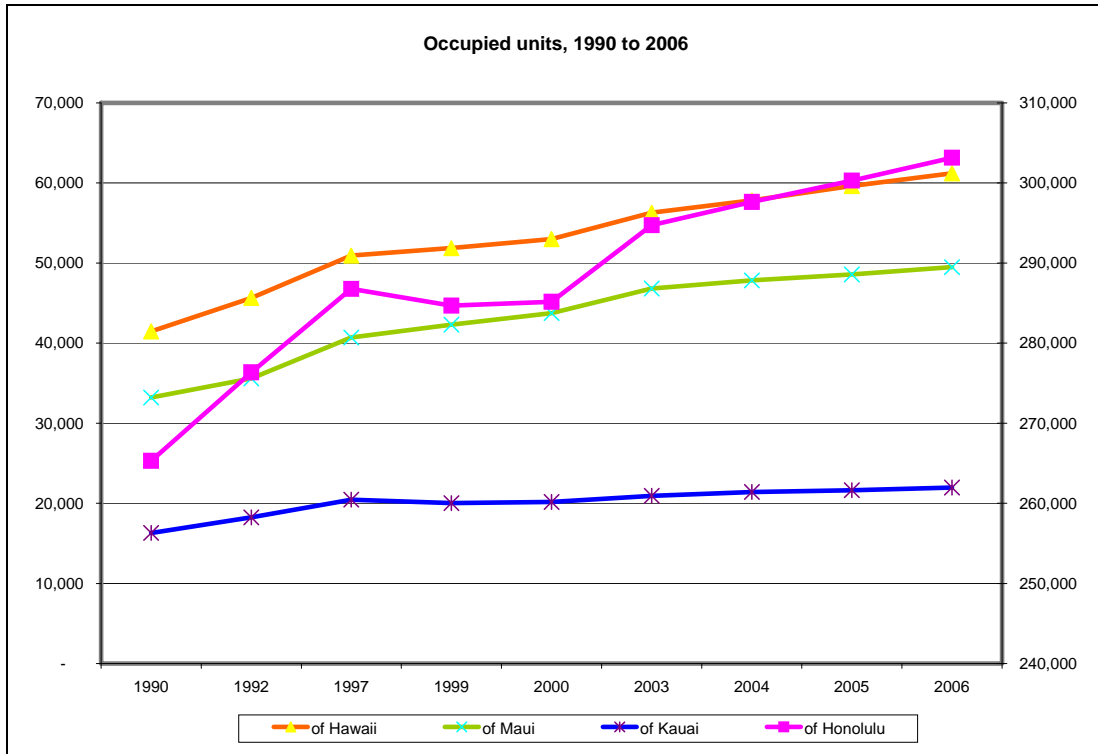


Figure B-3. Owner Occupied Units, 1990 to 2006

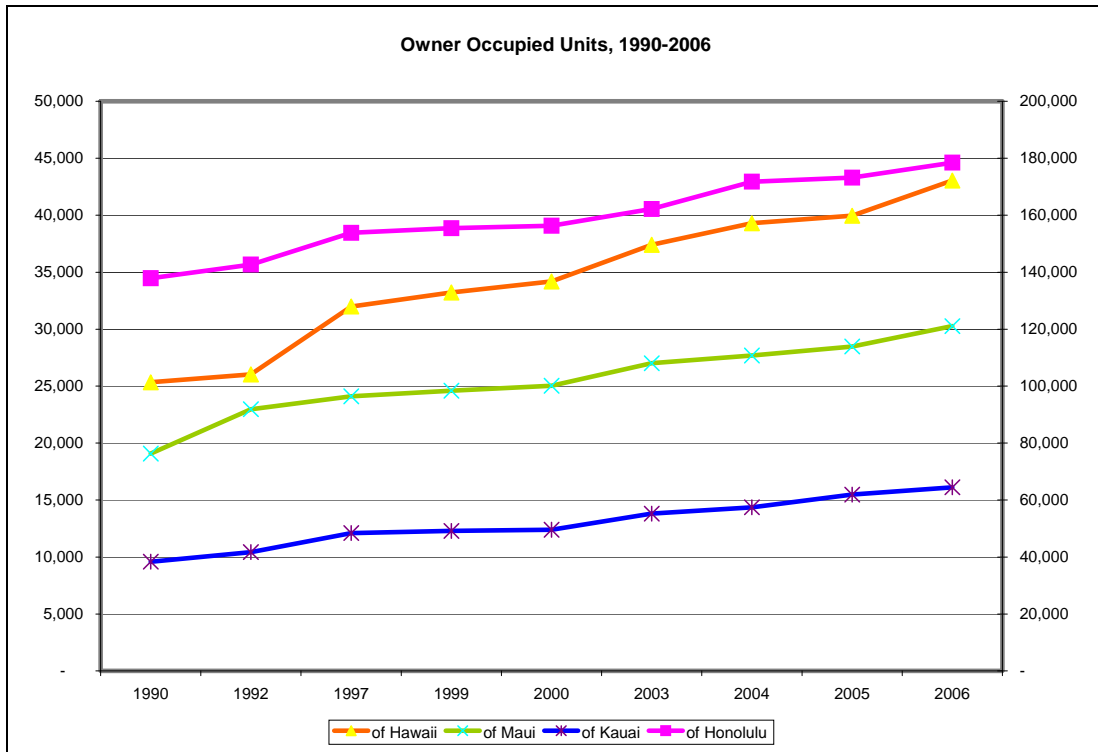


Figure B-4. Ownership, 1990 to 2006

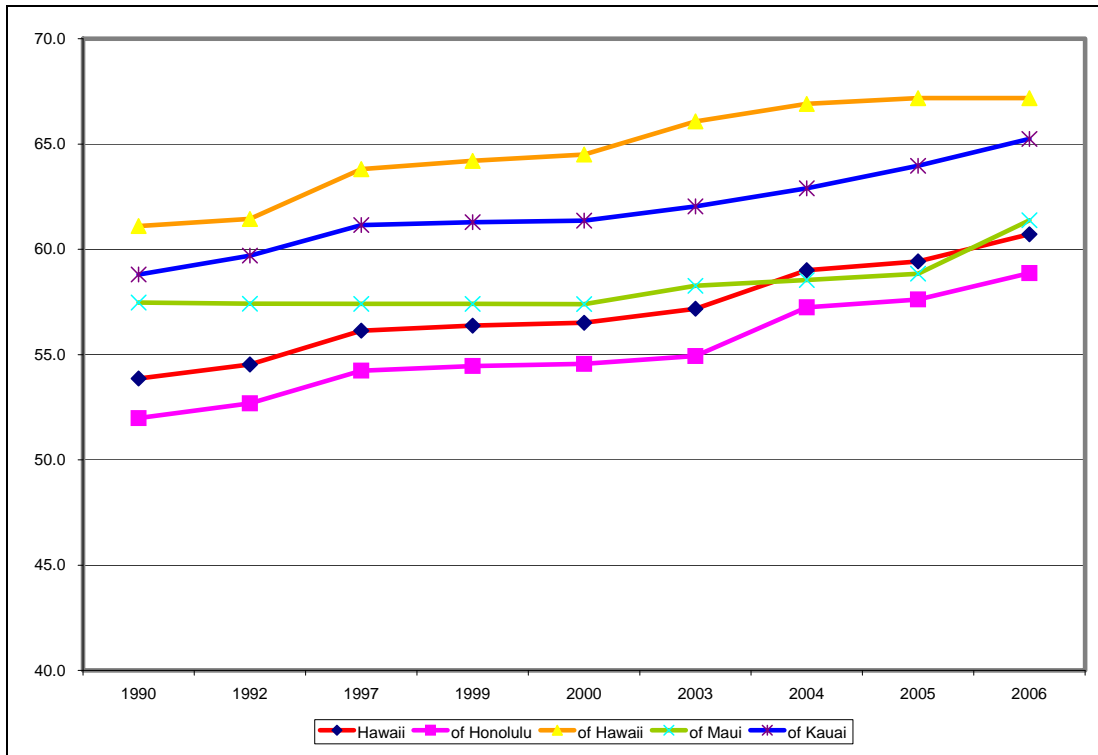


Table A-1. Total Housing Units, 1990-2006

	State of Hawaii	County of Honolulu	County of Hawaii	County of Maui	County of Kauai
1990	389,810	281,683	48,253	42,261	17,613
1992	411,494	290,571	49,394	51,578	19,951
1997	449,385	311,398	59,098	54,321	24,568
1999	456,091	314,448	61,108	55,475	25,060
2000	460,542	315,988	62,674	56,549	25,331
2003	477,333	322,845	67,878	59,788	26,822
2004	484,936	325,888	70,927	60,888	27,233
2005	491,671	329,300	71,984	62,178	28,209
2006	501,956	332,196	77,577	63,364	28,819
Pct. Chg. 1990-2000	1.6%	1.1%	2.5%	2.8%	3.5%
Pct. Chg. 2000-2003	1.2%	0.7%	2.6%	1.8%	1.8%
Pct. Chg. 2003-2006	1.6%	0.9%	4.3%	1.9%	2.3%

Table A-2. Occupied Units

	State of Hawaii	County of Honolulu	County of Hawaii	County of Maui	County of Kauai
1990	356,267	265,304	41,461	33,207	16,295
1992	375,849	276,353	45,655	35,588	18,253
1997	398,910	286,790	50,942	40,713	20,465
1999	398,914	284,695	51,877	42,321	20,021
2000	402,120	285,178	52,995	43,765	20,182
2003	418,772	294,723	56,281	46,834	20,934
2004	424,713	297,631	57,829	47,824	21,429
2005	430,162	300,307	59,634	48,574	21,647
2006	435,817	303,149	61,213	49,484	21,971

Table A-3. Owner Occupied Units

	State of Hawaii	County of Honolulu	County of Hawaii	County of Maui	County of Kauai
1990	191,911	137,910	25,336	19,083	9,582
1992	202,105	142,672	26,035	22,967	10,431
1997	222,031	153,831	31,983	24,110	12,107
1999	225,557	155,465	33,215	24,591	12,286
2000	227,888	156,290	34,175	25,039	12,384
2003	240,392	162,163	37,402	27,017	13,810
2004	253,099	171,755	39,293	27,688	14,362
2005	257,083	173,182	39,949	28,476	15,476
2006	267,923	178,474	43,053	30,268	16,127

Table A-4. Homeownership Rates, 1999 to 2006

	State of Hawaii	County of Honolulu	County of Hawaii	County of Maui	County of Kauai
1990	53.9	52.0	61.1	57.5	58.8
1992	54.5	52.7	61.4	57.4	59.7
1997	56.1	54.2	63.8	57.4	61.2
1999	56.4	54.5	64.2	57.4	61.3
2000	56.5	54.6	64.5	57.4	61.4
2003	57.2	54.9	66.1	58.3	62.0
2004	59.0	57.2	66.9	58.5	62.9
2005	59.4	57.6	67.2	58.8	64.0
2006	60.7	58.9	67.2	61.4	65.2