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# Boat Live-Aboards in the Florida Keys: A New Factor in Waterfront Development



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**BOAT LIVE-ABOARDS IN THE FLORIDA KEYS:  
A NEW FACTOR IN WATERFRONT DEVELOPMENT**

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## ABSTRACT

The origin and perception of special service needs of Florida Keys boat live-aboards were the focus of this study. Information was obtained by field and mail survey methods. A field survey of 1,388 live-aboard boats, housing a population of 2,498 persons, was made during November 1988 through January 1989 and June through July 1989, to characterize vessel attributes, demography, income and expenditures, seasonality, migration path, attitudes and opinions. Monthly boat counts, between September 1988 and July 1989, were obtained by a mail survey of 32 shoreside facilities and by direct observation at 15 anchorages. A marina manager survey of 32 shoreside facilities was conducted in May 1989 to characterize marina facilities, business economics and manager opinions regarding live-aboards. Land resident demographic and economic data were obtained from published U.S. Census projections. A field opinion survey of 101 shoreline residents, at six locations adjoining live-aboard sites, was carried out in April 1989, to elicit land resident attitudes concerning the perceived local effects of live-aboards. A mail opinion survey of 38 government agencies and civic organizations was carried out in May 1989 to characterize the impact of live-aboard service needs and life-styles on community responses. These data sets describe the spectrum of live-aboard life-styles and land group behavior patterns toward water residents. Attribute shoreline and live-aboard variables concerning the live-aboard presence and water use issues are consistent, representative, and comparable. Observations and analyses were by subregion, location, and planning area levels.

Live-aboards were classified by vessel type, mooring sites, and seasonality. Service needs, boating activities, household demography, participation in community life, and

opinions about conflict issues with the land residents varied by classification category. The most serious issues focused on anchor-out live-aboards and those tied to a seawall. Many of the concerns of the land residents also were shared by live-aboard residents.

Live-aboard boats were mostly sailing vessels and about one-third were powerboats. Household and sanitary waste disposal pretreatment systems were most effective on powerboats. Ninety percent of powerboats were located at shoreside dock sites, while 60 percent of sailing vessels were shoreside. The winter-summer ratio for all boat types was 2:1. There was an average number of 1.8 persons per boat, and about half the boat households may be described as families; the average female-male ratio was 1:1.42.

About 23 percent of the live-aboard population completed college. The age distribution of the population was concentrated in the 20 to 64 year class and was poorly represented in the less than 20-year age group. The retired and semi-retired accounted for 57 percent of the population. Surprisingly, 47 percent declared that they are employed, virtually all in the Florida Keys. The demographic, composite profile showed a varied, aging population, well-educated, with a bimodal, work-retired, distribution of respondents participating in the local labor force.

An "after-before" satisfaction index was developed to ascertain if the live-aboards were pleased with their visit to the Keys and whether they would return or remain. The results indicated that their main reasons for coming to the Keys were climate, scenic beauty, and clean air and water. The after-visit experience of the leading attraction criteria indicated approval of climate and scenic beauty, but disappointment over clean air and water.

Land groups and live-aboards were compared for similarities of selected family and household social attributes, as size of household, age-class distribution, sources of income, and monthly rent. The results of statistical tests indicated that land residents and live-aboards are different population groups in some attributes.

Live-aboards were asked to identify and rank the important problems they experienced. Noise, sewage, garbage, crime, and shore access were selected, in that order. Four of the same problem issues also were chosen by land residents.

Finally, both groups were asked to rank the same set of water-use problems and also to select and rank the boater groups responsible for the problems. Non-live-aboard boaters were seen responsible for some problems. The responses of the two groups showed a surprising degree of concurrence.

## I. INTRODUCTION

### 1. Background

While the importance of recreational boating to the social economy of Florida is widely appreciated, not much is known about its growing live-aboard boating segment. No systematic study has been made of live-aboard boaters and of the relations between them and land residents--particularly those dealing with the shared use of coastal waters (Ditton and Miller, 1986). The purpose of this study is to provide information that will contribute to the efforts of communities searching for an equitable solution to waterfront issues between live-aboards and land residents. The study implicitly recognizes the mutual interests of land and water residents to safeguard the shoreline which sustains their community.

A live-aboard is defined as an individual(s) whose continuous residence is a boat, not necessarily at a fixed location, for a period of more than two months. Live-aboards are unreported by the National Travel Survey and the 1980 U.S. Census (Behr and Gober, 1982). A preliminary national survey (Frankel, 1988) states that live-aboards are owners or renters of vessels with overnight living accommodations, who use their boats as private, principal or secondary residences for extended periods at dockside or anchored in coastal waters. Vessels may be sail or engine-driven, or, if lacking self-propulsion, floating homes. Live-aboards differ from daily recreational boaters or those who overnight aboard occasionally or intermittently. In many ways, live-aboards are comparable to "snowbirds," who migrate seasonally or continuously in motor homes or camper-trailer vehicles. Boat live-aboards, however, are shoreline- dependent and make special service demands on public, private, community resources. They compete for use

of the waterfront with land tourists and permanent land residents. Direct competition between live-aboard and land residents sets the stage for a conflict over access to the basic amenities of the community (Spurr, 1984).

During the past two decades, an explosion of development has occurred along the coastal U.S., and this growth promises to continue well into the future (American Planning Association, 1985). Nowhere has this been greater and more environmentally threatening than along the Florida shoreline, particularly the Florida Keys (Monroe County, 1986, Siemon, 1988). Live-aboards have added a new dimension to coastal management because their increasing use from the water side of the shoreline has joined with continuing growth pressure from the land side (Figure 1). The shoreline has become, in many locations, a tension zone between land-based and water-based users. The growth of the live-aboard population is shifting the geographic orientation of development, engendering change in social and environmental conditions. In some instances, conflicts have resulted that threaten the recreation-based economy and life-style of residents of coastal communities (Adams, 1987).

The search for the causes of such conflict can be focused on shoreline management, the adequacy and cost of public and private services, and local, state, and federal regulatory measures. Administrative enforcement authority, however, reflects the interests of permanent land residents. Live-aboards are viewed mostly as temporary visitors, vacationing tourists, drifter-migrants, even social dropouts, whose legal voting addresses may be elsewhere. In fact, however, many live-aboards anchor in coastal waters or tie-up dockside year-round, seasonally, or for extended periods as de facto

residents, and, even as members of the local labor force. They are an integral part of the community who participate in its social life and contribute to the local economy.

In the Florida Keys, the community schism between land and water residents' attitudes and behavior is exacerbated by the physical geography. The Keys form an archipelago that extends southwest from Miami for 150 miles into the Gulf of Mexico. The islands of the Upper and Middle Keys, developed on a Pleistocene coral reef, tend to be long and narrow; the Lower Keys, formed on oolitic limestone deposits, are less linear and have highly irregular shorelines. Elevations throughout are low, less than 20 feet above mean sea level. Distances between land and adjoining waterfronts are everywhere less than 3,000 feet. Numerous channels and dredged canals enhance the geography of land-water proximity.

The island chain, thus, has a unique habitat ecology in which physical geography underlies the community and its character. The interests of land residents and water residents meet along a "social shoreline" that echoes the natural land-water interface. The physical-social contrast along the latter is matched to an array of economic, social, and behavioral responses along the former. Such a shoreline model implicitly recognizes that live-aboards are water-based residents whose year-round and seasonal participation in the local social economy merit consideration in the planning process establishing the regulatory policies for the community.

The Keys have no hinterland, as do other coastal areas in peninsular Florida. Pressure for housing and other space needs caused by local population growth and increased tourism cannot be relieved by expansion into a hinterland area. The only open space is upward, since dredge-and-fill now is prohibited, for the most part, or outward

onto coastal waters. High-rise apartments and live-aboard boats are increasingly evident; both, however, are perceived as detracting from the scenic quality of the shoreline and as threatening to the natural resource base and its income-generating capacity (Rhor, 1989). There are strong countervailing forces to growth in the Keys, therefore, seeking to induce self-limiting controls to further expansion and the encroachment on open space. There is evidence that the loss of such space and environmental degradation are occurring in the Florida Keys (Estrin, 1988). Competition among the users of limited land and water space has intensified community divisiveness, as in the present case of live-aboard residents at Boot Key.

This report describes a systematic effort to construct an appropriate, coordinated data base of the "social shoreline" containing information on the live-aboard population, land residents, shoreline residents, marinas, and local organizations. The results of the study should have relevance for coastal communities seeking information to resolve the conflicting interests of land and water residents in protecting the attractiveness of their shoreline environment.

## 2. Research Guidelines and Objectives

The structure of the research design, to assess the role of live-aboards in waterfront management in the Florida Keys, was formulated after discussions with the planning staff of Monroe County, a reconnaissance survey, and interviews with marina managers, boaters, and land residents, in April 1988. An extensive review of literature in research journals and boating publications also was made (Albertson, 1988, Anderson 1988, Behr and Gober, 1982, Blanchfield and Hind, 1985, Brown, 1989, Burke, 1982, Closser, 1988, Donaldson, nd, Flannery, 1988, Gober and Mings, 1984, Link, nd, Malmgren, 1989,

Manning, 1986, PLANTEC, 1987, Rocholm, 1983, San Francisco Bay Conservation and Development Commission, 1985, Schensted, 1987, Schroeder, 1988, Skinner, 1988, Wiley, 1976). The initial conceptualization took the form of searching questions and commentary, which may be regarded as "working hypotheses." As this stage evolved, these were progressively formulated into more rigorous statements of specific research objectives, as hypotheses which were "tested" by data obtained from field and analytical methodologies.

The "working hypotheses" are listed below:

1. Live-aboards are unreported in the 1980 U.S. Census and the National Travel Survey, and little actual data are available on their nature, size, and geographic distribution.
2. Live-aboards include both permanent and seasonal residents, are housed in a variety of vessels, and anchor in coastal waters or tie-up dockside or along a seawall.
3. The typical live-aboard regards his (her) vessel as home, and it is so outfitted.
4. Live-aboards are characterized by a set of life-style and population parameters of several dimensions--temporal, locational, residential, demographic, economic--that distinguish them from land residents.
5. Live-aboards require specialized infrastructural services in addition to the array of public and private services also available to land residents.
6. The marina, either public or private, is the key entity interfacing with the live-aboard and the land community.
7. Live-aboard service needs differ from those of recreational boaters and depend on the number and distribution of live-aboard sub-groups in a local area.

8. Live-aboard population characteristics cover a wide spectrum, as do those of the land population; it is not clear if there is a unique core of attributes that sets live-aboards apart from the land population.

9. Live-aboards tend to be more mobile than the land population and follow general migration pathways.

10. Land residents have ambivalent attitudes toward live-aboards as neighborly members of the community which are expressed as: (a) a suspicion of "free" live-aboard life-styles which "cheapen" the community; (b) an awareness of live-aboard expenditures; (c) the feeling that live-aboards, especially those anchored in coastal waters, do not make a "fair-share" contribution to the service costs provided by the community; and, (d) the view that the presence of large numbers of live-aboards degrades the shoreline environment by uncontrolled waste disposal and abandonment of vessels.

11. Live-aboards have mixed reactions to community hospitality and available services, which influence the length of their stay and their desire to return. Their reactions can be expressed as: (a) objections to undue supervision and intervention by local, state, and federal authorities, which violate their constitutional rights as U.S. citizens; and, (b) an appreciation of available local, public and private services, but a concern about excessive costs.

The major lines of this research are built around these suppositions.

## II. RESEARCH COMPONENTS AND DESIGN

### 1. A Social View of the Waterfront

It became apparent during the preliminary phase of the study that the research effort would require more than a mere census of the live-aboard population. The initial pre-hypotheses posed in the previous chapter directed attention to the importance of the interaction of several community groups in order to assess the live-aboard factor in the public and private-sector waterfront management in the Florida Keys. Both of these groups are characterized by unique interests, perceptions, and behavioral patterns that govern relations with live-aboards and other groups within the larger community. The groups also exhibit considerable internal variation. Taken together, they constitute a social waterfront nexus which defines the live-aboard factor. An awareness of the workings of the nexus is a prerequisite to the implementation of the research strategy and policy formulation.

This chapter presents background information acquired during the reconnaissance phase which was used to identify the social groups and to design the field sample, the survey questionnaires, and the statistical data analysis, which are described in later chapters.

### 2. Community Groups and Activities

a. Live-aboards - The 1988 reconnaissance survey indicated that there were 1,410 live-aboard boats in the Florida Keys. The total live-aboard population was estimated to be around 3,000, roughly 5 percent of the total 1983 land-based resident population. This share of the population, while not insignificant, has an impact that is disproportionately greater than the figures would indicate precisely because of its

residential mode and accompanying actual or perceived life-style. Clearly, a high research priority was to answer the question, "Who are the live-aboards and how do they live?"

Several parameter sets were identified. They include: (1) demographic - census count of the live-aboard "household" population, family relationship and size, age, sex, income source and level, education; (2) vessel characteristics - type and size, living accommodations, propulsion systems, power requirements, equipment and sanitation facilities, ownership or rental status; (3) mobility pattern - movement within the Keys, homeport, trip origin and destination; (4) location within the Florida Keys - subregion (Upper, Middle, Lower Keys), planning area, and specific place; (5) time patterns and length of stay - travel to and within the Keys, year-round, summer or winter residence; (6) boat siting - dockside at a marina, anchor-out (and use of dinghy) in coastal waters, shoreside tie-up along a seawall; (7) service needs - specialized boating needs at the marina, general community service provision, marina operation; (8) opinions - community and live-aboard opinions on the boat live-aboard experience and life-style in the Keys and elsewhere.

b. Marinas and Marina Managers - The marina is likely to be the first community facility used, and the manager the first individual encountered, regardless of whether the live-aboard vessels locate at dockside or anchor out. This relationship continues for the duration of residence, though, of course, the location may change. The boaters' impressions of the community are strongly influenced by these marina experiences. In a similar manner, due to the proximity and frequency of contact, the marina manager's

impressions of the live-aboard life-style and service needs are probably more intimate than those of any other single community member.

Several information clusters were selected as worthy of study. These include: (1) the marina as a business enterprise - number of slips, fees, shoreside facilities, boat supplies, amenity services, dinghy tie-up, waste disposal, utility charges, occupancy rate (year-round, winter, summer) of live-aboards and recreational boaters; (2) competition - differences between private and public marinas in the area or in other parts of the Keys, and contrasts between marinas, anchor-outs and shoreside tie-ups; (3) manager perceptions and opinions of live-aboard boaters - comparisons of recreational and live-aboard boaters, by live-aboard sub-groups, as dockside, anchor-out, year-round, winter, summer season; (4) managers' suggestions for improvements.

c. **Land Residents** - This population group is the counterpart of live-aboard water residents. It includes persons whose legal voting residences or de facto permanent residences are the Florida Keys, though they may have retained legal residence elsewhere. This section is concerned primarily with the members of the first group, who are reported in the 1980 U.S Census. A shoreline resident subset of the land population also was identified, of those whose residences or locations are in close proximity to or directly along the shoreline.

Certain information was obtained, grouped as follows: (1) legal and de facto land residents - demographic attributes comparable to those obtained from live-aboards on location, numbers of persons, age, sex, household size, family relationship, education level, income source, work pattern, public service use, and owner/renter status; (2) shoreline residents (property owners, renters, managers) - location, orientation and view

toward shoreline, type of accommodation or residence, owner/renter status, opinion of shoreline environment, and reaction to live-aboard presence.

d. **Business and Professional Groups and Civic Organizations** - These groups include individuals with like interests and attitudes and are organized into more or less formal action groups with targeted objectives. Such groups represent and express the views of members and may exist for a limited or extended duration. They may act as supporters or opponents of community issues or proposals and may profess to speak for the community, or, failing that, may attempt to persuade the passive and uninvolved citizenry to adopt their views. Group operating styles vary widely and range from political lobbying to providing educational programs, holding charity events, public protest meetings, and seeking publicity in the mass media.

In order to factor the role of such groups into the assessment of the live-aboard equation, the researchers sought information about group reaction to the presence of live-aboards in the Florida Keys: (1) does the group distinguish between different classes of live-aboards? (2) does the group perceive the presence of live-aboards as a positive or negative influence on the environment? (3) do live-aboards present any special difficulties to the mission or the purpose of the group? (4) does the group distinguish between live-aboards and other boaters, recreational or commercial, in service needs, life-styles, and community adjustments?

e. **Government and Public Utility Agencies** - The information obtained from these agencies represents the views of a group, as in section d, above. These agencies provide infrastructural and social services to the community. Each has a specific mission or assignment to accomplish, but the extent of its activities may impinge on or interfere

with those of another agency or group, sometimes resulting in conflict. Functions performed to further the common needs of the community are authorized by agencies at various levels of government, or by the quasi-governmental agencies of public or privately owned utilities. A bureaucratic structure carries out its activities with characteristic attitudes and perceptions emerging from its objectives, procedures, and service deliveries.

Information on the relation between these agencies and the live-aboard population provide useful insights into the impact of live-aboard service needs and life-styles on community agency actions. This information is categorized to answer questions that include: (1) is there a distinction between live-aboard service needs and recreational boater needs? (2) do live-aboards present any special problems or difficulties to the agency's mission? (3) do live-aboard fees satisfy operational costs?

### 3. Structure of Community Group Data Sets

The background analysis and preliminary questions indicate that the live-aboard dimension in the Florida Keys extends beyond boat live-aboards to include relevant parameters of other community groups and connectivities among boat and land residents. The following data sets and subsets were created to address these relations and to facilitate data collection and analysis.

a. **Live-aboard Residents.** These sets include: (1) boat count and location; (2) vessel attribute and class; (3) demographic and economic profile; (4) seasonality and migration path; (5) attitude and opinion survey.

b. **Marinas and Managers.** The data sets include: (1) marina facilities and location; (2) business economics; (3) opinion survey.

c. Land Residents. The data sets include: (1) census and location; (2) demographic and economic profile; (3) shoreline population and opinion survey.

d. Groups and Organizations. The sets include: (1) government; (2) private; (3) opinion survey.

The sample design, sample frame and size, data collection procedures, and analytical methods are given in the next chapter.

### III. SAMPLE FRAME AND DATA COLLECTION

#### 1. Overview

The information collected in this study was grouped into data sets that are intended to describe the spectrum of live-aboard and other water and land group behavior patterns. The total population on the Florida Keys was used for some sets, while stratified, random samples of the population were taken for others. The data sets include ranges of variables which were measured as integer, ordinal, or nominal values. Field data collection and analysis methods were adapted to the characteristics of each set. Observations were geographically encoded as subregions (Upper, Middle, Lower Keys), locations (e.g. Boot Key Harbor, Stock Island), and planning areas of Monroe County. The logistics of the field work and limitations of time and budget required adjustments to facilitate data collection during the course of the field work. In several cases, raw data were transformed or combined into derived variables prior to analysis, and these procedures will be described separately for the applicable data sets.

Data collection was structured according to spatial-temporal-live-aboard study hypotheses, as shown by Figure 2. The data bank has two main divisions, water and land. Flow lines indicate information links between these two divisions. Water-related parameters are organized into a water data bank, hierarchically arranged regionally, temporally, and locationally. Greater generality occurs at the upper layers and more detail at the base, where the attributes of specific boat observations are found. The marina - marina manager data subset is positioned between the water and land divisions to simulate its real world location and function, but its strata differ partly from that of the live-aboard boat data set. This is also true of the anchorage boat count subset. In

general, lower level observation attributes may be aggregated to any desirable hierarchical level for variate and multivariate analysis.

The arrangement of the land data bank differs from the water group, except for shoreline residents and legal land residents whose geographic strata have been preserved. Geographic strata were not used for the organizations' data subset because their functions are Keys-wide. Data collection methods differ within and between land and water divisions. Only published data were used for legal residents. Despite the differences (which are discussed later in the chapter), attributes of the water and land observations were consistent and representative, and, therefore, comparable.

## 2. Live-aboard Boats and Residents

This information was obtained from direct interviews of boat residents by two members of the project staff. Actual interviewing was preceded by questionnaire pre-tests and trial runs outside the Keys. The interviewing method was standardized (Tourism and Recreation Research Unit, 1983, University of Michigan, 1976); these precautions enhanced the reliability of the results.

a. Sample Frame - The methodology was applied to all surveys, according to three hierarchically-related strata: seasonal (year-round, winter, summer); subregional (Upper, Middle, Lower Keys); and site (shoreside, anchor-out). The boat was the observation or counting unit. This sample frame grouped the observations into meaningful arrangements, ensuring that each stratum was represented adequately in the sample because season (time), subregion (geography), and site (location) are boat attributes; other attributes may be associated with them and with each other. Other data sets also characterize the live-aboard boats and occupants, vessel, demography,

household, work habits, service needs, and attitudes and opinions of the boaters. These attributes define the Florida Keys live-aboards and are used to expose the variability within the live-aboard community.

Chi square analysis (Siegel, 1956) was used to test for independence among the variables according to the sample frame. Are the variables independent, or are they related to the chi square categories? If they are independent, observed boat counts will be distributed proportionately to the total numbers of boats in each class. If they are not independent, the distribution is influenced by the classification and will indicate relations of boat attributes. The information may be useful in planning.

The following chi square analyses were run: (1) boat counts of summer, winter, and year-round seasons by Lower, Middle, and Upper Keys subregions; (2) boat counts of sail, power, and floating-home boat types by Lower, Middle, and Upper Keys subregions; (3) boat counts of shoreside and anchor-out by Lower, Middle, and Upper Keys subregions; (4) boat counts of shoreside and anchor-out by summer, winter, and year-round seasons.

The chi square values, in all cases, indicated at the .001 significance level that variable categories were not independent. Thus, for example, knowing about boat season, type, or site will indicate something about probable boat location. Examination of the chi square table cells exposes the specific differences between the observed counts and the counts expected if the observations had been distributed proportionately to the total counts of the variables; that is, if the boat counts of the variables in the categories were independent. If the observed counts are greater than the expected count, too many

boats are present in the category; if the expected counts exceed the observed count, too few boats are present in the category. The relationships are shown in Table 1.

The size of the sample decreases in a hierarchically structured sampling frame as samples are taken at lower levels. This is because fewer observations are available in the lower categories as greater detail is obtained about each boat. Thus, for example, the live-aboard boat sample size of 186 for all the Keys decreases to 89 at the subregional scale (Middle Keys) and to 70 for the Marathon planning area. The subregion includes Marathon, and the Keys includes the subregion. The decrease in sample sizes lowers the accuracy with which an inference about the population can be drawn from the sample at the same confidence level. This is illustrated by Table 2, using the variate, total fuel cost. As the sample size falls, the mean and standard deviation show no pattern, but the standard error of the estimate of the mean increases, and the confidence interval becomes larger. The confidence interval is the value range in which the unknown population mean falls. Because the interval gets larger to maintain the same level of confidence (say 95 percent) in the smaller samples, less is known about the population mean. Some of the data are ordinal and nominal, and they have been ranked, standardized, or transformed to a test statistic and fitted to a normal distribution, or an approximation, or fitted to a reference statistical distribution. These operations are described at relevant places in the text. Little was known about the distribution characteristics of the background live-aboard population. For these reasons, non-parametric statistical procedures were used (Sheskin, 1985).

b. Sample Method - The sample frame created a basis to obtain information about live-aboard sites within the Florida Keys and to determine if the distribution of

Table 1 - Differences Between Observed and Expected Boat Frequencies  
(Cell chi square values >1.0)

Test	Cell Description	Frequency	
		Observed	Expected
1. Season & Region	Winter-Lower Keys	2	12
	Year-Round-Lower Keys	44	32
	Winter-Middle Keys	31	22
	Year-Round-Middle Keys	48	58
2. Boat Type & Region	Power-Lower Keys	6	15
	Floating Home-Lower Keys	13	6
	Sail-Middle Keys	61	53
	Floating Home-Middle Keys	4	10
	Sail-Middle Keys	17	26
	Power-Middle Keys	24	14
3. Mooring Site & Region	Anchor-Out-Lower Keys	25	15
	Dockside-Lower Keys	25	35
	Anchor-Out-Upper Keys	3	13
	Dockside-Upper Keys	42	32
4. Mooring Site & Season	Anchor-Out-Winter	4	13
	Dockside-Winter	41	32
	Anchor-Out-Year-Round	46	35
	Dockside-Year-Round	73	84

Table 2 - Live-Aboard Fuel Cost - Sample Size and Confidence Interval  
(95% Confidence Level)

Area	No.	Mean	Stan. Dev.	Stan. Error	Confidence Limits	Interval
All Keys	186	283	136	10	303-263	40
Subregion	89	283	145	15	313-253	60
Marathon	70	290	135	16	322-258	64

boats and their sites are related to the duration and periodicity of live-aboard residence. A 13.4 percent sample of live-aboard boats was selected from each season, subregion, and site stratum. A given boat can have only one site location and one seasonal classification, i.e., double-counting of boats was not possible since mutually exclusive sub-populations were defined and sampled independently at the time of observation.

A preliminary reconnaissance trip to the Florida Keys was made in April 1988, to approximate the live-aboard boat population size in each stratum: base figures were obtained from marina managers for the April 1987 to 1988 year-round, summer 1987, and winter 1988 populations. Visits were made to 92 commercial marinas, boatyards, motel docks, dockminiums, restaurant piers, seawall tie-up areas and 9 anchorages. These locations were obtained from marina and anchorage listings (Papy, 1986, Waterway Guide, 1988, Southern Bell, 1988) and by suggestions from the Monroe County Planning Department. Field inspection and discussions with managers eliminated 42 commercial marinas because they were either "high-and-dry" facilities or did not service live-aboard boaters.

The logistics of the field sampling procedure and sample size were based on the April 1988 reconnaissance and upon budget and time considerations. With a total of 1,410 live-aboard boats distributed in the three strata, a sample size of 13.4 percent, (186 boats), was judged to be feasible logistically and analytically. In order to include live-aboard boats in small marinas as candidates for the sample, two operating rules were adopted: (1) if the number of live-aboard boats in a marina was  $< 4$  boats, they were pooled with the boats in another marina in the same subregion before computing the sample size; and (2) if calculation of the 13.4 percent sample yielded a value of  $\geq 0.5$

boats, that value was rounded to the next larger number. The preliminary boat count of the April 1988 reconnaissance in each category is given in Appendix A. Minor departures from findings of the preliminary reconnaissance were made during the course of the field data survey, undertaken during November 1988 to January 1989, and June to July 1989. The interviewed population is given in Appendix A.

The preliminary 1988 reconnaissance identified the subregional locations and local sites of candidate boat interviews. The order of the independent boat samples was not fixed in order to minimize field effort and facilitate travel. The field team adopted a participant-observer approach, visiting candidate sites by boat and residing at pre-selected live-aboard sites (shoreside, anchorage), to encourage openness by respondents and to obtain a better understanding of live-aboard life-style and perceptions (Bernard, 1988).

Live-aboard boats were distinguished from recreational boats not used for continuous overnight stays of at least two months duration. A live-aboard status for anchor-outs and tie-ups was investigated at the start of the interview; if not confirmed, the boat was rejected. At marinas, live-aboard status shoreside was determined by asking the marina manager; the status was confirmed at the start of the interview. Seasonality (year-round, winter, summer) of residence was determined by field observation and by inquiring at the start of the interview. Summer field season interviews, for example, could only be identified as year-round and summer live-aboards, and winter season interviews could only be identified as year-round and winter live-aboards. Seasonality was interview-confirmed; if not confirmed, the boat was rejected.

A 13.4 percent sample was taken at each sampling location of the eligible live-aboard sub-population for the appropriate stratum. The size of the sub-population at the sample location did not always agree with the April 1988 reconnaissance survey; necessary adjustments were made prior to interviews.

The interview was conducted by two researchers, either individually or together. The interview period varied from 0.5 to 1.5 hours, and the questionnaire was completed in the presence of the interviewee. Questionnaire information was coded, formatted, and entered as a data file for subsequent analysis, using several measurement scales. The questionnaire variables on live-aboard residents fell into several groups: vessel, population, employment, income and expenditure, service demands, travel cycles, problem perceptions and opinions on living aboard in the Florida Keys. Appendix A provides the population and sample from the shoreside and anchor-out locations. Table 3 shows the distribution of boats by sampling strata. A copy of the live-aboard questionnaire is in Appendix B.

c. Monthly Boat Count - An independent live-aboard boat count was conducted monthly during the September 30, 1988 to July 3, 1989 period. The count was obtained by a monthly mail survey of shoreside facilities that serviced live-aboard boats, as determined in the April 1988 reconnaissance. The mail survey initially included 50 facilities, but these were reduced to 32 because of attenuation of responses. The procedure required initial mailing of a cover letter and questionnaire, followed by a reminder card after one week; a second letter reminder and questionnaire was sent during the third week following the first mailing, if no reply was received (Dillman, 1978). Failure to respond to these contacts was cause to drop the facility from the list.

Table 3. Number of Live-aboard Boats in Sampling Strata<sup>1</sup>

Subregion	Season			Site			Total
	Summer	Winter	Year-round	Anchorage	Shoreside		
Lower Keys	4 (8.0)	2 (4.0)	44 (88.0)	25 (50.0)	25 (50.0)		50 (26.9)
Middle Keys	12 (13.2)	31 (34.1)	48 (52.8)	27 (29.7)	64 (70.3)		91 (48.9)
Upper Keys	6 (13.3)	12 (26.7)	27 (60.0)	3 (6.7)	42 (93.3)		45 (24.2)
All Florida Keys	22 (11.8)	45 (24.2)	119 (64.0)	55 (29.6)	131 (70.4)		186 (100.0)

2

<sup>1</sup>Row percentages are ( ).

Appendix C includes samples of the letters, reminder card and survey form, and a list of the cooperating facilities.

The monthly counts of anchor-out live-aboards were made by direct observation of live-aboard type boats on the last day of the month during the same period. Appendix D provides the field data form and list of anchor-out locations. Boats were sited approximately on USGS 7.5' quadrangles and large-scale county planning maps. Ground photographs were taken at each location. The purpose of the monthly mail-out and field surveys was to relate monthly variations in the live-aboard population to boat migration pathways.

### 3. Marina Owners and Managers

The marina and the marina manager/owner are pivotal contacts along the live-aboard - community interface. They introduce the live-aboard to the community and provide facilities and service information to boaters who rent slips and to those who anchor-out. Marinas, as providers of services, are an essential part of the tax-paying business community. It should be noted that we use the term marina to include boatyard, dockominium, restaurant pier, and motel dock.

A personal questionnaire interview, of the 32 residual marina managers who had completed the monthly boat count mail survey (see Section c), was conducted during May 1989. The design of the questionnaire was based on the April 1988 preliminary reconnaissance and the personal boating experience of the principal investigator. It was pre-tested in a coastal area other than the Florida Keys. The interview was conducted by a two-member team, one of whom also participated in the live-aboard boat survey.

This ensured interviewer consistency between the two data sets (see Appendix E for sample questionnaire).

#### 4. Land Population

Land resident data for Monroe County were examined in order to assess the relative importance of the boat population and to compare selected demographic, financial, and household characteristics of the water and land resident groups.

a. Population Projections - This information was provided by the Monroe County Planning Department at county, planning area, and census enumeration district levels. Population data were compiled from several original and secondary sources and were further refined and aggregated for the purposes of this study. The original sources were the 1970 and 1980 U.S. Censuses, which were used as a basis for annual and five-year planning projections. The updating of the 1980 Census figures to 1988, the year of the live-aboard survey, was taken from the Hatchitt Report (1987) which incorporates trends from the 1970 to 80 period, based on the 1970 Census. This report also made monthly projections and included the flows of visitors, thus giving the total resident and non-resident population. The Hatchitt Report treated the scarcity of undeveloped lots or building sites as a factor constraining future population growth. In order to calculate household and useable residential units, the utility accounts of the Florida Keys Aqueduct Authority, the Florida Keys Electric Cooperative, and the City Electric Service were used.

Population data were extracted from the census and made compatible with live-aboard boat variables, so that the two data sets could be compared. The selected

variables were size of household, age-class distribution, travel time to work, monthly rent, source of income, use of home air conditioning, female and male population.

b. Shoreline Residents - The land residents most directly impacted by the presence of shoreside and anchored live-aboard boats are those who occupy or rent sites along the shoreline. Their scenic views, security, and general enjoyment of the locale are affected by the appearance, activity and density of live-aboard boats and boaters in the immediate vicinity. In short, the two groups are neighbors. Shorefront land residents are the population group assumed to be most impacted by live-aboards, and their attitudes and opinions are an important source of information on the position, acceptance, and status of live-aboard boaters in the Florida Keys. An opinion survey was carried out at the following six locations: Lower Keys (Pine Channel Anchorage), Middle Keys (Boot Key Harbor, Key Colony Beach, Coco Plum), and Upper Keys (Key Largo Beach, Port Largo). This survey was conducted in the following steps: (1) delineation of areas with both shoreline property owners/renters and boat live-aboards using air-photo interpretation, field reconnaissance and discussions with county planning staff; (2) definition of the target shoreline population having a residence with a view of the water and live-aboard boats; (3) definition of shoreline building types, as (a) hotel/motel, (b) single family, (c) multi-family home (distinguished as townhouse, duplex, or high-rise, and by number of units, 3 through 12, 13 or more); (4) definition of the interviewee as owner, renter or manager; (5) definition of residence period as year-round, winter season (more than two months from November through April).

The survey was conducted by personal interview, during which the interviewee and interviewer filled out a questionnaire. Immediately before, during and after the

interview, information on building type and residence period was obtained and recorded on the questionnaire form. Photographs were taken of the site. A priority order was followed in the selection of the interviewee for multiple dwellings, i.e. owner or board chairperson, manager, senior staff person, unit owner or renter. The owner or renter was selected as the interviewee for single-family dwellings.

The questionnaire was designed to elicit attitudinal responses from the interviewee about the presence of live-aboards in immediate proximity to the residence and the perceived effect of live-aboards on the quality of the environment and the value of their residence. Opinion subsets included ranking the problems related to increased boating activities (e.g. noise, garbage, sewage, loitering), identifying groups responsible for perceived problems in general, and determining the degree of responsibility for each group. A sample questionnaire is provided in Appendix F.

#### 5. Government Agencies and Civic Organizations

An especially sensitive dimension of the issue of year-round live-aboards centers on public concern that they are de facto residents of the Keys who do not pay property taxes but who require public services. In other words, there is a widely held view that "live-aboards do not pay their fair share." In order to examine the "fair share" issue, a mail survey was conducted of two groups of agencies: (1) government or quasi-government agencies; and (2) civic groups. The first category included federal, state, county, and city agencies. The second category included such groups as business associations, home-owner and live-aboard associations, and merchants. Sixty agencies and organizations were asked to complete the survey questionnaire; thirty-eight responses were received.

The questionnaire was administered according to the Dillman method (1978). The following opinion subsets were posed to elicit responses: (1) problems relating to increased boating activities; (2) responsibility for the perceived problems, and the associated degree of responsibility; (3) additional services required by boaters; (4) financial support for additional services provided by respondent agency. The complete questionnaire, covering letter, and list of respondents are provided in Appendix G.

#### IV. DESCRIPTIVE STATISTICS

Selected physical and social characteristics of live-aboard boats (LAB boats) and boaters (LABs)—value of the vessel, occupants and their employment, income and expenditure, service consumption, travel cycles and routes—are described at the levels of the data bank structure (see Figure 2), seasonally, subregionally, site, and type of vessel. General characteristics provide an overview of LAB boat conditions in the Keys. Seasonal variations are reflected in winter (November through April), summer (June through August) and year-round patterns. Specific LAB boat locations are considered geographically by subregion and are grouped into anchorage and shoreside sites. Finally, data are presented by type of vessel—sail, power and floating home— as these distinctions reflect differences in life-style characteristics.

##### 1. Vessel

Live-aboards, in general, own their vessels. The average vessel's value is \$62,241, but this figure varies widely: over 40 percent of vessels are worth less than \$30,000, and almost 25 percent are worth between \$100,000 to \$200,000. Vessels that visit the Keys seasonally are valued almost twice as much as those that are based there year-round. Similar disparities are found among vessels that are located in the Upper and Lower Keys, and between those berthed shoreside and those at anchor. Expensive boats tend to be power yachts, while floating homes are more likely to be low cost. Sailboat value spans the broadest range, though more than 60 percent are under \$50,000.

Average LAB boat dimensions are 37.0' length, 12.4' beam, 4.2' draft. Sixty-one percent are shallow-draft vessels capable of navigating both the Intracoastal Waterway along Florida Bay and Hawk Channel on the oceanside (Figure 1). Eighty-eight percent

are powered by either diesel (71.2 percent) or gasoline (28.8 percent). The average boat carries 188 gallons of fuel and 139 gallons of water. Forty-one percent are connected directly to public water using pressure step-down devices. Electricity is obtained either directly from a shore-power source using one or more 110- or 120-volt umbilical connections, or is provided by an on-board electrical power-generating plant. About 50 percent use air conditioning and electrical heating.

Waste disposal methods were examined. The average LAB boat occupants disposes 113.5 gallons of garbage per week, predominantly in plastic bags, using dumpster facilities. Disposal of sanitary waste may be by one or more methods: overboard by flushing, holding tank storage and subsequent shoreside pump-out, and/or onboard pretreatment and discharge. The mean sewage pretreatment capacity for LAB boats in the Florida Keys is about 30-percent reduction of the biochemical oxygen demand (BOD) of the sewage load, roughly equivalent to a primary sewage treatment plant. The remaining 70 percent of the BOD load of sanitary waste is degraded in the receiving adjacent waters. The total per vessel depends upon the per capita daily discharge times the total live-aboard population (see Appendix H for an explanation of estimating procedures).

The average shoreside-docked LAB boat is considerably longer and beamier, carries six times the fuel, and has roughly six times the electrical power demand for air conditioning and heating as the anchored LAB boats. Shoresiders contribute 25 percent more garbage than anchored boats. Their sewage pretreatment capacity is higher than anchored boats, and on the average, anchored vessels' pollution impact is slightly less. Seventy-five percent of anchored LAB vessels are sailboats.

The largest LAB boats are concentrated in the Upper Keys, in the winter season, and have the largest fuel (305.8 gal.) and water (199.2 gal.) storage capacities. About 60 percent have direct water connections to the public supply system and have a high installed demand capacity for electrical appliances. The Upper Keys has the highest level (128.7 gal.) of live-aboard solid waste production per boat per week. This subregion's boats have a sewage pretreatment capacity slightly less than the mean for the entire area, but the per-vessel pollution impact is very high because of higher boat population density. Winter LAB boats show similar solid and sanitary waste disposal patterns.

While the above analysis describes spatial and temporal variability within the Keys, the following analysis of vessel type (sail, power and floating-home boats) provides useful insights into their variability. LAB boats are mostly sailing vessels; approximately one-third are strictly power vessels, and few are floating homes without on-board propulsion systems (Photos 1 through 3). On the average, power vessels are larger (43.2' x 13.9' x 3.9'), sail boats have the deepest draft (4.7'), and floating homes are the smallest and shallowest draft (2.4'). Less than half of the LAB sailboats can navigate both Florida Bay and Hawk Channel waterways, while most of the powerboats can move in an unrestricted manner. Floating homes move only when towed by another vessel.

Fuel and water tankages vary among the vessel types: LAB powerboats carry five times as much fuel and twice as much water as LAB sailboats; floating home fresh water tankage is closer to the powerboat capacity. Diesel boat propulsion is twice as common as gasoline in both auxiliary sail and power vessels. There are notable differences in access to water and electricity. Sailing vessels have the fewest direct water connections



**Photo 1. Auxilliary (powered) LAB sailboat. Profile 3 cruising-sailer type. Research vessel "La Vida." Bags on foredeck hold headsails and provide additional space below deck.**



**Photo 2. LAB powerboat suitable for navigating in Florida Bay. Potted plants on deck indicate live-aboard status.**



Photo 3. Floating home LAB moored to mangroves (background). Access to shore is by dinghy. Solar water-heating panels are on roof.



Photo 4. Campbell's at Tavernier, Upper Keys. Marina shoreside facility. Floating homes (foreground) and LAB powerboats (extreme left and mid-ground facing away from viewer).

and powerboats the greatest number. Because most LAB sailboats have a built-in water conservation system, their water consumption is least; floating homes are intermediate water users, and LAB powerboats are the heaviest users. LAB powerboats have a greater demand for electricity, both from shoreside and on-board generators. Sailboat LABs have less demand, and floating homes show the least demand for electricity. LAB powerboats have a greater installed-heating capacity than floating homes, whereas floating homes have twice the installed air conditioning capacity of LAB sailboats.

Solid waste disposal also varies by boat type. LAB powerboats produce 143.2 gallons per vessel per week, compared to 103.1 for sailboats and 90.0 for floating homes. Floating homes have the least efficient sewage pretreatment capacity and the highest pollution impact of the three LAB boat types. Power vessels have the most efficient sanitary sewage disposal system and the least pollution impact. LAB sailboats have a pretreatment capacity closer to powerboats, but because of the higher number of people on-board, the per-vessel pollution impact is closer to that of floating homes.

Seventy percent of the LAB boats are found at shoreside sites, but this percentage varies with boat type; 90 percent of powerboats and about 60 percent of sailboats and floating homes are shoreside. Thirty percent of the LAB boats are at anchorages; these are mostly sailboats and floating homes. Over half of the LAB sailboats are located in the Middle Keys, while power vessels are about evenly divided between Upper and Middle Keys. Over one-half of the floating homes are in the Lower Keys.

The predominance of year-round boats is striking: 85.7 percent of floating homes are year-round, followed by sailboats (76.9 percent) and power vessels (48.2 percent). The winter-to-summer ratio for all boat types is 2:1.

## 2. Population

The sample of 340 live-aboard boaters revealed a number of demographic characteristics. Over 60 percent of LABs reside on two-person boats, about evenly divided into family and non-family units. On the average, there are 1.42 males to every female. The dominant age cohort is 20-64 years, and a negligible number of individuals are less than 20 years old. One-quarter of the boaters have a college degree, and an additional one-third have completed up to three years of college. Another 27 percent have a high school education.

Variations occur in these patterns. Two-person boats are much more commonly summer and winter season LAB boats. This is particularly true in the Middle and Upper Keys. Families occupy winter-season boats; partner-roomer-boarder-occupied (non-family) boats are concentrated in the Lower and Upper Keys. Anchorages have a high concentration of non-family-occupied boats, while families predominate at shoreside LAB locations. Children and adolescents are more often found on year-round LAB boats. The female-to-male ratio is slightly higher in year-round than in seasonal LAB boats. Education levels appear uniformly distributed, except for the greater number of shoreside LABs with four or more years of college.

In general, boats occupied by two persons are twice as common as single-occupant boats. The former are especially prevalent among sail and powerboats; floating homes are evenly divided between one- and two-person boats. Family versus non-family occupancy in sailboats is evenly divided; two-thirds of powerboats are family LABs, while one-third of floating homes are occupied by families. The female-to-male ratio of

sailboat occupants is slightly higher than the Keys average; floating homes have the lowest ratio. The education level is lowest for floating home LABs.

### 3. Employment

The boat population is divided into employed and retired LABs, including a small group of semi-retired or part-time workers. About one-third are self-employed. A significant source of their employment is the service sector, often that of tourism or construction.

There are seasonal and subregional differences among the LABs. Seasonal boaters are predominantly retirees, while year-rounders are usually employed. Employment in service industries is common to all groups, but work in construction is more prevalent among year-rounders. The majority of employed LABs are anchored in the Lower Keys; most retirees are in the Middle and Upper Keys. Semi-retired LABs are distributed across regional and seasonal strata.

Transportation to work is by car, bicycle, dinghy and on foot. Three-quarters of the LABs have cars; almost 40 percent travel to work by car; and two-thirds of LABs park their automobiles in shoreside lots. A greater proportion of shoreside LABs have cars and rely on them for transportation to work. Their travel time to work is half that of the anchor-outs. Over half of the LAB boats have bicycles and 85 percent have dinghies. One-third of those who are employed use bicycles or dinghies to get to work, while one-fifth walk. Dinghying is an especially important mode of transportation in the Middle Keys, where the travel time is half the mean of five minutes for elsewhere in the Keys.

#### 4. Income and Expenditure

Wages, interest, dividends and pensions/annuities are the sources of live-aboard income. Over sixty percent of heads of boats are wage-earners and 80 percent of these individuals are employed in the Florida Keys. Boaters may have more than one type of income. Forty percent of all LAB boats reported income from interest, dividends, or pensions and annuities (including social security). Though wage income is generated locally, interest and pension income are transferred from sources outside the Keys.

There is wide variation in the distribution of type and source of income. Seasonal LABs rely mostly on interest and pensions and draw revenue to the Keys. Almost three-quarters of the year-rounders, concentrated in the Lower Keys and to a lesser extent in the Middle Keys, are wage earners. Almost 80 percent of the anchor-outs are wage earners. Though more than one-half of the shoresiders are wage-earners, almost an equal proportion have interest and pension income.

Further variations in income source are reflected across boat categories. Practically all floating-home dwellers are wage-earners. Powerboaters are divided almost evenly among the three income types. Sailboaters span the extremes, relying mostly upon wage earnings but having additional income from investments and pensions.

LABs spend on the average \$1,344 per month, 44 percent is spent on slip fees (\$262), maintenance (\$161), and mortgage, insurance and fuel (\$161). Groceries and personal entertainment consume 50 percent (\$672) of the total monthly budget. Health insurance, clothing and laundry, car, and miscellaneous expenses account for the remainder (\$88). An examination of the total monthly boat expenditures indicates that over 40 percent of

LABs spend under \$1,000 per month, 41 percent spend between \$1,000 and \$2,000 per month, and the remainder spend over \$2,000 per month.

Patterns of expenditure vary by season, subregion, site and boat type. Monthly outlays generally are highest in summer, in the Middle Keys, and at shoreside locations. Expenditures are least for floating homes, for LABs in the Lower Keys and for those at anchor. Boat-related expenses consume about 50 percent of the powerboat, shoreside, winter-season budget; only 25 percent of the total budget is spent by floating home and anchor-out boaters on the vessel. Live-aboards in the Lower Keys frequently eat on-board and spend the least on entertainment. The winter-season group in the Middle Keys spends the most on entertainment and eating ashore.

An examination of monthly expenditures provides an answer to the question, What contributions do live-aboards make to the economy of the Florida Keys? The LABs were classified into summer, winter, and year-round groups, and for purposes of calculation, the seasonal periods were defined as: summer (May through August), winter (December through April), and year-round (12-month calendar year). Seasonal boat populations were totalled and those figures were used in the calculation. The annual expenditure of each live-aboard seasonal group was obtained from the product of mean monthly (per boat) expenditures, the number of months (season), and the number of boats (LAB boat count). The sum of the group expenditures equaled the weighted annual live-aboard expenditures total. Table 4 shows the following: summer live-aboards spent \$1,130,288; winter live-aboards spent \$2,679,600; year-round LABs spent \$12,680,640. The total live-aboard annual expenditures was \$16,490,528; the mean monthly sum was \$1,374,210. This is a conservative estimate because the only

Table 4. Total Weighted Annual Live-Aboard Expenditures

Live-aboard Seasonal Group	Mean Monthly Expenditures (\$)	Months in Season of Year (number)	LAB Count (number)	Amount Spent Season or Year (\$)
Summer	\$1,723	4	164	\$1,130,288
Winter	\$1,595	5	336	\$2,679,600
Year-round	\$1,190	12	888	\$12,680,640
TOTAL	-	-	1,388	\$16,490,528
Mean Monthly	\$1,344	-	-	\$ 1,374,210

expenditures allocated to the months of September through November come from the year-round group.

## 5. Services

Shoreside services are available at commercial and private facilities when live-aboards pay a slip fee to berth their vessels. Anchor-outs may gain access to marina services by paying a dinghy dockage fee. Shoreside facilities may include, but are not limited to, toilet and shower, laundry, telephone and mail, ice, refrigeration, snack bar and restaurant, parking, dinghy dockage, and pump-out. LABs may draw upon a wider network of community services, including medical and dental, fire and police protection, and educational.

Almost three-quarters of the boaters use marina parking; over one-half use the toilet and shower facilities, and mail service. About 40 percent use the laundry, telephone, snack bar and restaurants, when available. Pump-out service use is negligible. One-half of the LABs draw on medical services in the community. They seldomly use fire and police services. Only six percent of the boats have children attending school in the Keys. Approximately 40 percent of LABs are public library users.

Seasonal and spatial patterns are not much different, except for a few differences. There is greater demand for parking space in the winter. Lower Keys LABs use marina services half as often as those boaters in the Middle Keys. Library users among LABs in both the Lower and Middle Keys outnumber those in the Upper Keys.

A strong difference exists in dockside service use between anchor-outs, the light users, and shoresiders, who are the heavier users. Anchor outs, however, use the library more frequently. Floating homes are light users of dockside services; few are located at

commercial facilities. Most are situated in the Lower Keys at Houseboat Row where seawall access is leased from the City of Key West and public utilities are contracted from local utilities.

The type and level of services available do not always meet LABs' needs. Live-aboards were asked to list and rank, on a scale of 1 to 5, those unavailable services most desired. The most sought-after services, in descending order, are: (1) improved dockside facilities; (2) showers and restrooms; (3) pump-out facilities; (4) recreation; (5) public dinghy dockage. Of noteworthy interest is the fact that pump-out facilities are the most desired among most Keys LABs, whether grouped as seasonal, subregional, site or boat type; the sole exceptions are among the Lower Keys and anchor-out categories. Other variations from the usual pattern of desired services include improved television reception by powerboaters and the choice of anchor-outs for public dinghy dock facilities.

#### 6. Travel Cycles and Pathways

Mobility is a general tenet of the LABs' life-style. The fact that their home is either a vessel capable of traveling distances under its own power, or a floating home that can be towed from place to place, in large measure contributes to a mystique of the "water vagabond." There are seasonal cycles and travel pathways that characterize this life-style.

LABs are likely to be recent arrivals to the Keys. Over half have come since 1985, three-quarters by boat. Many are novice boaters, and almost 60 percent have less than five years (or seasons) experience living aboard.

Two distinct seasonal flows are observed: a primary season from October to May; and a secondary season from May to August. A peak arrival period (November to January) accounts for 58 percent of all vessels, and a secondary arrival flow (April to

July) includes another 27 percent. Over half of all departures occur between January and May.

LAB migration falls into certain patterns. While almost half consider the Florida Keys their home, another 10 percent have uncertain travel plans but are likely candidates to remain. Aside from this permanent resident group, there are three migratory groups. First, 20 percent of all LAB boats were found to be heading for the Bahamas and the Caribbean; about half of these are Keys-based boats. Second, a much smaller group, about 7 percent, are East Coast boat which plan to return north. Third, a still smaller number, about 2 percent, are Gulf Coast boats in transit.

The principal stop-over locations in the Florida Keys' are mapped in Figure 3. The graduated circles on the map show proportionate numbers of vessels laying over at each location. There is a progression from higher to lower numbers as LAB boats move from the Upper, through the Middle to the Lower Keys. Both Hawk Channel and the Intracoastal Waterway are heavily used in travelling to and from the Keys. Principal stopovers, in descending order of importance, are Key Largo, Marathon, Key West, Islamorada, Tavernier, Pine Channel, and Lower Matecumbe.

LAB boats tend to remain dockside or at anchor once they arrive at their destination in the Keys; one-third of the vessels stay moored until departure, and another third make only one or two trips per month. Thus, in the case of two-thirds of the boats, the vessels' mobility is important only in travelling to and from the Keys. Only one-third of the vessels are moved (three or more times per month) for sailing, cruising or weekend jaunts.

There are departures from these general patterns. Year-rounders reside in the Keys for longer periods than seasonal boaters. Conversely, seasonal boaters sail their vessels and leave their slips or moorings more frequently than year-rounders. Travel cycles vary too, with flows to and from the Gulf Coast more common among summer LAB boats; winter East Coast boats, as well as year-rounders, are in the Keys en route to the Bahamas and Caribbean islands.

More Lower Keys live-aboards have long-established roots in the area; 84 percent call the Lower Keys home. Almost half arrived overland. They sail their boats least. Over one-half plan to remain there; another 20 percent have the Caribbean as their ultimate goal. The Middle Keys have a proportionately larger number of Gulf and East Coast boats, many destined for the Bahamas and Caribbean. The Upper Keys draws principally boaters from the East Coast.

The travel cycles and paths of anchored and shoreside LABs differ in several ways. Anchor-outs rely on overland access to the Keys and sail their vessels less frequently than shoresiders. The main distinction among boater types is that floating-home dwellers live in the Keys for a longer period of time and have more years of boating experience. They arrived in the Keys by overland means, however.

#### 7. Profiles of Live-aboard Boaters

A primary objective of the study is to determine "Who are the boat live-aboards, and what are their resources and service needs?" During the interview process, the interviewee was placed in one of six profile classes. Five profile types, characterizing live-aboard movements, locations, accommodations and socioeconomic conditions, were constructed ex ante, based on impressions obtained from an examination of the literature

on boating populations, from previous field experience, and discussions with persons connected with marina operations in the Florida Keys. Another profile emerged during the interviews.

**Profile 1:** LABs who either reside permanently or winter in the Keys. These people are often retirees over the age of 50, predominantly male; if couples, they have few children. Their upper-middle income derives from pensions, annuities, and investments. They live on well-equipped floating homes and motorized vessels, and are confined to marina dockage, where they are dependent upon shore facilities.

**Profile 2:** Summer-season travellers who stay for extended vacations. They are middle-incomed, have dependent children with them, and live on sailing craft or motorized vessels. They probably require minimal shoreside facilities because they often moor in the Keys' locations that afford protected anchorage.

**Profile 3:** Predominantly winter season cruisers. These LAB boaters are often over 40 years of age, are single males, couples, or families, and are on leave from professional jobs and businesses. They use dockside facilities and anchorages.

**Profile 4:** Year-round live-aboards. Middle-aged males predominate. They probably are less affluent than the preceding groups and are financially dependent on local employment.

**Profile 5:** Social mavericks. People of all ages and personal affiliations with no reliable income who live on poorly maintained, sometimes derelict boats. They are often accused of being responsible for dumping garbage and sewage indiscriminately and of living on abandoned vessels. This group is most frequently found at anchorages primarily in the Middle and Lower Keys.

**Profile 6:** Middle-incomed, permanent or winter-based retirees. This profile was added during the initial stage of field work when it became apparent that a less affluent variant of Profile 1 was present.

Twelve variables--including socioeconomic, boating, seasonal, and locational characteristics--were subsequently analyzed to determine whether the model profiles were valid. Results of this analysis are presented in Table 5 and are described below.

Profiles 1 and 2 stand apart as affluent LABs, spending an average of \$1,733 to \$2,045 per month. Profile 1 is evenly divided between year-round and winter groups; Profile 2 includes those who come for the summer season only and are one-half the size of the winter group. Both populations are older (54 to 60 years) than the mean age of Keys live-aboards. Profile 1 describes retirees with a substantial proportion of income from interest and pensions; less than one-third are wage earning. Both profile groups are overwhelmingly shoreside and based in the Middle and Upper Keys. Other differences exist between the groups: Profile 1 LABs have the larger vessels, evenly divided between sail and power. Neither group has floating homes.

Profile 6 is demographically similar to the above groups in mean age, absence of children, female-to-male ratio, and family social structure. Economic differences, mainly of degree, exist. Income shows a similar dependence on interest and pension, but expenditure is half that of the former groups. Profile 6 LABs are concentrated in the Middle and Upper Keys. A high percentage are anchor-outs. There is a 2-to-1 preference of sail over power vessels. A few floating homes are present.

Profile 3 describes the cruising sailors, noticeably younger than any of the preceding groups. Partner-roamer-boarder (non-family) social structure prevails. Many are single

Table 5. Six Live-Aboard Profiles

LIVE-ABOARD PROFILES <sup>1</sup>							TOTAL (Sum/Mean)
	1	2	3	4	5	6	
<b>Season:</b>							
Summer	3 ( 5.3)	13 (100.0)	2 (16.7)	3 ( 3.7)	1 (16.7)	0 ( 0.00)	22 (11.8)
Winter	27 (47.4)	0 ( 0.0)	5 (41.7)	8 ( 9.9)	0 ( 0.0)	5 (29.4)	45 (24.2)
Year-Round	27 (47.4)	0 ( 0.0)	5 (41.7)	70 (86.4)	5 (83.3)	12 (70.6)	119 (64.0)
<b>Subregion:</b>							
Lower	4 ( 7.0)	1 ( 7.7)	5 (41.7)	33 (40.7)	5 (83.3)	2 (11.8)	50
Middle	37 (64.9)	7 ( 53.8)	6 (50.0)	29 (35.8)	1 (16.7)	11 (64.7)	91
Upper	16 (28.1)	5 ( 38.5)	1 ( 8.3)	19 (23.5)	0 ( 0.0)	4 (23.5)	45
<b>Population:</b>							
Age (Person 1 Mean)	60	54	43	42	39	63	50 (mean)
Children & Adolescents (<20 years old)	1 ( 5.0)	0	0	19 (95.0)	0	0	20
Female-Male Ratio	1:1.19	1:1.00	1:1.43	1:1.65	1:7.00	1:1.31	1:1.42
Family Organization	45 (78.9)	9 (69.2)	5 (41.7)	30 (37.0)	0 (0.0)	10 (58.8)	99 (53.2)
<b>Income:</b>							
Wages	17 (29.8)	5 (38.5)	6 (50.0)	79 (97.5)	4 (66.7)	3 (17.6)	114 (61.3)
Interest	34 (59.6)	9 (69.2)	7 (58.3)	18 (22.2)	0 ( 0.0)	9 (52.9)	77 (41.4)
Pension	38 (66.7)	4 (30.8)	2 (16.7)	13 (16.0)	3 (50.0)	13 (76.5)	73 (39.2)
<b>Expenditure:</b>							
Monthly (\$)	\$1733	\$2045	\$1650	\$1062	\$636	\$936	\$1344
<b>Boat Type:</b>							
Sail	27 (47.4)	9 (69.2)	11 (91.7)	50 (61.7)	2 (33.3)	10 (58.8)	109 (58.6)
Power	30 (52.6)	4 (30.8)	1 ( 8.3)	15 (18.5)	1 (16.7)	5 (29.4)	56 (30.1)
Floating Home	0 ( 0.0)	0 ( 0.0)	0 ( 0.0)	16 (19.8)	3 (50.0)	2 (11.8)	21 (11.3)
<b>Vessel Length:</b>							
(ft)	43.2'	35.5'	36.0'	36.2'	23.7'	36.4'	37.0' (mean)
<b>Site:</b>							
Anchorage	2 ( 3.5)	2 (15.4)	6 (50.0)	34 (42.0)	6 (100.0)	5 (29.4)	55 (29.6)
Shoreside	55 (96.5)	11 (84.6)	6 (50.0)	47 (58.0)	0 ( 0.0)	12 (70.6)	131 (70.4)
<b>Total<sup>2</sup></b>	<b>57 (30.6)</b>	<b>13 ( 7.0)</b>	<b>12 (6.5)</b>	<b>81 (43.8)</b>	<b>6 ( 3.2)</b>	<b>17 ( 9.2)</b>	<b>186 (100.0)</b>

<sup>1</sup>Percentages reflect either indicated column totals or adjusted totals which reflect lower frequency counts for missing data<sup>2</sup>Percentage of row total

## Live-aboard profiles

1-Affluent Retirees  
2-Summer Travellers  
3-Cruising Sailors4-Local Wage Earners  
5-Mavericks  
6-Middle Income Retirees

adults, both male and female. Income, measured by mean monthly expenditure, remains high relative to the preceding groups. As sailors, they have an equal preference for anchorage and shoreside locations. Profile 3 is predominantly winter and year-round, though few summer-type boaters are found. The Middle Keys is the prime base, but some boats are located in the Lower Keys.

Profile 4 stands apart as year-round, almost entirely local, wage-earning live-aboards. The population is young. Although the overall number of persons under 20 years of age is small, practically all LAB children and adolescents are in this group. Only one-third of the households, however, are family units. Mean monthly expenditures are about one-half those of Profiles 1 and 2. Though the largest number of floating homes is concentrated here, over 60 percent of Profile 4 vessels are sailboats. In addition, over 40 percent of the LAB boats in this profile are situated at anchor. Profile 4 is mostly located in the Lower Keys.

Only six LAB boats (3.2 percent of the total) are type-cast as mavericks, Profile 5. These are the youngest of the live-aboard population, almost exclusively male and predominantly year-round. Their income is divided between part-time employment and entitlements; mean monthly expenditure is \$636. It is not surprising that Profile 5 contains exclusively anchor-outs. Mavericks are found in the Lower Keys.

## V. COMPARISON OF LIVE-ABOARD AND LAND RESIDENT HOUSEHOLD ATTRIBUTES

This section compares the live-aboard and land resident households. Does the boat population differ from the land population in household size, age, source of income, monthly rent, travel time to work, and air conditioning use? These attributes were selected to provide a social-demographic profile of the two groups (Hartley, 1982). Several of them also may be used to anticipate community service demands of the growing live-aboard population.

### 1. Analysis Procedure

Data were obtained from the live-aboard survey and 1980 U.S. Census provided by the county planning department. To compare the two types of households, it is necessary to consider the proportionate distribution of each attribute in the live-aboard sample to the land population, and to determine if the observed differences are not the result of chance but are due to real differences (Henry, 1976). Such a decision can be made with some degree of confidence, which is identified by statistical significance. The chi square test of homogeneity was used, with a confidence level of 95 percent; that is, the results of the test may be wrong 5 times out of 100 times because the observed counts may have been due to chance. The tests were made for two geographic levels: (1) the entire Keys; and (2) the Marathon-Boot Key planning area. Each test attribute in the live-aboard sample was compared separately to the land population.

The social-demographic attributes compared were: (1) the number of households with one person, two persons, or more than two persons (household size); (2) the number of persons younger than 20, between ages 20 to 44, between 45 to 64, and over

65 years (age class); (3) travel time to work of working households (less than 15 minutes, between 15 to 30 minutes, more than 30 minutes); (4) monthly rent (excluding anchor-out LAB boats and owner-occupied land homes) classified as the number of households paying less than \$200, between \$200 to 299, between \$300 to 399, between \$400 to 499, and equal to or more than \$500; (5) sources of income (numbers of households receiving income from wages and salary, interest and dividends, social security, pension or retirement funds); (6) use of air conditioning in the home (numbers of households with air conditioning and without air conditioning); (7) female and male population counts.

## 2. Test Results

The results of the tests are given in Table 6. They show that for the Keys as a whole and for the Marathon-Boot Key planning area in particular, five of the seven attributes differ significantly between the population groups. In only one attribute, travel time to work, do water and land residents behave as members of the same population. The female and male populations of live-aboard and land resident groups differ significantly for the Keys as a whole. In the Marathon-Boot Key Harbor area, however, the observed distribution of females and males has a high probability of being due to chance.

Table 6. Chi Square Test Results of Social-Demographic Differences  
Between Live-Aboard and Land Populations

Socio-Demographic Attribute	Do Water and Land Populations Differ?		Significance Level	
	Florida Keys	Marathon	Florida Keys	Marathon
Size of Household	yes	yes	<.001	<.001
Age-Class Distribution	yes	yes	<.001	<.001
Travel Time	no	no	>.100	>.100
Sources of Income	yes	yes	.010	.001
Use of Air Conditioning	yes	yes	<.001	<.010
Monthly Rent	yes	yes	<.001	<.001
Female-Male Population	yes	no	.010	>.100

## VI. DEVELOPMENT AND USE OF WATER AND LAND FACILITIES ALONG THE SHORELINE

The demand for services and their availability for both water and land residents merge at the shoreline. Growth of these coastal populations with their amenity-recreational life-styles creates competing settlement patterns. This chapter examines the development, use and location of both land- and water-based facilities, and the attendant residential, recreational boating, and infrastructural services.

### 1. Live-aboard Vessel Locations

Figure 1 is a small-scale (1:500,000) map showing generalized areas where LAB boats are concentrated. Intermediate (1:250,000) and large-scale (1:24,000) maps show subregional clusters: Figure 4 locates the 51 shoreside and anchorage LAB locations evaluated in this report. Figures 5, 6, and 7 provide subregional coverage: Figure 5 includes the Upper Keys from north Key Largo to Lower Matecumbe; Figure 6 includes the Middle Keys from Channel Five to Marathon; and Figure 7 includes the Lower Keys from Moser Channel to Key West. Appendix A presents a tally of surveyed vessels in each of the large-scale mapped areas (Figures 5 through 7, insets A through O).

### 2. Shoreside Live-aboard Sites

a. **Classes of Facilities** - A variety of shoreside docking facilities and boater services are found in the Florida Keys (Table 7). Marinas, boatyards and restaurant piers account for more than 80 percent of shoreside LAB boat infrastructure; they are similar in services offered, but different in service quality (Photo 4). Dockage is the principal service, but marinas and boatyards may also offer repairs, supplies, shower, laundry,

Table 7. Shoreside Live-aboard Facilities<sup>1</sup>

Type of Facility	Number of Facilities	Percentage of Total
Boat Yard	3	9.4
Marina	23	71.9
Private Club	4	12.5
Restaurant Pier	1	3.1
Seawall	1	3.1

<sup>1</sup>Based on the 32 facilities responding to the personal questionnaire survey.

and/or boater specialty stores. Services are offered to the general public on a daily, weekly, seasonal or annual basis. Price and availability appear to determine use.

Four shore-side facilities are private clubs. They range from moderately equipped (basic dockage, restrooms, showers) to lavishly appointed (basic services plus clubhouse, restaurant) facilities. One club is a private, waterfront development with shoreside housing, golf courses, clubhouse, shopping area, and a full-service marina which from time to time accepts LAB boats. Club dockage is limited to owner members or their guests. Ownership may be as a stockholder in a corporation, with the individual boater retaining rights to the use of one slip (similar to a cooperative), or as an association of boat slip owners with individuals owning slips on a common property (resembling a condominium). The cost of ownership includes the purchase price of the slip, which ranges from \$38,000 to \$200,000 (but generally is \$1,000/foot of dock space), and maintenance fees (\$40 to 100 per month); it may include annual membership dues and miscellaneous assessments.

The seawall facility Houseboat Row is located on the eastern shore of Key West adjoining Cow Key Channel (Figure 7, inset O). The City of Key West, through its Port and Transit Authority, leases space to live-aboard boaters, principally floating-home dwellers. The city maintains 26 sites, of which 23 were leased at the time of the survey (three were empty). The lease agreement provides live-aboards with access to the seawall, and this right can be transferred to a prospective buyer when the lessor's boat is sold. The monthly lease fee is \$46 regardless of size of vessel. All dock structures, which provide access from the land to the vessel, are built and maintained at leasor expense. Water, electric, garbage and telephone services are individually contracted with

the utility companies (Photo 5). There is a proposal to expand slips at the Key West Municipal Marina and relocate Houseboat Row live-aboards. This plan, however, has not materialized.

Another shoreside tie-up is situated at the extreme northeast end of the Florida Keys on the western approach to the Card Sound Bridge (Figure 5, inset B). A number of live-aboards have constructed docks and platforms onshore along a drainage canal. This provides access to their vessels; the LABs appear to be squatting on the public road right-of-way. Water must be trucked to the site. Power is available individually from the utility company.

b. Berths and Dockage Fees - There are 1,476 berths available for live-aboard, recreational, commercial, and wet storage purposes, in the 32 facilities which responded to the personal questionnaire survey. These berths are frequented by permanent and transient boaters, who may be year-round or seasonal (winter, summer) live-aboards, as well as recreational and commercial boaters. Some slips are used for wet storage. The proportion of vacant slips varies over the year; peak vacancy is during August and September, which is the annual hurricane season. Vacancies at marina shoreside facilities are rare during the peak December through February winter boating months.

The pattern of year-round and seasonal live-aboard boat occupancy resembles a bimodal migration cycle, as shown by the graph in Figure 8. The winter season peaks during January. The number of year-round vessels should be constant, as shown by the mean value line. But the survey indicates that, in fact, the year-round shoreside vessel distribution has a weak seasonal oscillating pattern which mimics the seasonal pattern although in a much suppressed form. This phenomenon should be explored further



Photo 5. Houseboat Row at Key West, Lower Keys. Seawall tie-up. Utility pole with meters in foreground. View east towards Cow Key Channel Anchorage.

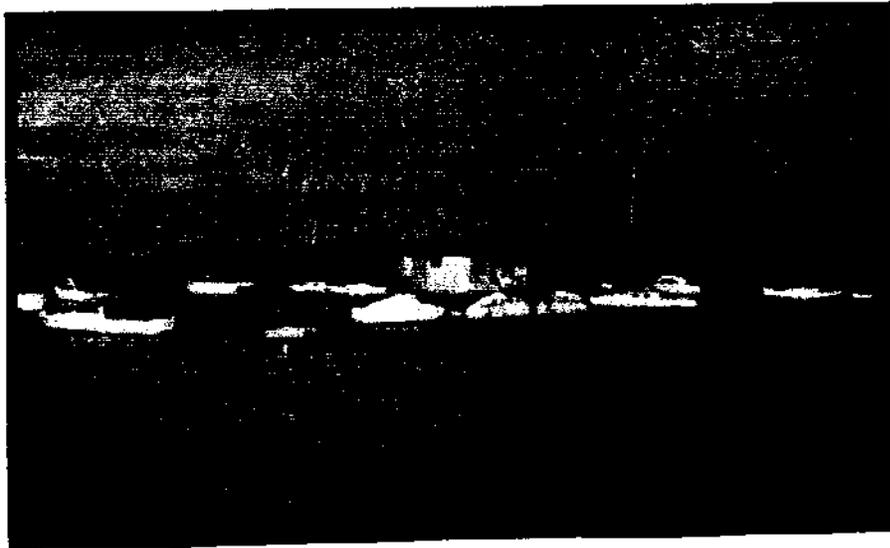


Photo 6. Cow Key Channel Anchorage, Lower Keys. View east showing (midground) floating home built on two derelict hulls. Variety of LAB sail and powerboats.

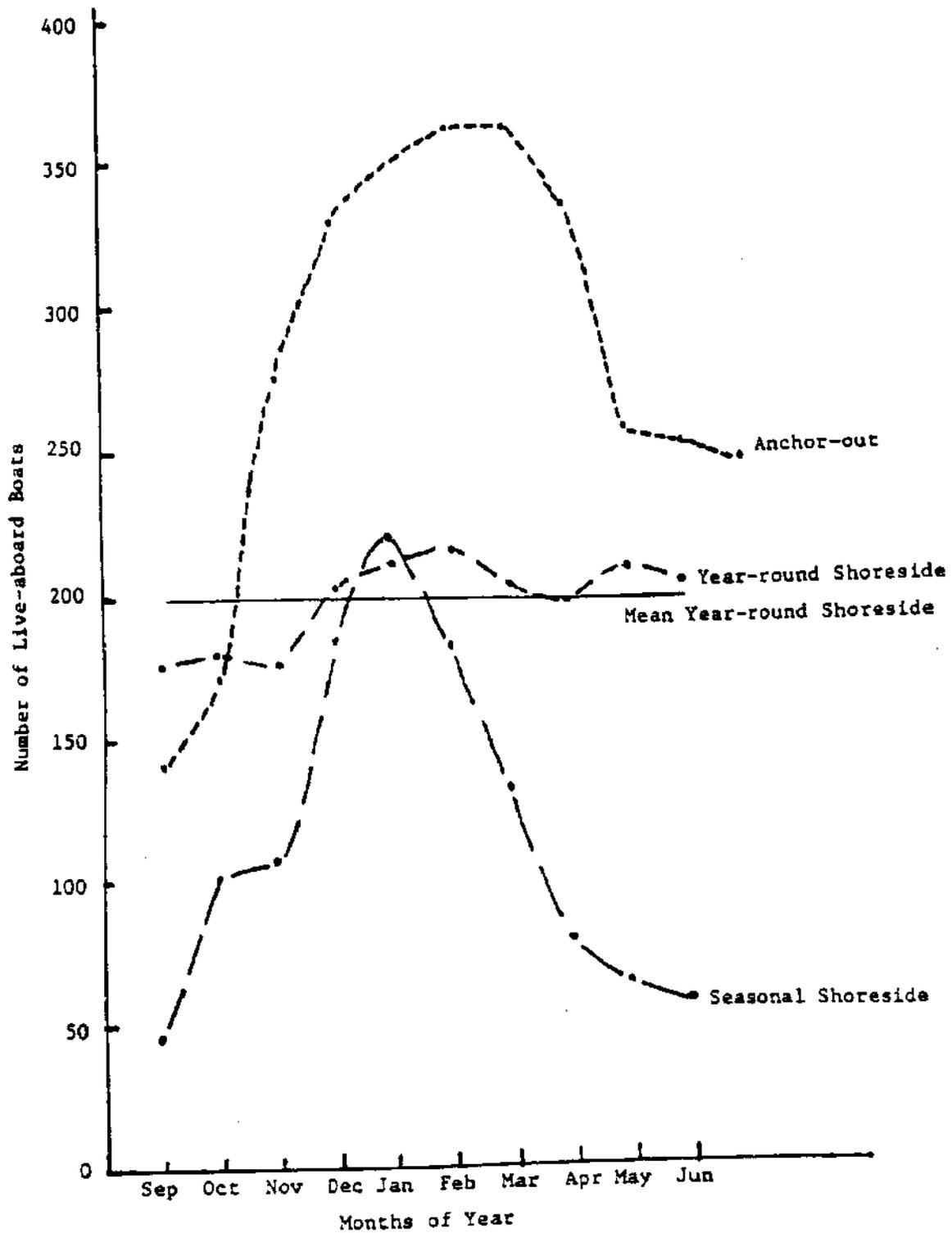


Figure 8. Number of Live-aboard Boats by Month of Year

because it suggests that the behavior of individual sites can be characterized in terms of live-aboard migration behavior.

Marina income from dockage fees is indicated in Table 8. Rates have been standardized to units of dollars per foot per month based upon the mean length of live-aboard vessels (37.0') as a surrogate boat length for all types of vessels. Rates (Table 8, item 1) vary among boat types; however, there is no difference between transient winter and summer rates for recreational and commercial boaters. Income data are presented for May 1989, representative of low summer season conditions (Case 1), and an average month typifying peak winter conditions (Case 2).

Case 1 shows a 70 percent (1,031) slip occupancy; one-third are live-aboards and the ratio of year-round to seasonal LAB boats is 10:1. About 50 percent are recreational and commercial, 8 percent transient, and 6 percent wet storage. Estimated total monthly income is \$366,810; the live-aboard portion is estimated at \$116,527; the permanent recreational boater portion is \$116,550. Their combined total accounts for 63.6 percent of the total dockage income.

Case 2 assumes 100 percent slip occupancy during the winter season. Twenty-eight percent are live-aboards, almost equally divided between year-round and seasonal. The proportion of permanent recreational and commercial boaters drops from 50 to 37 percent; wet storage is proportionately lower. Transients represent almost one-third of the occupied slips, a four-fold increase from the summer season. Estimated total monthly income is \$802,562; live-aboards contribute \$168,263, more than permanent recreational and commercial boaters combined. Cases 1 and 2 indicate that the live-aboards' berth fee contribution to marina income is considerable: \$116,527, the



estimated monthly income for May 1989, and \$168,263, the estimated average for a month during the 1989 winter season.

Another way to evaluate the live-aboard's contribution to the marina enterprise is by looking at the income differential reflected in the additional price paid by the live-aboard, above the recreational boater's fees, for berthing his vessel and using marina shoreside facilities. This per-boat-per-month cost to the live-aboard, for "live-aboard privileges," is \$55.13 for year-round occupancy, \$224.59 during the winter season, and \$200.91 during the summer season (Table 9). The additional monthly income to the marina enterprise generated by this price differential is \$23,315 for a slow season month (May 1989) and \$55,597 for a busy season month. The graph in Figure 8 indicates that the high demand, busy season is November through March and the low demand, slow season is April through October. The May figure (\$23,315) and the average winter month figure (\$55,597) were used to extrapolate seasonal monthly totals in order to determine an approximate annual figure, \$441,190, representing the total additional income derived from the price differential between dockage charged the permanent recreational boater and dockage charged the live-aboard. The average monthly figure is \$36,766 (\$441,190 divided by 12).

c. Utilities - Water and electric services are provided to boating customers at the dock-head. In some cases, the cost for these utilities is included in the dockage fee. This is usually the case for transient recreational and commercial boaters. Live-aboards, in most instances, pay either a surcharge to the marina or contract directly with the utility companies. Over half of all shoreside live-aboards pay one of these additional charges to cover their monthly utility bills (Table 10). Water and electric surcharges are

Table 9. Price and Income Differentials Between Live-Aboard and Recreational Boat Marina Dockage Fees

Shoreside Live-aboard Type	Price Differential Cost Per Boat (\$/ft/mo)	MAY 1989		AVERAGE WINTER MONTH	
		Number of Boats	Additional Monthly Income	Number of Boats	Additional Monthly Income
Year-round	1.49	299	\$16,484	210	\$11,577
Winter	6.07	-	-	196	\$44,020
Summer	5.43	34	\$ 6,031	-	-
<b>TOTAL</b>			<b>\$23,315</b>		<b>\$55,597</b>

\*Projections use mean length of live-aboard vessel (37.0') as surrogate boat length for all types of vessels.

Table 10. Separate Utility Payments Made by Shoreside Live-aboards

	Number of Shoreside Live- Boats		Aboard		Total Monthly Payments (\$)		% of Shoreside Live-Aboards Paying Separate Utility Charges <sup>1</sup>	
	May 1989	Average Winter Season Month	May 1989	Average Winter Season Month	May 1989	Average Winter Season Month	May 1989	Average Winter Season Month
<u>Separate Utility Payments</u>								
<u>Surcharge Collected by Marine</u>								
Water	171	196	2,505	3,082	51.4	57.6		
Electric	177	162	10,439	10,019	53.2	47.6		
<u>Utility Company Payments</u>								
Water	29	31	258	266	8.7	9.1		
Electric	101	147	5,207	8,155	30.3	43.2		

<sup>1</sup> Calculated for 32 facilities responding to the personal questionnaire survey.

the most common form (between 48 and 58 percent); this additional revenue goes to the marina. Direct payments to the electric company are less common (43 percent), and payments to the water authority are least common (9 percent). Table 11 is a comparison of average monthly boat utility payments made to the marina, in the form of a surcharge, and to the public utility, under an individual household-type contract, for the representative slow season month (May 1989) and an average month during the 1989 winter season. The surcharge is always higher than the individual utility contract bill: the cost to obtain water from the marina, as opposed the water authority, is 60 to 80 percent higher; the price for electricity from the marina is higher too, but in a more modest 12 to 14 percent range.

d. Availability and Cost of Pump-out Facilities - There are eight sewage pump-out facilities in the Florida Keys: two in the Lower Keys at Key West (the Galleon Resort) and Stock Island (Key West Resort-Oceanside Marina); five in the Middle Keys at Marathon (Faro Blanco, Boot Key Marina, Sombrero Resort), Key Colony (Marie's Yacht Harbor), and Duck Key (Hawk's Cay Marina); and one in the Upper Keys at Key Largo (Ocean Reef Club). Two of these are private clubs and do not service the general public; another is an exclusive destination resort distant from concentrations of live-aboard boaters. There are two pump-out stations in Boot Key Harbor, at Boot Key Marina and Sombrero Resort, adjoining a major nucleus of shoreside and anchor-out LABs. The Galleon Resort maintains a pump-out station accessible to LABs in the West Bight location and at Christmas Tree Island anchorage, and Key West Resort-Oceanside Marina offers pump-out service on Stock Island. Equipment may be stationary or mobile, and service varies from free-of-charge pump-out for marina

Table 11. Comparison of Average Monthly Boat Utility Payments Made to the Marine and Utility Companies

	May 1989	Average 1989 Winter Season Month
Marine Water Surcharge	14.65	15.72
Utility Company Water Bill	8.90	8.58
Cost Differential	5.75 (64.6)	7.14 (83.2)
Marine Electric Surcharge	58.98	61.85
Utility Company Electric Bill	51.55	55.48
Cost Differential	7.43 (14.4)	6.37 (11.5)

Calculated as price over amount of average live-aboard utility bill.

customers to charges for both marina and non-marina boaters. The general fee is \$15 per tank. Only 16 (8.6 percent) of the LAB boats in the field survey used these services.

e. Dinghy dockage - Twenty-three live-aboard boats (41.8 percent of all anchor-outs) use commercial, shoreside, dinghy tie-up facilities; the remaining 32 anchor-outs (58.2 percent) tie-up along the shoreline. Two commercial marinas offer dinghy dockage. Lands End Marina (Figure 4, 27), situated at West Bight in downtown Key West, services LAB boats at the Christmas Tree Island anchorage (Figure 4, 91). There is a \$1 per day charge (\$25 per month), which includes dinghy tie-up, garbage disposal, potable water, and bike storage. Four LAB boats in the sample population used this service. Twenty spaces are available; 15 dinghies were tied-up at the time of the winter survey in December 1988.

Voit's Sombrero Marina Dockside Lounge (Figures 4, 10), Marathon, provides the only available commercial tie-up for dinghies at Boot Key Harbor (Figure 6, inset M). There is a \$10 weekly charge, which includes dinghy tie-up, garbage disposal, toilet facilities, bike storage, car lot parking, a mail drop and message center. Optional services, of showers at \$1.50 each and potable water at \$0.05 per gallon, are available at cost. Eighteen LAB boats of the sample population used this service. Voit's has three floating docks with space for 40 dinghies. This was filled at the time of the winter survey.

f. Other Services - Dockage usually includes, at no additional charge, the use of shoreside parking, restrooms and showers. One facility had no restrooms, and four had no showers; the average facility has four restrooms and three showers. Other services usually available for an additional charge include clothes washers and dryers and ice.

g. Evaluations of Boater Service Payments - Marina managers were asked their opinions about boaters' contributions to the marina enterprise as favorable, indifferent or adverse, and to rank them. Categories included recreational boaters, shoreside live-aboards, and anchor-out live-aboards. Numerical ratings were assigned to the classes as follows: favorable, 1.0; indifferent, 0.5; adverse, 0.0. The sum of the weighted product elements gives a contribution score that is a measure of the marina manager's satisfaction or dissatisfaction with each of the boater groups' contribution to business. The scores represent an average for the Keys and are based on the shoreside marina managers who responded to the personal questionnaire survey. Table 12 shows the results of this analysis. Both recreational boaters and shoreside live-aboards scored 1.0, indicating favorable financial contributions. Managers appear indifferent, a 0.5 score, towards anchor-outs.

A parallel set of questions was directed to government organizations and civic groups which provide services to live-aboard boaters. They were asked to evaluate whether LABs contribute their "fair share" of the cost to provide services, responding with either "yes or no" to each service provided. The boater categories were the same as those used in the marina manager survey. Answers were converted into numerical counts: pays fair share, 1.0; does not pay fair share, 0.0. The fair share payment score (Table 13) is a sum weighted product. No boater group, in the opinion of the service providers, pays its fair share. Both shoreside and anchor-out live-aboard groups are viewed in less than favorable terms. The recreational boater rating is closer to a favorable score.

The same organizations were asked to rate as high, medium, or low, the demand for service in order to determine variations in service use by the three boating groups (Table

Table 12. Boaters' Contribution to the Marina Enterprise

Type of Boater	BOATER CONTRIBUTION						Total Counts	Weighted Sum	Contribution Score
	Favorable		Indifferent		Adverse				
	Count	Weighted Count F=1.0	Count	Weighted Count I=0.5	Count	Weighted Count A=0.0			
Recreational Boats	30	30.0	0	0.0	0	0.0	30	30.0	1.0
Live-Aboard Shoreside	28	28.0	1	0.5	1	0.0	30	28.5	1.0
Live-Aboard Anchor-out	3	3.0	23	11.5	4	0.0	30	14.5	0.5
							n	(ΣF+I+A)	(Σ/n)

Table 13. Evaluation of Boaters' Fair Share Payment for Services Rendered<sup>1</sup>

Boating Group	Pays Fair Share		Does Not Pay Fair Share		Total Counts n	Weighted Sum (Σ(A+B))	Fair Share Payment Score (Σ/n)
	Count	Weighted Count (A=1.0)	Count	Weighted Count (B=0.0)			
Recreational Boater	15	15.0	6	0.0	21	15.0	0.7
Shoreside Live-Aboard	9	9.0	12	0.0	21	9.0	0.4
Anchor-out Live-Aboard	4	4.0	17	0.0	21	4.0	0.2

<sup>1</sup>Assessment by 21 government agencies and civic groups responding to mail questionnaire survey.

14). Numerical ratings assigned to the classes were as follows: high, 1.0; medium, 0.66; low, 0.33; none, 0.0. Weighted demand scores, in declining order, show highest service demand by recreational boaters, followed by shoreside live-aboards, then anchor-out live-aboards. A comparison of Tables 13 and 14 indicates recreational boaters create the highest demand and come closest to paying, in the opinion of the service providers, a "fair share" for services rendered. Conversely, anchor-outs create the least demand and pay the least; shoreside live-aboards create a demand midway between the other two groups but resemble the anchor-outs more than the recreational boaters in not meeting their fair share of the cost of services.

### 3. Anchorage Sites

There are 274 live-aboard type vessels anchored in the Florida Keys in an average month (maximum of 368 for February, minimum of 141 for October, see Table 15). The distribution is uneven; clearly, over half the anchor-outs are located in Boot Key Harbor in the Middle Keys. Lower Keys anchorages at Cow Key Channel and Christmas Tree Island account for another 27 percent (Photos 6 and 7). The remaining 17 percent are scattered among 12 other anchorages mostly in the Upper and Lower Keys. The casual observer's impression of greater numbers of live-aboard boats at Boot Key, Cow Key, Boca Chica and Community Harbor results from concentrations of derelict, mostly abandoned fishing vessels at these locations (Antonini, Ryder, and Garretson, 1989).

### 4. Adjacent Land Resident and Live-aboard Locations

There are six locations where shore residents and concentrations of water residents are in physical proximity to each other and have a perceived effect on the other's space and environment. These are Pine Channel (Lower Keys), Boot Key, Key Colony, Coco

Table 14. Assessment of Boaters' Demand for Services<sup>1</sup>

Boating Groups	Level of Service Demand				Total $\Sigma=(H+M+L+N)$	Demand Score $\Sigma/n$
	High (H=1.0)	Medium (M=0.66)	Low (L=.33)	None (N=0.0)		
Recreational Boaters	11.0	1.8	0.66	0.0	13.46	0.7
Shoreside Live-Aboards	6.0	1.98	0.99	0.0	10.97	0.6
Anchor-Out Live-Aboards	7.0	1.32	0.99	0.0	9.31	0.5

<sup>1</sup> Assessment by 18 government organizations and civic groups responding to mail questionnaire survey.

Table 15. Monthly Boat Count at Live-Aboard Anchorages and Seawall Tie-Up Locations

Anchorage & Seawall Tie-Up Locations	Location Number (Figure 2)	Field Survey Monthly Boat Count												Annual Average Monthly Total	Percent of Annual Average Monthly Anchorage Total <sup>2</sup>			
		Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July						
<b>Lower Keys</b>																		
Christmas Tree Island	91	21	24	31	29	..	15	31	33	29	38	30	28	11.2				
Garrison Bight	93	..	..	..	..	..	37	40	39	26	20	..	..	..				
Houseboat Row	99	18	20	20	20	..	20	18	20	21	21	20	20	18.0				
Cow Key Channel	90	31	33	42	38	..	33	45	46	44	42	50	40	..				
Boca Chica Channel	92	..	..	..	..	..	..	25	20	22	15	10	..	4.8				
Pine Channel	98	9	9	8	12	..	10	18	16	12	15	14	12	..				
<b>Lower Keys Subtotal<sup>1</sup></b>	--	79	86	101	99	..	78	112	115	106	116	115	100	32.0				
<b>Middle Keys</b>																		
Boat Key Harbor	87	40	65	150	200	..	250	225	180	110	100	82	140	56.0				
Key Colony Beach	86	4	7	6	7	..	6	6	3	6	7	9	6	2.4				
<b>Middle Keys Subtotal<sup>1</sup></b>	--	44	72	156	207	..	261	229	183	116	107	91	146	58.4				
<b>Upper Keys</b>																		
Watercumbie Harbor	85	0	0	1	1	..	0	0	2	1	1	1	1	0.4				
Islamorada	84	6	4	5	8	..	10	9	4	15	16	18	10	6.0				
n.n. 84.5 Bayside	95	..	..	..	..	..	..	6	14	9	12	14	..	..				
Community Harbor	83	..	..	..	..	..	..	7	5	13	14	14	9	3.6				
Largo Sound	94	6	5	6	7	..	7	5	10	9	9	9	..	..				
Erada Key	82	2	1	4	5	..	8	5	6	2	0	5	4	1.4				
Card Sound Bridge	81	4	4	4	4	..	4	4	4	4	4	4	4	..				
<b>Upper Keys Subtotal<sup>1</sup></b>	--	16	14	20	25	..	29	23	29	36	32	42	28	9.4				
<b>Florida Keys Total<sup>1</sup></b>	...	141	172	277	331	..	368	364	327	258	255	248	274	100.0				

<sup>1</sup>Subregional and Florida Keys Totals for location with 10 month field records.

<sup>2</sup>Percent of anchorage excludes seawall tie-up locations, Houseboat Row and Card Sound Bridge.



Photo 7. Cow Key dinghy dock along sea-wall at Houseboat Row. LAB ground transport includes bikes and vehicles parked curbside. Anchor-out boat household garbage (left background) awaits collection.

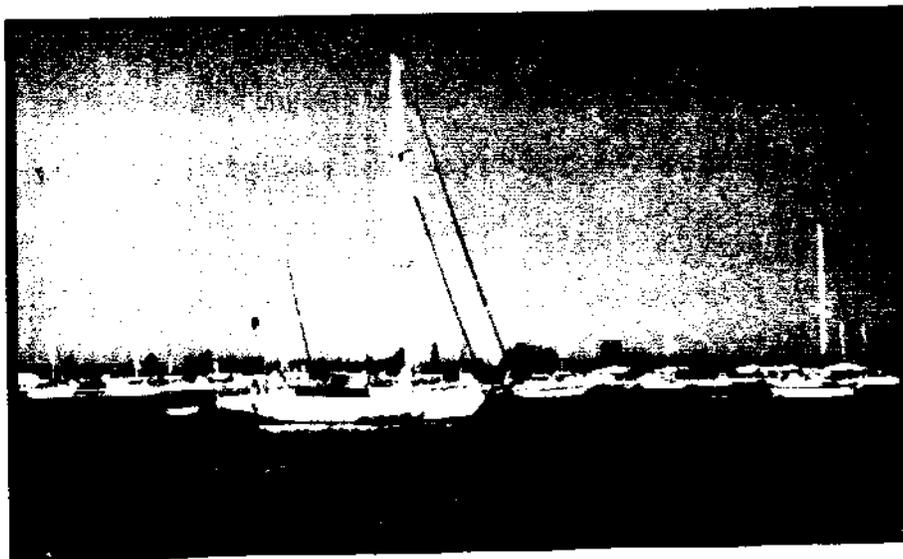


Photo 8. Boot Key Harbor Anchorage, Middle Keys. View north from Spanish Galleon Condominiums. LAB boats are sail. Vessel (foreground) has wind-powered generator. Dinghies ferry LABs from vessels to shore.

Plum (Middle Keys), and Key Largo Beach and Port Largo Canal (Upper Keys). Three-quarters of the shoreline residents at these locations are year-round, and over 90 percent of the land structures are residential units. Single-family homes predominate. Water frontage consists of a seawall or dock. The locations of the 101 shore residents who were personally interviewed are plotted on Figures 5, 6, 7 (insets G, F, N, M, L). Results of the shore resident opinion survey are reported in subsequent chapters.

## VII. COMMUNITY PROBLEM PERCEPTIONS AND SOLUTION OPINIONS

### 1. Land Groups' Problem Evaluations

Though live-aboards are central to this study, several other community groups are relevant: marina managers; shoreline land residents; business, professional and civic organizations; and government and public utility agencies. Interactions among these groups may define the live-aboard situation as a political issue. The attitudes and opinions of each of these groups were surveyed directly or by mail for selected aspects. The object was to ascertain the separate and collective views of the land groups, and of the live-aboard boaters themselves, toward the following questions: (1) what are the specific problem issues?; (2) can these issues be ranked in order of importance and be composited for all resident groups - land, water, and land and water?; (3) who is perceived by the respondent groups as responsible for specific issues identified in (1) and (2)?; (4) can the responsible groups, as viewed by the respondent groups, be ranked in order of responsibility and associated with the ranked issues? Remedial and solution pathways will be indicated by answers to these questions. The approach focuses on two sides of the live-aboard matter - the perceived problem issues and the perceived responsibility.

a. Problem Issues - Responding individuals and organizations in each group were asked to review a set of issues and to identify and rank their three most important live-aboard concerns. The issues were floating debris, sewage, garbage, noise, crowding, abandoned boats, shore access, and crime. Tallies for each issue were ranked by their frequency of occurrence. Weighted rank values were assigned to each count, 1st rank = 1.0, 2nd rank = 0.66, 3rd rank = 0.33. The frequency-rank weighted values were

summed to obtain a problem-issue score and the scores were ranked. Tables 16, 17, and 18 list the ranked issue-problems in the opinion of the shore residents, marina managers, and government and civic organizations, respectively. Shore residents and government-civic organizations believe sewage, floating debris and garbage are the three most severe waterfront problems. Marina managers selected floating debris and garbage as the first and second problems; crime was ranked as third and sewage as fourth.

The varied responses of each group then were reduced to a globally-ranked problem-issue for all land groups using a similar procedure. The separate group rankings were frequency-rank weighted by the three land groups to yield a composite rank order of the issues. Table 19 lists these concerns representing the composite views of shoreline residents, marina managers, and government agencies, utilities, and private organizations.

There is a consensus that sewage, garbage and floating debris, in descending importance, are the three most critical waterfront problems related to increased boating activities in the Florida Keys. The "percent of responses" column indicates the top three problems are in a class by themselves since the percent frequency counts drop dramatically from the third to the fourth problem, setting apart the remaining problems 4 through 8 at a lesser order of magnitude.

The rankings of problem issues perceived by the land groups indicate that the respondents used different criteria in ranking the issues. Kendall's correlation was used to show the association between two sets of rankings by pairs of land groups. The coefficient shows the degree of concordance between the separate rankings of pairs of land groups for the eight problem issues (Siegel, 1956). Table 20 lists the Kendall's correlation coefficients and the significance of the association between the importance-

Table 16. Shore Residents' Ranking of Waterfront Problems and Opinions Concerning Boaters' Responsibilities

Problem	Boater Groups Responsible (% of respondents)					Boater Type Uncertain	Rank Order of Problem <sup>2</sup>
	Recreational Boaters	Commercial Boaters	Dockside Live-a-boards	Anchor-out Live-a-boards			
Floating Debris	33.7	20.5	12.2	21.8	11.8		2
Sewage	18.9	8.0	27.3	45.8	0.0		1
Garbage	24.4	19.5	19.8	29.5	6.8		3
Noise	46.6	36.8	2.6	11.7	2.3		4
Crowding	25.4	14.7	11.5	48.4	0.0		6
Abandoned Boats	18.3	19.4	4.1	36.7	21.5		8
Shore Access	20.2	17.8	7.1	44.3	10.6		7
Crime	23.9	12.2	16.0	25.8	22.1		5

Rank Order of Type of Boater<sup>2</sup> Responsibility<sup>2</sup>

2 3 4 1 5

<sup>1</sup> Interviewee recognizes problem but is unable to identify specific boater type.

<sup>2</sup> Weighted by frequencies of waterfront residents.

Table 17. Marine Managers' Ranking of Waterfront Problems and Opinions Concerning Boaters' Responsibilities

Problem	Boater Groups Responsible (% of respondents)					Boater Type Uncertain	Rank Order <sup>2</sup> of Problem
	Recreational Boaters	Commercial Boaters	Dockside Live-aboards	Anchor-out Live-aboards			
Floating Debris	29.4	32.6	2.3	12.4	23.3		1
Sewage	0.0	16.7	58.3	25.0	0.0		4
Garbage	31.4	27.4	15.7	25.5	0.0		2
Noise	54.5	18.2	27.3	0.0	0.0		5
Crowding	60.0	0.0	40.0	0.0	0.0		7
Abandoned Boats	0.0	0.0	0.0	0.0	100.0		8
Shore Access	68.6	0.0	0.0	31.4	0.0		6
Crime	32.7	13.0	32.5	6.5	15.3		3
Rank Order of Type of Boater Responsibility <sup>2</sup>	1	2	3	4	5		

<sup>1</sup> Interviewee recognizes problem but is unable to identify specific boater type.

<sup>2</sup> Weighted by frequencies of marina managers.

Table 18. Government Organizations' and Civic Groups' Ranking of Waterfront Problems and Opinions Concerning Boaters' Responsibilities

Problem	Boater Groups Responsible (% of respondents)					Boater Type Uncertain	Rank Order <sup>2</sup> of Problem
	Recreational Boaters	Commercial Boaters	Dockside Live-aboards	Anchor-out Live-aboards			
Floating Debris	29.4	27.6	15.5	27.5	0.0	0.0	3
Sewage	18.4	15.1	22.9	40.7	2.9	2.9	1
Garbage	23.3	17.3	18.9	37.7	2.8	2.8	2
Noise	27.3	27.3	18.2	18.2	9.0	9.0	5
Crowding	21.1	21.1	15.8	42.0	0.0	0.0	8
Abandoned Boats	12.2	17.6	12.2	29.9	28.1	28.1	7
Shore Access	0.0	0.0	0.0	100.0	0.0	0.0	6
Crime	12.9	19.1	12.9	12.9	42.2	42.2	4

Rank Order of Type of Boater<sup>2</sup> Responsibility<sup>2</sup> 3 4 2 1 5

<sup>1</sup> Interviewee recognizes problem but is unable to identify specific boater type.

<sup>2</sup> Weighted by frequencies of agencies and groups.

Table 19. Composite Land Groups' Ranking of Waterfront Problems and Opinions Concerning Boaters' Responsibilities

Problem	Boater Groups Responsible (% of respondents)							Rank Order of Problem <sup>2</sup>
	Recreational Boaters	Commercial Boaters	Dockside Live-aboards	Anchor-out Live-aboards	Boater Type Uncertain <sup>1</sup>	Percent of Responses		
Floating Debris	30.8	26.9	10.0	20.6	11.7	20.3	3	
Sewage	12.4	13.3	36.2	37.1	1.0	30.2	1	
Garbage	26.4	21.4	18.1	30.9	3.2	21.5	2	
Noise	42.8	27.4	16.0	10.0	3.8	6.7	5	
Crowding	35.5	11.9	22.4	30.2	0.0	7.0	4	
Abandoned Boats	10.2	12.3	5.4	22.2	49.9	3.4	7	
Shore Access	29.6	5.9	2.4	58.6	3.5	3.1	8	
Crime	23.2	14.8	20.5	15.1	26.4	4.8	6	

Rank Order of Type of Boater Responsibility<sup>2</sup>

25.9      19.0      17.8      26.8      8.5

<sup>1</sup>Interviewee recognizes problem but is unable to identify specific boater type.

<sup>2</sup>Weighted by frequencies of the composited land groups.

Table 20. Correlations of Land Groups' Perceptions of Eight Problem Issues Using Kendall's Correlation Coefficient

Land Groups	Correlation Coefficient, tau	Significance level, P ( $\geq$ tau)
Shoreline Residents and Marina Managers	.64	.016
Marina Managers and Organizations	.30	.199
Shoreline Residents and Organizations	.43	.089

ranks assigned to the problem-issues. The significance is stated as the probability of obtaining by chance a coefficient value equal to or greater than the one obtained from the data. Two of the three coefficient values yielded low probabilities of chance that such responses would come from marina managers and shoreline residents, and shoreline residents and organizations. Marina managers and organizations showed that the correlation value of their responses has a higher probability of chance. The results suggest, therefore, that the respondent organizations may not have used the same criteria in ranking the important problem issues, or do not perceive the problems in the same manner.

b. Perceived Responsibilities - The same respondents were asked to select three groups from a list and rank their perceptions of these groups as responsible for the problems previously identified. This list included recreational boaters, commercial boaters, dockside live-aboards, anchor-out live-aboards, and unidentified boaters. Three ranked levels of responsibility were used: high, 1.00; medium, 0.66; and low, 0.33. The counts of each responsible party, weighted by rank, summed for each problem, gives a frequency-rank weighted score of responsibility for the particular problem as perceived by land groups. This statistic is analogous to the problem-issue score computed in the previous section. The results are given in Tables 16 through 19.

Both shore residents and government-civic organizations perceive anchor-out live-aboards as most responsible for sewage and garbage (Tables 16 and 18). Both agree, too, that recreational boaters contribute most to the floating debris problem. Marina managers (Table 17) ranked floating debris and garbage as the first and second problems and agreed with the other land groups that recreational boaters are most responsible for

floating debris; however, they pointed to recreational and commercial boaters, not anchor-out live-aboards, as the major contributors of garbage. Sewage, in the eyes of the marina managers, ranked fourth and was overwhelmingly perceived as caused by shoreside live-aboards. Crime was ranked third by marina managers, attributed equally to recreational boaters and shoreside live-aboards.

An "across-the-board" responsibility ranking (Tables 16 through 18, bottom row) shows, again, concurrence between shore residents and government-civic organizations in declaring anchor-out live-aboards most responsible for all water-related problems. However, there is disagreement concerning lower levels of responsibility: shore residents put recreational and commercial boaters in second and third place, while organizations identify shoreside live-aboards and recreational boaters in that order. The marina managers' overall view is that the recreational boater is the most responsible group, followed by commercial and shoreside live-aboards.

The composite land group assessment (Table 19) is that live-aboards, both anchor-out and shoreside, are most responsible for sewage; anchor-out live-aboards and recreational boaters are most responsible for garbage; and recreational and commercial boaters are, by far, the principal sources of floating debris. There is a consensus that anchor-out live-aboards and recreational boaters share the responsibility for most water-related problems. However, no overall, singly, clearly defined responsible boating group has been identified.

## 2. Live-aboard Views of Problems

Live-aboards also were asked to rank a list of problems, and, to select from a list of land and water groups the ones whom they perceived were responsible for the chosen

problems. The problem list the live-aboards considered included noise, sewage, garbage, crime, and shore access. The list of groups included recreational boaters, other live-aboards, shore residents, marina managers, and public sector agencies. Each problem was coupled with a group or agency, and the live-aboard respondents were required to rank the severity of the problem as non-existent, moderate, or severe. Rank values of 0.0, 0.5, and 1.0 were assigned, respectively. The problem scores were frequency-rank weighted to obtain a general ranking of their perceptions of the problems, from no problem to a severe problem, the most severe having the highest score. The groups associated with each problem also were ranked according to the number of times each group was cited by the live-aboards.

Table 21 summarizes the results of the live-aboard problem opinion survey: noise was the predominant problem, and it was associated with recreational boaters. Live-aboards perceive most conflict as occurring with shore residents, who also were considered responsible for crime and restricting access to the shore. Because the live-aboard phenomenon is presented usually as the impact of the live-aboard presence on land residents and water quality, it was useful to turn the coin over and see shoreline concerns through the eyes of live-aboards. Many problems that disturb land residents also upset water residents.

Table 21. Live-aboard Views of Problems That Cause Conflicts Among Live-aboards and Between Live-aboards and Other Groups--All Florida Keys

Problems	Groups With Whom Conflicts Occur (% of conflicts)					Rank Order of Problem
	Recreational Boaters	Other Live-aboards	Shore Residents	Marina Managers	Public Sector	
Noise	51.3	19.2	9.0	7.7	12.8	1
Sewage	12.3	16.9	38.5	13.8	18.5	2
Garbage	52.7	12.7	25.5	7.3	1.8	3
Crime	0.0	0.0	73.6	11.3	15.1	4
Shore Access	6.7	0.0	53.3	20.0	20.0	5

Rank Order of Groups With Whom Conflicts Occur<sup>1</sup>

2 5 1 4 3

<sup>1</sup>Weighted by frequencies of live-aboard responses.

## VIII. LIVE-ABOARD OPINIONS OF THE KEYS

A substantial part of the live-aboard questionnaires was devoted to an assessment of boater attitudes and opinions of the community, life-styles, and the personal rewards of boat living in the Keys. This section summarizes live-aboard perceptions of the Keys as a place to live and work. The survey data were generalized in two steps: (1) identification of the main reasons for coming to the Keys; and (2) satisfaction or dissatisfaction with the Keys after arrival. Questionnaire responses were subjective and qualitative. Using opinion survey sampling and interview methods, responses were assigned ranked values and placed in ordinal classes for evaluation. Compositing, comparing, and averaging different data subsets required the use of appropriate frequency and rank-weighting factors (Wolpert, 1965, Zelinsky, 1971).

### 1. Reasons for Coming to the Keys

Each live-aboard was asked to select and rank five (from a list of twenty) reasons for coming to the Keys. Interviewees ranked the selected five reasons on a scale of 1 to 5. Only two of the twenty reasons were not selected. Table 22 lists the eighteen reasons which were selected.

Equally scaled, numeric, class intervals were set up for the five ranked reasons: 1 = 1; 2 = 0.8; 3 = 0.6; 4 = 0.4; 5 = 0.2. The count of each reason in each rank class was recorded. The sum of the number of counts times the rank value yielded a frequency-ranked value weighted score, which was used to select the most important reason for coming to the Keys.

Table 22 shows the relative importance of each reason in the live-aboard boaters' decision to move to the Keys and demonstrates variations among the sampling strata--

Table 22. Weighted Summed Scores and Ranked Reasons for Coming to the Florida Keys

Reasons for Coming to the Keys	Season										Subregion						Site		Boat Type					
	Florida Keys		Summer		Winter		Year-round		Lower		Middle		Upper		Anchorage		Shoreside		Sail		Power			
	Summed Scores	Rankings																						
<b>Environment</b>																								
Flora & Fauna	10.2	13	1.8	9	3.0	10	5.4	13	1.4	13	6.8	10	2.0	13	2.8	13	7.4	12	6.0	13	6.0	13	4.0	9
Scenic Beauty	78.6	3	13.2	2	19.8	3	45.6	2	18.8	5	37.0	3	24.8	2	18.4	3	60.2	3	39.6	4	29.6	4	28.8	2
Clear Water & Air	89.6	2	13.8	1	25.8	2	50.6	2	18.8	2	47.8	2	23.0	3	23.0	2	66.6	2	54.8	2	54.8	2	28.6	3
Climate	118.2	1	12.6	3	15.8	1	79.7	1	24.0	1	64.8	1	29.4	1	27.0	1	91.2	1	73.4	1	73.4	1	38.0	1
<b>Boating Related</b>																								
Sailing	45.2	5	4.2	6	6.8	7	34.2	5	18.2	3	21.6	4	5.4	7	17.4	4	27.8	6	42.8	3	42.8	3	0.8	15b
Fishing	22.6	7	5.0	5	8.8	5	8.8	11	1.6	12	15.2	7	5.8	5	3.2	12	19.4	7	7.2	10	11.4	4		
Shorefishing	18.4	9	2.0	8b	3.4	9	13.0	8	8.0	9	7.8	9a	2.6	11	7.4	9a	11.0	8	16.2	7	1.6	12		
Beachcombing	1.4	18	0.4	18	0.6	15	0.4	18	--	--	1.0	15	0.8	18a	0.4	16	1.0	18	0.6	14a	0.8	15a		
<b>Personal</b>																								
Freedom	47.2	4	1.2	10	9.0	4	37.0	4	17.2	4	17.4	6	12.6	4	16.8	6	30.4	4	21.4	5	18.0	5	15.4	5
Tranquility	44.0	6	6.8	4	8.6	6	28.6	6	25.4	6	17.8	5	10.8	5	15.0	7	29.0	5	18.0	6	16.6	4	16.6	4
Casualdare	16.6	10	0.2	12	4.4	8	12.0	10	3.4	10	9.6	8	1.6	9	7.4	9b	9.2	10	11.0	9	11.0	9	4.6	8
<b>Keys Services</b>																								
Boaters Services	6.2	14	--	--	2.4	11	3.8	14	--	--	6.0	12	--	--	17.0	5	3.6	14	4.8	13	4.8	13	1.4	13
Community Services	1.8	17	--	--	0.4	16	1.4	17	0.6	15	0.4	16	0.8	16b	--	--	3.8	16	0.6	14b	1.2	14a		
Entertainment	3.2	15	0.4	11b	1.2	14	1.6	16	0.8	16	1.2	14	1.6	16	0.8	14	2.4	15	2.0	16	1.2	14b		
Local Hospitality	11.2	12	2.0	8a	2.2	12	8.0	13	2.6	11	6.4	11	2.2	11	4.0	11	7.2	13	6.0	11b	4.8	7		
<b>Financial</b>																								
Budgeting	19.2	8	2.6	7	--	--	16.0	7	8.2	8	7.8	9a	3.2	10	10.6	8	8.6	11	11.0	6	2.8	10		
Financial Constraints	2.0	16	--	--	--	--	2.0	15	1.0	14	--	--	2.0	15	0.6	15	1.4	17	0.4	15	--	--		
Cost-of-Living	16.4	11	--	--	1.4	13	15.0	8	8.4	7	3.1	13	4.8	8	6.4	10	10.0	9	5.0	12	2.4	11		

subregion, season and site. Different combinations of the five top reasons were selected by strata, though climate was the most significant for all strata except among the summer boaters. Scenic beauty, clean water and air are the next two or three most important reasons. Personal freedom and tranquility ranked four or five. The remaining reasons generally reflect special interests of live-aboards in a particular stratum.

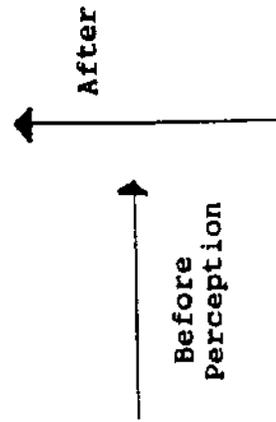
## 2. Change Perception Matrix

A composite evaluation index was developed of live-aboard "after-before" perception of the Keys boating experience for each of the five most important reasons for coming to the Keys. The index also may be used as an indicator of trends in waterfront attractiveness as seen by the boaters. The five reasons form the basis for the construction of a satisfaction-dissatisfaction scale by an examination of paired "after-before" reactions. The reason is the variate and the "before-and-after" ranked perceptions are the values. The data were obtained from interviewee responses to the question "how do you rate each of the selected five reasons, as you perceived them before you came to the Keys and as you perceive them now (i.e., at the time of the interview)?" Excellent, good, fair, and poor were the rank choices and numerical ratings were assigned to the ranked classes as follows: excellent, 1.0; good, 0.75; fair, 0.50; poor, 0.25. An "after-before" ratio of the ranks indicates approval, disapproval, or no change in perception. Broadly viewed, the ratios may be interpreted as a measure of the attraction of the waterfront experience.

The ratios were assembled in a square "after-before" matrix in which the entries are perception change coefficients (Figure 9). The perception change matrix is a scalar identity matrix with the diagonal elements equal to unity because no perception change

Figure 9. "After-Before" Perception Matrix

Before Perception	After Perception			
	Excellent (1.00)	Good (0.75)	Fair (0.50)	Poor (0.25)
Excellent (1.00)	1.00	0.75	0.50	0.25
Good (0.75)	1.33	1.00	0.67	0.33
Fair (0.50)	2.00	1.50	1.00	0.50
Poor (0.25)	4.00	3.00	2.00	1.00



has a ratio value of 1. Off-diagonal elements are greater than or less than 1. Thus, cells (1,1; 2,2; 3,3; 4,4) equal 1 because the respective ratios are (1.00/1.00; 0.75/0.75; 0.50/0.50; 0.25/0.25); off-diagonal cells less than 1 indicate decline as (1,2; 2,3; 3,4) with respective ratios (0.75/1.00; 0.67/0.75; 0.25/0.50) less than 1; and, off-diagonal cells more than 1 indicate improvement as (2,1; 3,2; 4,3) with respective ratios (1.00/0.75; 0.75/0.50; 0.50/0.25), which are more than 1.

"After-and-before" rank values are entered in each cell and multiplied by counts of transactions. The multiplication of the corresponding elements yields a set of frequency-perception change weighted product values of disappointment or improvement. If, for example, 60 observers ranked climate excellent after and before, the product would be 60 (60 x 1.00); if 60 boaters ranked climate excellent before and good after, the cell product would be 45 (60 x 0.75), a decline; if 30 boaters ranked climate fair before and good after, the cell product would be 45 (30 x 1.50), an improvement. The sum of the weighted product element values divided by the total count of boaters gives a double-weighted mean. A mean greater than 1.00 indicates an improvement; less than 1.00 indicates a decline; a value = 1.00 indicates a stable perception situation. The results of these calculations for each of the eighteen ranked reasons are shown by sampling strata in Table 23.

A summary satisfaction score for the five highest ranked reasons for coming to the Florida Keys is presented in Table 24. In general, the three most important reasons exhibit small differences among the strata. Reasons of lesser overall importance, however, show wider variation among the strata. This suggests that a decline in the shoreline experience quality level may have begun to appear. Lower scores were

Table 23. Satisfaction Scores by Reason and Strata

Reasons for Coming to the Keys	Florida Keys	Season				Subregion				Site				Boat Type	
		Summer	Winter	Year	Lower	Middle	Upper	Anch.	Shore	Sail	Power	Float	Home		
Environment	0.89	0.81	0.95	0.86	0.75	0.94	0.84	0.83	0.91	0.90	0.90	0.90	0.90	0.90	0.75
Flora & Fauna	1.01	1.12	1.00	0.99	0.86	1.03	1.08	0.90	1.05	1.05	0.98	0.98	0.92	0.92	0.92
Scenic Beauty	0.96	1.04	0.96	0.94	0.85	1.02	0.94	0.96	0.96	1.01	0.95	0.95	0.87	0.87	0.87
Clear Water & Air	1.03	1.02	0.99	1.05	1.08	1.02	1.00	1.01	1.03	1.03	1.02	1.02	1.13	1.13	1.13
Climate															
Boating Related	1.02	0.97	1.20	0.97	0.94	1.10	0.92	0.99	0.97	1.03	1.00	1.00	0.75	0.75	0.75
Sailing	0.78	0.77	0.72	0.85	1.00	0.75	0.78	0.93	0.71	0.81	0.77	0.77	0.61	0.61	0.61
Fishing	0.93	0.92	0.88	0.95	0.86	1.07	0.81	0.99	0.90	0.90	1.08	1.08	2.00	2.00	2.00
Snorkeling	0.69	0.71	0.33	1.00	--	0.67	0.71	1.00	0.58	0.84	0.54	0.54	--	--	--
Beachcombing															
Personal	0.96	0.61	0.97	0.97	0.87	0.94	1.07	0.94	0.95	0.97	0.97	0.97	0.94	0.94	0.94
Freedom	0.94	0.88	0.96	0.95	0.87	0.94	1.02	0.87	0.97	0.95	1.01	1.01	0.79	0.79	0.79
Tranquility	1.15	1.00	1.07	1.20	1.42	1.10	1.07	1.08	1.18	1.10	0.94	0.94	4.00	4.00	4.00
Camaraderie															
Keys Services	1.34	--	1.81	0.94	--	1.34	--	1.58	1.19	1.39	1.17	1.17	--	--	--
Boaters Services	1.08	--	1.00	1.11	1.00	1.00	1.17	--	1.01	1.00	1.11	1.11	--	--	--
Community Services	1.06	1.50	1.00	1.00	1.00	1.33	0.88	1.00	1.07	1.00	1.17	1.17	--	--	--
Entertainment	1.31	1.50	1.33	1.28	0.87	1.28	1.75	1.14	1.37	1.48	1.12	1.12	1.50	1.50	1.50
Local Hospitality															
Financial	1.33	1.00	--	1.23	0.90	1.56	0.92	1.17	1.22	1.15	1.00	1.00	0.84	0.84	0.84
Occupation	1.25	--	--	1.25	1.33	--	1.00	1.50	1.00	1.00	--	--	1.33	1.33	1.33
Financial Constraints	0.91	--	0.92	0.91	0.91	0.86	0.95	0.94	0.89	0.82	1.03	1.03	0.93	0.93	0.93
Cost-of-Living															

Table 24. Satisfaction Scores for Five Most Important Reasons for Coming to Keys

Five Most Important Reasons for Coming to the Keys	Florida Keys	Season					Subregion			Site			Boat Type			Marathon-Boat Key Case Study	
		Summer		Winter		Year	Lower	Middle	Upper	Anch.	Shore	Sail	Power	Float Home			
		(1)	(2)	(1)	(2)	(1)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)		(4)
Climate	(1) 1.03 (2) 0.96 (3) 1.01 (4) 0.96 (5) 1.02	(3) 1.02 (1) 1.04 (2) 1.12 (4) 0.97 (4) 0.88	(1) 0.99 (2) 0.96 (3) 1.00 (4) 0.97	(1) 1.05 (2) 0.94 (3) 0.99 (4) 0.97	(1) 1.08 (2) 0.85 (3) 0.86 (4) 0.87	(1) 1.02 (2) 1.02 (3) 1.03 (4) 1.07	(1) 1.00 (2) 0.94 (2) 1.08 (4) 1.07	(1) 1.01 (2) 0.96 (3) 0.90 (4) 0.95 (5) 0.97	(1) 1.03 (2) 0.96 (3) 1.05 (4) 0.95 (5) 0.97	(1) 1.01 (2) 1.01 (4) 1.05 (5) 0.97 (4) 1.01	(1) 1.02 (3) 0.95 (2) 0.98 (5) 0.97 (4) 1.01	(1) 1.13 (3) 0.92 (2) 0.92 (1) 0.94 (3) 0.79	(1) 1.01 (2) 1.07 (3) 1.04 (5) 0.95 (5) 0.94 (4) 1.10				
Clean Water & Air																	
Scenic Beauty																	
Freedom																	
Tranquility																	
Sailing																	
Fishing																	
Cost of Living																	
Boaters Services																	

( ) Rank of importance  
 \*Tied

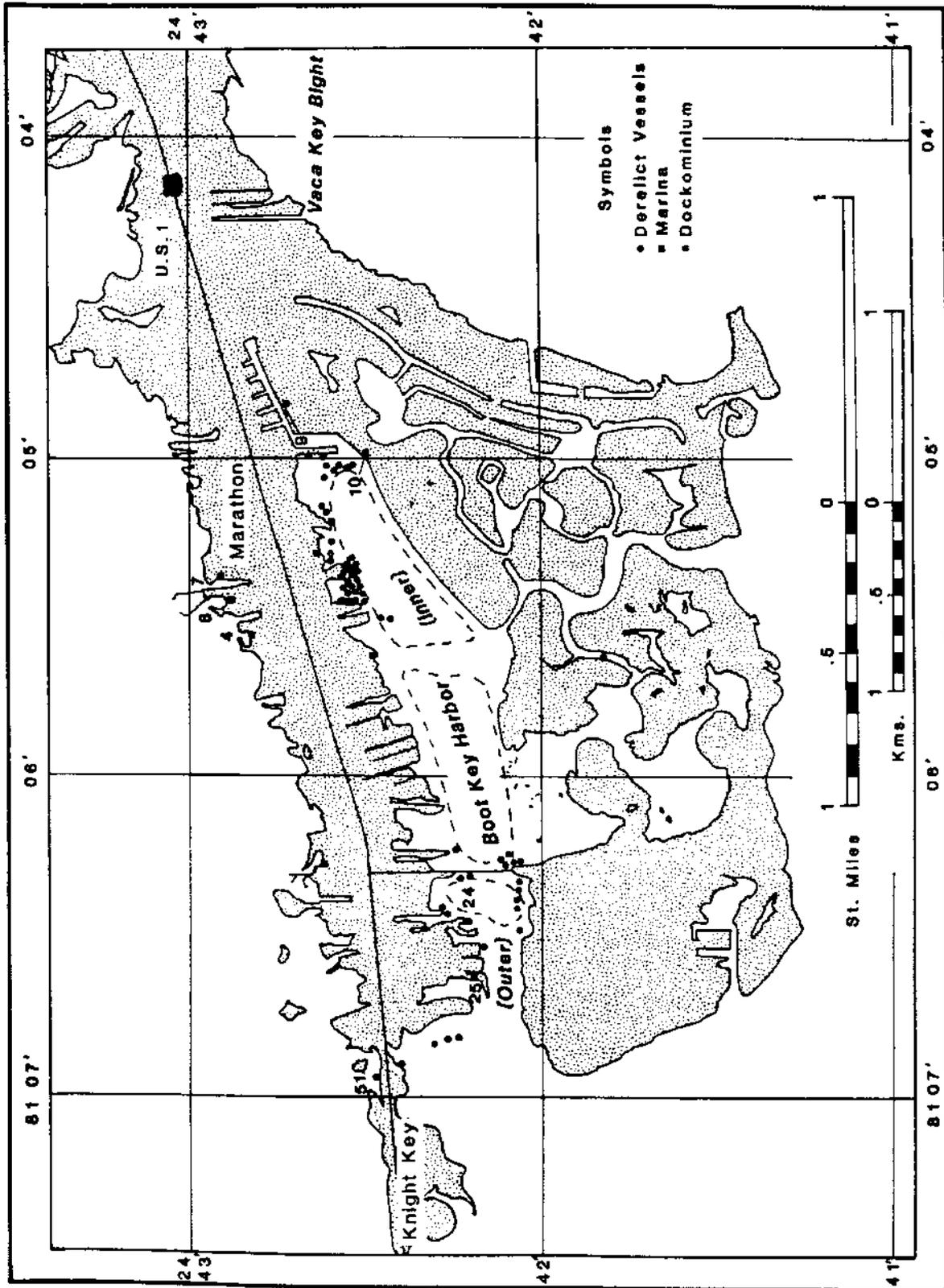
recorded for tranquility by summer season boaters and floating-home live-aboards; summer and winter season groups who enjoy fishing were disappointed; clean water and air attained moderately low scores for Lower and Upper Keys subregions. It is worth noting that freedom and tranquility were almost unanimously scored less than one by all strata.

## IX. LIVING ABOARD IN THE MARATHON - BOOT KEY AREA

Marathon's large concentration of boat live-aboards in close proximity to shoreline land residents and their competitive demands on waterfront use make it a microcosm of the Florida Keys coastal management condition. Marathon offers an attractive base for living aboard. Varied shoreside commercial facilities are available to fit most budgets and tastes. As an important service center in the Middle Keys and a base for sailing, and commercial and sportfishing, the area provides both a range of employment opportunities that draw year-round LABs as well as an array of boater and community services sought-after by seasonal live-aboard visitors. Marathon's location--at the hub of routes north to the Gulf Coast, east to the Atlantic Seaboard and southeast to the Bahamas and Caribbean--is further reason for visits by cruising sailors and seasonal live-aboards. Perhaps the overriding attraction, however, is the appeal of Boot Key Harbor, a deepwater, all-weather anchorage, accessible to Hawk Channel and Florida Bay cruising grounds and adjacent to downtown Marathon's services. The harbor draws increasing numbers of recreational boaters, commercial fisherman, live-aboards, shore residents and land tourists, all of whom compete for space in this fragile setting. Such competition has caused serious community differences in how the harbor is to be managed for those who live on the water and for those who live on the land. Marathon may become a prototype of joint management initiatives by government and private groups.

The area includes Vaca Key, Boot Key and Knight Key (Figure 10). Live-aboard shoreside facilities are situated along the north shore and within Boot Key Harbor. They include, on the north shore, from west to east, Harbour Cay Club (a private live-aboard

Figure 10. Boot Key Harbor



club, Figure 10, 51), Faro Blanco Marina Resort (Figure 10, 1), Tarpon Lodge Marina (Figure 10, 8) and the Econo Lodge (motel with marina facilities--Figure 10, 7). Boot Key Harbor is the principal live-aboard location. The harbor is divided by a bascule bridge, linking Boot Key and Vaca Key, into inner and outer sectors. Boat access into this protected sanctuary is either through Sister's Creek or Boot Key Channel.

The outer harbor includes the shoreside facilities of the Pinellas Oil Dock (fuel oil storage and retail outlet), Boot Key Marina (full service marina annex to Faro Blanco), and Marathon Seafood Retail Store and Marina (major wholesale and retail commercial fishing enterprise and marina). All land developments are on the north shore of the outer harbor. The commercial fishing fleet of approximately 100 vessels during the season ties-up along north shore canals. A relatively small number of anchor-out live-aboards are situated west of the bridge in the outer harbor. There are shoreside live-aboards at Boot Key Marina and Marathon Seafood, but they are few in number. Abandoned (derelict) vessels also are found in this area.

The main inner harbor is located east of the bridge. Residential and commercial land developments are found on the north and south shores. These include on the north, Trailerama RV Park (a recreational vehicle-trailer park) and on the south shore, Spanish Galleon Condominiums (a residential duplex development), Voit's Sombrero Marina Dockside Lounge (a principal shoreside live-aboard facility offering dinghy tie-ups to anchor-outs, Figure 10, 10), and Sombrero Resort and Lighthouse Marina (a destination resort accommodating shoreside live-aboards and land tourists alike, Figure 10, 9). A deep-water canal leads east to an inner basin where tour-boats and commercial day-fishing boats are berthed. The inner harbor has two anchorages, one north of the

condominiums and Voit's Lounge (Photo 8), the other west of the Sister's Creek Channel which extends to the bridge. Derelict vessels are found adjacent to the south end of the bridge and clustered along the north shore, mainly near Colpac Fisheries.

A small number of derelict-type vessels, anchored in the mangroves facing Voit's Dockside Lounge, are used as floating homes; they are referred to by land and water residents alike as "mangrove manor" (Photo 9). It is difficult to determine just how many LAB boats fall into the "manor" category, but ten is a conservative estimate. "Mangrove manor" residents are considered squatters and not live-aboards by shoreside LABs and those who anchor in the harbor proper.

There are sixty-three derelict vessels situated in the inner and outer harbors. These are abandoned, junked vessels, in various states of disrepair, with no visible sign of human habitation or manner of owner identification. They pose potential or actual threats to people, the environment and navigation. Most are abandoned fishing vessels situated near Colpac Fisheries that have become havens for street people and addicts ostracized by land and water residents alike. Due to juxtaposition of derelict vessels and anchor-out live-aboard vessels, many land residents--especially those living along the south shore of the inner harbor--make no distinction between them (Antonini, Ryder, and Garretson, 1989). Do Marathon LABs differ from the average Keys live-aboards (described in Chapter IV)? Departures from typical Keys conditions include these special characteristics. There are more sailboats and fewer floating homes in Marathon. All vessels are owned, and the average value is slightly higher at \$66,214. More vessels have on-board electrical power generation. Vessel sewage pretreatment capacity is about the same as the mean in the Keys.

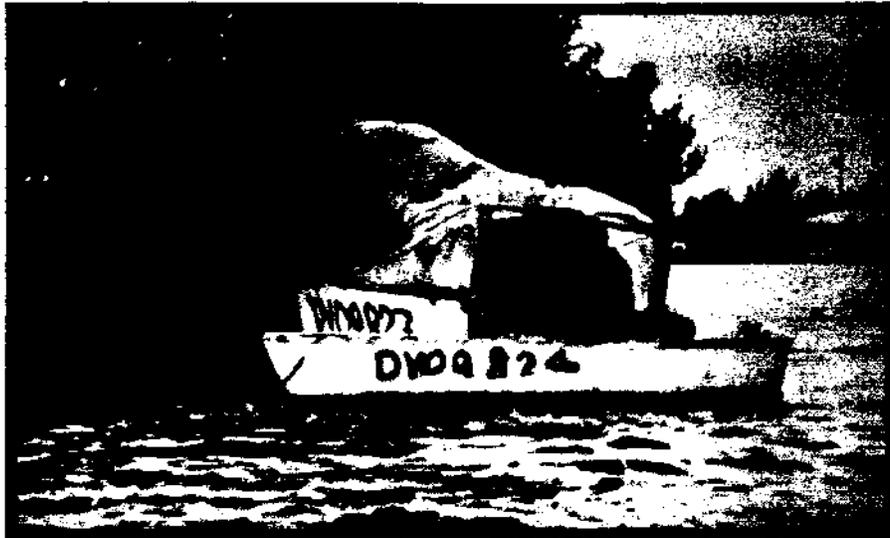


Photo 9. Derelict vessel used by LAB at "mangrove manor," Boot Key Harbor, Middle Keys. Abandoned fishing skiff, decked over with plastic tarp provides temporary haven for street people.

Socioeconomic conditions differ in several ways. There are more two-person family boats and, as a result, the female-male ratio is lower. LABs are more highly educated. More people are retirees; the ratio of retired to employed is 2:1. As a result, a higher proportion of live-aboard income is generated outside the Keys as interest, dividends and pensions. LABs in Marathon spend \$1,437 monthly per boat, about \$100 more than the Keys average.

Are Marathon LABs different in the type of services used and services desired? There is generally a heavier use of marina services, toilet, shower, telephone, mail drops, parking, snack/restaurant, and dinghy dockage. Community service, however, parallels the Keys average, even though Marathon LABs have a different set of priorities for desired services. Their five highest ranked service needs include, in descending order: (1) pump-out; (2) recreation; (3) public dinghy docks; (4) improved dockside facilities; (5) better laundry services.

Though three out of the eight pump-out stations in the Keys are located in Marathon on the north shore, and in the inner and outer sectors of Boot Key Harbor (Figure 10, 1, 9, 25), use of these facilities is one-half of the Keys average, in itself at an extremely low level (5.4 percent of all LAB boats). Under-utilization of existing facilities is due, in part, to boater unawareness. The general consensus that pump-out is their number one service need points to the likelihood of local receptivity to reducing the discharge of sanitary waste into the adjacent coastal waters.

Marathon LABs rate better recreational facilities as their second most important unfulfilled service need. This probably reflects the greater ratio of retirees to individuals in the labor force. Public dinghy dockage represents the third most desired service.

Though one of the two commercial marinas offering dinghy tie-up is located in Boot Key Harbor's inner sector (Figure 10, 10), boaters anchoring in the inner harbor's western area or in the outer harbor west of the bridge have no commercially available shore access points. This leads to trespassing on private property. The increase in the number of anchor-out and shoreside LAB boats throughout the Marathon area has outstripped marina services. It is understandable, therefore, that improved shoreside facilities, including laundry, are rated fourth and fifth most desired.

Proportionately more boaters have arrived in Marathon over the past five years than in previous years. Having arrived by sea, most take one to two boating excursions each month during their stay.

Do shore residents and live-aboards in Marathon concur in their perception of waterfront problems? Tables 25 and 26 present their views on problem issues and perceived responsibilities. Both groups rank sewage as the number one problem. Shore residents perceive anchor-outs as most responsible, and live-aboards believe that most of their conflicts with shore residents are regarding this problem. Shore residents rank floating debris as the second most serious problem and, again, perceive anchor-outs as most responsible. Field evidence suggests that the large concentration of derelict vessels along the north shore of the inner harbor provides a source of debris that breaks free as flotsam under storm conditions, particularly with the passage of northers during the winter season, and pollutes the harbor's south shore along the seawall fronting the condominiums.

Garbage disposal is the third most frequently selected problem for shore residents, and live-aboards are perceived as major contributors. The problem of garbage

Table 25. Marathon Shore Residents' Ranking of Waterfront Problems and Opinions Concerning Boaters' Responsibilities

Problem	Boating Groups Responsible (% of responsibility)					Boater Type Uncertain	Rank Order of Problem <sup>2</sup>
	Recreational Boaters	Commercial Boaters	Dockside Live-aboards	Anchor-out Live-aboards			
Floating Debris	17.8	18.8	8.9	41.2	13.3		2
Sewage	8.3	4.9	22.0	64.8	0.0		1
Garbage	18.7	13.8	22.5	33.7	11.3		3
Noise	37.0	11.1	18.6	33.3	0.0		5
Crowding	0.0	0.0	28.5	71.5	0.0		4
Abandoned Boats	9.5	0.0	0.0	47.4	43.1		6
Shore Access	0.0	0.0	0.0	75.0	25.0		8
Crime	0.0	0.0	0.0	50.3	49.7		7
Rank Order of Type of Boater Responsibility	3	5	2	1	4		

<sup>1</sup> Interviewees recognizes problem but is unable to identify specific boater type.

<sup>2</sup> Weighted by frequencies of waterfront residents.



disposal is related to limited shore access for anchor-outs. Shoreside LABs are provided with receptacles for garbage disposal which is included in the marina services covered by dockage fees. Where dinghy dockage is available to anchor-outs, e.g. in the inner Boot Key Harbor (Figure 10, 10) garbage collection also is included as part of the docking service. Anchor-outs, forced to land elsewhere, have no readily available means for disposing of household trash. It is noteworthy that live-aboards rank garbage disposal fifth on their conflict list and identify recreational boaters as the principal source of litter (Table 26). Trash in the water, however, probably comes from several sources.

Noise pollution is the third most serious problem for live-aboards, and recreational boaters are perceived as the primary cause of it. Crowding and abandoned boats, ranked by shore residents as fourth and sixth (respectively), are perceived to be caused by anchor-outs. While crowding, in part, may result from the increase in numbers of anchor-outs in Boot Key Harbor's inner sector, it is the concentration of derelict vessels in the same area that contributes to the perception of crowding. The condominium resident looking north across Boot Key Harbor likely does not distinguish between anchor-outs and abandoned boats. In most cases, the abandoned boats have no connection to live-aboards, but rather appear to be abandoned fishing boats. Finally, shore residents and live-aboards concur that the greatest number of group conflicts over all waterfront development issues occur between them; anchor-outs are particularly targeted.

Are Marathon live-aboards satisfied with local conditions? Are their expectations being fulfilled? They share with Keys live-aboards their five most important reasons for coming to the Florida Keys: (1) climate; (2) clean water and air; (3) scenic beauty; (4)

sailing; (5) freedom. Contrary to Keys live-aboards, who are dissatisfied with water quality, those in Marathon are satisfied. However, they are slightly more dissatisfied in attaining their initially perceived free life-style (Tables 27 and 28).

The concentration of LABs and the water quality degradation in Boot Key Harbor have prompted a number of public sector responses under the auspices of Monroe County's Port Advisory Commission. While recognizing that Boot Key Harbor problems are complex and due to multiple causal agents, both land- and water-based, public action and planning have focused on live-aboard boaters.

In 1983, Monroe County declared the harbor a "designated water management area" and attempted to manage it through a lease agreement with the private sector; perceived anchor-out service demands for pump-out, garbage collection and showers would be provided for a fee, and the county sheriff's department would enforce regulation (Monroe County, 1983). No bids were received, however, and no program was implemented. The county also attempted to have the harbor regulated by the U.S. Coast Guard and by the state Department of Natural Resources (Nutting, 1988). These actions were taken separately rather than as a unified land-water effort. Meanwhile, the object of this targeted approach, the live-aboard boaters, organized into the Vaca Key Yachting Association. Competition between land and water residents has escalated to harbor blockades and boardings by law enforcement agencies (Cheakalos, 1989). Though freedom is a personal and life-style goal of most live-aboards, there is also a sense of community that pervades the inner eastern harbor, especially the anchorage. Live-aboards identify the harbor as their neighborhood. The association of live-aboards into the Vaca Key Yachting Association manifests its community ethos in several ways,

Table 27. Weighted Summed Scores, Ranked Reasons and Satisfaction Scores for Coming to the Keys by Live-aboards in the Marathon Area

Reasons for Coming to the Keys	Summed Scores	Rankings	Satisfaction Score
<b>Environment</b>			
Flora & Fauna	5.6	11	0.97
Scenic Beauty	26.2	3	1.04
Clear Water & Air	37.0	2	1.07
Climate	54.0	1	1.01
<b>Boating Related</b>			
Sailing	19.2	4	1.10
Fishing	9.8	6	0.76
Snorkeling	6.8	8	0.95
Beachcombing	0.4	16	0.67
<b>Personal</b>			
Freedom	13.2	5a	0.95
Tranquility	13.2	5b	0.94
Camaraderie	9.4	7	1.11
<b>Keys Services</b>			
Boaters Services	6.0	10	1.34
Community Services	0.6	15	1.33
Entertainment	1.0	14	1.25
Local Hospitality	4.2	12	1.23
<b>Financial</b>			
Occupation	6.4	9	1.41
Financial Constraints	--	--	--
Cost-of-Living	1.6	13	0.67

Table 28. Marathon Live-aboard Boaters' Satisfaction Scores for the Five Most Important Reasons for Coming to the Keys

Five Most Important Reasons for Coming to the Keys	Satisfaction Scores	Ranking
Climate	1.01	1
Clean Water & Air	1.07	2
Scenic Beauty	1.04	3
Freedom	0.95*	5*
Tranquility	0.94*	5*
Sailing	1.10	4

\*Tied

through publishing of a monthly newsletter (Hocking, 1988), joining a neighborhood crime watch (Drake, 1989), supporting a floating ministry with Sunday prayer services and a local physician and nurse, and sponsoring neighborhood-charitable events. Furthermore, the live-aboard neighborhood association is attempting to address the concerns of land groups and water residents alike by self-regulation. Efforts are being made to promote proper anchoring procedures, appropriate land access and dinghy dockage, marine sanitation, noise control, and garbage disposal. This is an experiment at community action to manage the harbor, within the association's sphere of influence in the eastern sector of the inner harbor. It may broaden its sphere to include other harbor areas, and many devise a mechanism to regulate transient live-aboards passing through the neighborhood.

## X. SUMMARY, CONCLUSIONS AND IMPLICATIONS

The importance of recreational boating to the tourist-based economy of the Florida Keys is well known. Little attention, however, has been given to the serious waterfront management issues engendered by the special service needs of increasing numbers of live-aboard boat households. The focus of this study is on describing these households, their life-styles and consequent service demands, the perceptions of non-boat residents about their LAB neighbors, and, the origins and perceptions of community conflicts between boat residents and land residents, and, the place of the live-aboards in the larger Keys' community. Hopefully, a clear exposition will become a basis for policies beneficial to the entire Keys community and its unique coastal environment.

A live-aboard residence is a boat used as a home continuously for a period more than two months, not necessarily in the same location. Such use of a boat should be distinguished from recreational and commercial uses. Serious community differences have arisen between those who live on the water and those who live on land over issues such as (a) access from the water to the land side of the shoreline, (b) disposal of kitchen and sanitary wastes, (c) abandonment of vessels, (d) location, crowding, and appearance of live-aboard vessels in coastal waters, (e) live-aboard settlement rights and the preemptive uses of water space, (f) surveillance of live-aboard activities by local authorities, (g) general impact of live-aboards on the scenic and ecologic qualities of the waterfront zone, and (h) appropriate fees for live-aboard services.

Because little was known about the members and the form and functions of the live-aboard community at the start of this study, an intensive survey was planned to define this amorphous segment of the Keys' population. A survey of the live-aboard population

and land-resident group was conducted during the period of December 1988 through June 1989 to research these concerns and describe the attitudes of each party. A stratified random sample of the live-aboard population was interviewed. A prior reconnaissance survey, made in April 1988, provided the basis for the stratification and the sampling method. During this period, background information was collected from land residents whose interest in the subject was identified by the investigators' observations, the county planning staff, and from information obtained from the public media.

A survey of 1,388 live-aboard boats housing a population of 2,498 persons was made in the Keys during the periods November 1988 to January 1989 and June to July 1989. The boats were concentrated at specific locations in the Upper, Middle and Lower Keys related to such conditions as prior waterfront development, distance from the Miami metropolitan area, and safe mooring sites. A 13.4 percent random sample of the live-aboard boats was investigated to obtain information about vessel attributes, service needs, household social and demographic characteristics, participation in community life, boat migration pathways, and boaters' opinions and perceptions of waterfront-shoreline issues.

The survey showed that the live-aboard population can be classified into several subgroups based on the following: (1) type of vessel (sail with auxiliary power, power-boat, floating home), (2) local mooring site (shoreside with dock facilities, anchor-out in coastal waters, tie-up at seawall), (3) seasonal live-aboard residence (year-round, summer, winter). Service needs, boating activities, household characteristics, participation in community life, and opinions about conflict issues with the land residents

varied. The most serious issues involved the anchor-out and seawall tie-up live-aboards. Many of the concerns of the land residents also were shared by live-aboard residents.

Differences among the live-aboard sampling strata were brought out by findings of the survey. Live-aboard boats were mostly sailing vessels; about one-third were powerboats. Household and sanitary waste disposal pretreatment systems were most effective on powerboats. Ninety percent of powerboats were located at shoreside dock sites, while 60 percent of sailing vessels were shoreside. The winter-summer ratio for all boat types was 2:1. There was an average number of 1.8 persons per boat, and about half the boat households may be described as families; the average female-male ratio was 1:1.42.

About 23 percent of the live-aboard residents completed college. The age distribution of their population was concentrated in the 20- to 64- year class, and was poorly represented in the less-than-20-year age group. Occupationally, the retired and semi-retired class accounted for 57 percent of the population. Surprisingly, 47 percent declared that they were employed, virtually all in the Florida Keys. The demographic composite profile showed a varied, aging population, well-educated, with a bimodal work-retired distribution participating in the local labor force.

An "after-before" satisfaction index was developed to ascertain if the live-aboards were pleased with their visit to the Keys and whether they would remain or return. The results indicated that their main reasons for coming to the Keys were climate, scenic beauty, and clean air and water. The after-visit experience of the leading attraction criteria indicate approval of climate and scenic beauty, but some disappointment over clean air and water.

Corresponding information about the live-aboard presence and water use issues was obtained from land residents and groups by several survey methods: personal interviews, mail questionnaire surveys, and the 1980 U.S. Census of Population. The land population groups contacted were shoreline residents, marina managers, and local government, civic, utility, and volunteer agencies.

Land groups and live-aboards were compared for similarities of selected family and household social attributes, such as size of household, age distribution, sources of income, and monthly rent. The results of statistical tests indicated that land residents and live-aboards are different population groups in some attributes.

The live-aboards were asked to identify and rank the most important problems they experienced. Noise, sewage, garbage, crime and shore access were selected in that order. Four of the same problem issues also were chosen by the land residents.

Finally, both groups were asked to rank the same set of water use problems and to select and rank the boater groups responsible for the problems. For some problems, non-live-aboard boaters were seen responsible. The responses of the two groups showed a surprising degree of concordance.

During the past decade, "living aboard" has expanded phenomenally in the Keys. The intensity of recreational and housing activities on the land and water sides of the shoreline has raised serious governmental, environmental and community issues. Because solutions appear elusive, the ecologic and economic viability of the Keys is threatened. Limited land and rising land prices have accelerated the trend toward using water areas for housing. The projected need of water-residential space along the shoreline will severely stress the assimilative capacity of nearshore waters unless

corrective measures are adopted.

A managerial dilemma confronts Monroe County. Can growth be achieved while maintaining the attractiveness of the shoreline? What are the sustainable intensity limits? Where and how should limits be applied? Who has authority over the use of shallow waters and submerged lands for live-aboard residential purposes? Does the authority to regulate the use of land extend to water bodies? What specific regulations should be stipulated? Would such regulations infringe upon the public's boating and navigational rights? Where will the funding come from to meet enhanced costs of administration, monitoring and enforcement of new and different public services?

Some of the issues have been resolved; others are moot. The county has attempted to find solutions by taking specifically focused actions: (1) establishment of authority over nearshore shallow waters and submerged lands; (2) authorization of spot water quality and boat waste discharge surveys; (3) designation of Boot Key Harbor as a water management area; (4) appointment of a citizen-government task force; (5) targeting of live-aboard boat households as a special study group.

The community response to these efforts has been sharply divisive: inter-group recrimination, suspicion, hostility and, recently, widespread, unannounced live-aboard boardings. The issues remain unsolved, and the environmental threat has become more urgent. This study adds a new dimension to steps already taken, offering a Keys' community-wide geographic review of the interests, perceptions and opinions of water and land groups involved in environmental management of the waterfront. The shoreline has a physical geography and a social geography. Both must be considered in policy formulation. Relatively little is known of the perceptions and opinions of the live-

aboard community and its relation to other community groups, who have perceptions and opinions of their own. Perhaps, too much credibility has been given to atypical examples and anecdotal experiences which may have created misleading views and avoidable antagonisms.

The public interest is in the maintenance of the environmental quality and the attractiveness of the sensitive and unique Keys landscape and seascape. Given that land uses and water uses both are contributing sources of pollution and that the residents of each have parallel needs serviced in different ways, it is their joint responsibility to support appropriate measures. Perceptions of aberrant behavior or life-style may be found among land and water groups. They should not be allowed to engender conflict. With 84 percent of its population composed of upper- and middle-income retirees and local wage earners, the live-aboard group has a large core of committed citizens. The absence of a response by private contractors to the county proposal to establish shoreline waste disposal and dinghy docking facilities suggests that local civic land and live-aboard groups might arrange with the county to administer or monitor delimited areas, in a manner analogous to condominiums, cooperatives, or neighborhood watch and block associations. There are federal and state agencies available to provide guidance and support for such an effort.

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**APPENDIX A: PRELIMINARY (APRIL 1988) AND SAMPLED LIVE-ABOARD  
POPULATIONS AT SHORESIDE AND ANCHORED LOCATIONS**

Appendix A - Preliminary (April 1988) and Sampled Live-board  
Population at Shoreside and Anchorage Locations

Subregion	Site Anchorage Shoreside	Map Inset	Location Name	LAB Surveyed Sum. Win. Year- round			Total Vessels Surveyed	
Figure 4								
Lower Keys	88	N	Pine Channel	1	1	1	3	
	90	O	Cow Key Channel			10	10	
	91	O	Christmas Tree Island	1		6	7	
	92	O	Boca Chica Channel			4	4	
	93	O	Garrison Bight			1	1	
			Dolphin Marina, Little Torch Key			1	1	
		22	N	Lands End Marina, Key West	1		3	4
		27	O	The Galleon Resort, Key West			1	1
		28	O	Harborside Hotel & Marina, Key West			1	1
		30	O	Key West Municipal Marina, Key West			4	4
		32	O	Key West Yacht Club Marina, Key West			1	1
		33	O	Safe Harbour Marina, Stock Island			4	4
		34	O	Key West Resort Oceanside Marina, Stock Island	1	1	3	5
		36	O	Murray Marine, Stock Island			1	1
		38	O	Houseboat Row			3	3
		89	O					
	Subtotal				4	2	44	50
Figure 3								
Middle Keys	86	L	Key Colony Beach			2	2	
	87	M	Boot Key Harbor	2	3	20	25	
			Faro Blanco Marine Resort, Marathon	3	5	3	11	
		1	M	Driftwood Harbor Marina, Marathon			1	1
		3	L	Marie's Yacht Harbor Club, Coco Plum Bch.	2	2	1	5
		5	L	Econo Lodge, Marathon			1	1
		7	M	Tarpon Lodge Marina, Marathon			1	2
		8	M	Sombrero Resort & Lighthouse Marina, Marathon			6	5
		9	M	Voit's Sombrero Marina Dockside Lounge, Marathon	1	1	5	7
		10	M	Bonefish Marina Condominiums Assoc., Coco Plum Beach			2	1
		11	L	Hawk's Cay Marina, Duck Key			2	2
		20	K	Dock n Dine, Coco Plum Beach	1	1	1	3
		21	L	Boot Key Marina, Marathon	1	4	2	7
		24	M	Marathon Seafood Retail Store & Marina, Marathon	2	1	1	4
		25	M	Harbour Cay Club, Marathon			2	1
		51	M					3
	Subtotal				12	31	48	91

Subregion	Site Anchorage Shoreside	Map Inset	Location Name	LAB Surveyed			Total Vessels Surveyed
				Sum.	Win.	Year-round	
Upper Keys		Figure 2					
	84	I	Islamorada			1	1
	85	J	Matcumbe Harbour	1			1
			Mile Marker B4.5				
	95	I	Bayside			1	1
			Campbell's Marine,				
	13	G	Tavernier	3	5		8
			Plantation Yacht				
	14	H	Harbour, Islamorada	3	5	5	13
			Richmond's Landing,				
	15	I	Islamorada			1	1
			Islamorada Yacht				
	17	I	Basin, Islamorada			1	1
			Caloosa Cove Marina &				
			Resort, Lower				
	19	J	Matcumbe	1	1		2
	40		Curtis Marine,				
		G	Tavernier			1	1
			Blue Waters Marine,				
	41	G	Tavernier			1	1
			Key Largo Harbour,				
	42	F	Key Largo	1	1		2
			Holiday Inn Docks,				
	43	F	Key Largo			3	3
			Pilot House Marine,				
	45	F	Key Largo			1	1
			Point Laura Campground				
	48	C	& Marina, Key Largo			1	1
			The Crafty Pelican,				
	50	C	Key Largo		1		1
			Matcumbe Marine,				
	52	I	Islamorada			2	2
			The Suites of Key				
	53	F	Largo, Key Largo	1	1		2
	81	B	Card Sound Toll Bridge			3	3
Subtotal				6	12	27	45
Florida Keys				22	45	119	186
Totals							

**APPENDIX B: BOAT LIVE-ABOARD QUESTIONNAIRE**



FLORIDA SEA GRANT COLLEGE PROGRAM  
PROJECT R/C-P-15

Boat Live-Aboards in the Florida Keys:  
A New Factor in Waterfront Management

Live-aboard Boaters

We are asking you to participate in a study being carried out by the University of Florida in the Florida Keys.

This study deals with the needs and impact of live-aboard boating on public services in coastal Florida. We hope that you will provide us with information concerning your live-aboard experiences so that we may relate them to other boat live-aboard, shore resident, and waterfront community needs.

After we have gathered this information, we will study it to determine the nature and extent of live-aboard demands on shoreside facilities and public services. We hope that this study will offer guidelines to incorporate boat live-aboards into the local planning process.

We want to be sure that the conclusions reached in this study are realistic. We place great importance on your willingness to participate in this interview and provide us with responses to the questions.

We would be pleased to answer any questions you have concerning the research procedures. All information is absolutely confidential. You may withdraw your consent to continue participation in the interview at any time without prejudice. Kindly note that no monetary compensation is made for completing the interview.

Thank you for your cooperation.

Gustavo A. Antonini  
Principal Investigator  
Department of Geography  
3141 Turlington Hall  
University of Florida  
Gainesville, Florida 32611  
(904) 392-6233

I. QUESTIONNAIRE CONTROL

1. Live-aboard Classification:

Year-round \_\_\_\_\_  
Winter \_\_\_\_\_  
Summer \_\_\_\_\_

2. Site Classification:

Commercial Shoreside Facility (specify):

Marina \_\_\_\_\_  
Restaurant Pier \_\_\_\_\_  
Boat Yard \_\_\_\_\_  
Dockminium \_\_\_\_\_  
Other (specify) \_\_\_\_\_

Non-commercial Shoreside Facility \_\_\_\_\_

All-weather Anchorage \_\_\_\_\_

3. Site Name \_\_\_\_\_

4. Site I.D. Number \_\_\_\_\_

5. Date of Interview: \_\_\_\_ (day) \_\_\_\_ (mo) \_\_\_\_ (year)

6. Time of Interview \_\_\_\_\_

7. Interviewer \_\_\_\_\_

II. VESSEL CHARACTERISTICS

1. General Classification:

Self-propelled (specify):

Power \_\_\_\_\_  
Sail Only \_\_\_\_\_  
Sail With Auxiliary Power \_\_\_\_\_

Floating Home \_\_\_\_\_

2. Dimensions (feet):

Length \_\_\_\_\_  
Beam \_\_\_\_\_  
Draft \_\_\_\_\_

3. Propulsion and Power Generation Systems:

Propulsion (if applicable)

Number of Engines \_\_\_\_\_

Type (specify) \_\_\_\_\_

Diesel \_\_\_\_\_

Gasoline \_\_\_\_\_

Fuel Capacity (gallons) \_\_\_\_\_

Power Generation (if applicable)

Electrical Current

AC \_\_\_\_\_ Voltage \_\_\_\_\_

DC \_\_\_\_\_ Voltage \_\_\_\_\_

AC/DC \_\_\_\_\_ Voltages \_\_\_\_\_

Generator

Type (specify)

Fossil Fuel Systems

Diesel \_\_\_\_\_

Gasoline \_\_\_\_\_

Fuel Capacity (if Different from Propulsion System) \_\_\_\_\_

Alternative Systems

Wind \_\_\_\_\_

Solar \_\_\_\_\_

Water \_\_\_\_\_

Storage Batteries: No. \_\_\_\_\_ Type \_\_\_\_\_

4. Utilities

Electrical (specify number of shorepower outlets required):

110V \_\_\_\_\_

220V \_\_\_\_\_

Water

Water Tank Capacity (gallons) \_\_\_\_\_

Direct Hookup with Pressure Stepdown Device \_\_\_\_\_

Source:

Public \_\_\_\_\_

Private \_\_\_\_\_

Other (specify) \_\_\_\_\_

Telephone \_\_\_\_\_

TV Cable \_\_\_\_\_

Sewerage

Direct Hookup for Shoreside Disposal \_\_\_\_\_

Holding Tank \_\_\_\_\_

Pumpout Location:

Dockside Facility \_\_\_\_\_

Inshore \_\_\_\_\_

Offshore \_\_\_\_\_

Plumbed Directly to Sea \_\_\_\_\_

Garbage Disposal

What do you put your garbage in?

- Paper Bags \_\_\_\_\_
- Plastic Bags \_\_\_\_\_
- Cartons (Open \_\_\_\_\_ Closed \_\_\_\_\_)
- Other (specify) \_\_\_\_\_

Quantity (bags per day, sample sizes shown) \_\_\_\_\_

Place of Disposal

- Marina Dumpster \_\_\_\_\_ Separate Fee (specify amount) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

Grey Water (Sink Water) Disposal:

- Direct Hookup for Shoreside Disposal \_\_\_\_\_
- Holding Tank \_\_\_\_\_
- Plumbed Direct to Sea \_\_\_\_\_

5. Appliances (specify number):

- Washer/Dryer \_\_\_\_\_
- Television \_\_\_\_\_
- VCR \_\_\_\_\_
- Radio/Stereo \_\_\_\_\_
- Computer \_\_\_\_\_
- Refrigerator \_\_\_\_\_
- Freezer \_\_\_\_\_
- Microwave \_\_\_\_\_
- Fan \_\_\_\_\_
- Hot Water Heater \_\_\_\_\_
- Air Conditioner:
  - Central \_\_\_\_\_
  - One Cabin Unit \_\_\_\_\_
  - Two or More Cabin Units \_\_\_\_\_
- Cabin Heater:
  - Electric \_\_\_\_\_
  - Kerosene \_\_\_\_\_
  - Propane \_\_\_\_\_
  - Diesel \_\_\_\_\_
  - Charcoal (Wood) \_\_\_\_\_
  - Cooking Stove
    - Electric \_\_\_\_\_
    - Alcohol \_\_\_\_\_
    - Kerosene \_\_\_\_\_
    - Propane \_\_\_\_\_
    - Diesel \_\_\_\_\_

Other Appliances (specify) \_\_\_\_\_

6. Accommodations:

- Forward Cabin (if applicable)
- Sleeping (no. of berths) \_\_\_\_\_
- Storage \_\_\_\_\_
- Other (specify) \_\_\_\_\_

**Main Cabin**

**Galley**

Sink With Piped Water \_\_\_\_\_  
Cooking Stove \_\_\_\_\_  
Refrigerator \_\_\_\_\_  
Ice Box \_\_\_\_\_

**Dinette**

Sleeping (no. of berths) \_\_\_\_\_

Other (specify) \_\_\_\_\_

**Head**

Number of Complete Heads (Flush Toilet, Tub or Shower, and Wash Basin With Piped Water) \_\_\_\_\_

Number of Half Heads (at least Flush Toilet or Tub/Shower But Does Not Have Other Facilities) \_\_\_\_\_

**Type of Toilet:**

Raw Water (No Holding Tank) \_\_\_\_\_  
Raw Water (With Holding Tank) \_\_\_\_\_ Capacity (Gall) \_\_\_\_\_  
Macerator \_\_\_\_\_  
Chemical \_\_\_\_\_  
Other (specify) \_\_\_\_\_

**Shower/Bath**

With Sump \_\_\_\_\_  
Sump Pumpout:  
Dockside Facility \_\_\_\_\_  
Inshore \_\_\_\_\_  
Offshore \_\_\_\_\_

**Other Cabins (if application)**

Sleeping \_\_\_\_\_  
Storage \_\_\_\_\_  
Other (specify) \_\_\_\_\_

**Bilge**

**What goes into bilge?**

Rainwater \_\_\_\_\_  
Fuel/oil seepage \_\_\_\_\_  
Shower/bath \_\_\_\_\_  
Seawater seepage \_\_\_\_\_  
Ice box seepage \_\_\_\_\_

**Bilge Pump:**

Type: Automatic \_\_\_\_\_ Manual \_\_\_\_\_  
Discharge: Inshore \_\_\_\_\_ Offshore \_\_\_\_\_

7. Ownership Status

Owned or Being Bought by You or Someone Else Aboard: \_\_\_\_\_

Boat Value:

A _____	less than \$10,000	J _____	\$50,000 to \$ 59,999
B _____	\$10,000 to \$14,999	K _____	\$60,000 to \$ 69,999
C _____	\$15,000 to \$19,999	L _____	\$70,000 to \$ 79,999
D _____	\$20,000 to \$24,999	M _____	\$80,000 to \$ 89,999
E _____	\$25,000 to \$29,999	N _____	\$90,000 to \$ 99,999
F _____	\$30,000 to \$34,999	O _____	\$100,000 to \$124,999
G _____	\$35,000 to \$39,999	P _____	\$125,000 to \$149,999
H _____	\$40,000 to \$44,999	Q _____	\$150,000 to \$199,999
I _____	\$45,000 to \$49,999	R _____	\$200,000 or more

Rented for Cash Rent: \_\_\_\_\_

Monthly Rent:

A _____	less than \$50	H _____	\$200 to \$ 249
B _____	\$ 50 to \$ 99	I _____	\$250 to \$ 299
C _____	\$100 to \$119	J _____	\$300 to \$ 349
D _____	\$120 to \$139	K _____	\$350 to \$ 399
E _____	\$140 to \$159	L _____	\$400 to \$ 499
F _____	\$160 to \$179	M _____	\$500 to \$1,000
G _____	\$180 to \$199	N _____	more than \$1,000

Occupied Without Payment of Cash Rent: \_\_\_\_\_

III. ITINERARY

1. Home Port \_\_\_\_\_
2. Arrival Date in the Florida Keys \_\_\_(day)\_\_(mo)\_\_(year)
3. Dockside and Anchorage Locations Visited in the Keys on Journey to Present Site (numbered from 1, first visited):
  - Key Largo \_\_\_\_\_
  - Tavernier \_\_\_\_\_
  - Windley Key \_\_\_\_\_
  - Islamorada \_\_\_\_\_
  - Lower Matacumbe \_\_\_\_\_
  - Duck Key \_\_\_\_\_
  - Key Colony \_\_\_\_\_
  - Marathon \_\_\_\_\_
  - Pine Channel/ \_\_\_\_\_
  - Little Torch \_\_\_\_\_
  - Stock Island \_\_\_\_\_
  - Key West \_\_\_\_\_
4. Stopovers Foreseen Between Present Location and Final Destination in the Keys:
  - Key Largo \_\_\_\_\_
  - Tavernier \_\_\_\_\_
  - Windley Key \_\_\_\_\_
  - Islamorada \_\_\_\_\_
  - Lower Matacumbe \_\_\_\_\_

Duck Key \_\_\_\_\_  
 Key Colony \_\_\_\_\_  
 Marathon \_\_\_\_\_  
 Pine Channel/ \_\_\_\_\_  
 Little Torch \_\_\_\_\_  
 Stock Island \_\_\_\_\_  
 Key West \_\_\_\_\_

5. Estimated Departure Date From Keys \_\_\_(day)\_\_\_(mo)\_\_\_(year)

6. Ultimate Destination \_\_\_\_\_

IV. DEMOGRAPHIC PROFILE

1. Owner or Renter of Vessel (Person 1)

Sex: \_\_\_ Male \_\_\_ Female

Age at Last Birthday \_\_\_\_\_

Marital Status:

Now Married \_\_\_\_\_

Separated \_\_\_\_\_

Widowed \_\_\_\_\_

Never Married \_\_\_\_\_

Divorced \_\_\_\_\_

Highest Grade Attended at Regular School or College

Elementary Through High School (specify 1-12) \_\_\_\_\_

College (No. of Academic Years) \_\_\_\_\_

Never Attended School \_\_\_\_\_

Information on persons who usually live onboard but may be temporarily away  
 (Persons 2 - 7)

2. Person 2

Relationship to Person 1

Relative:

Husband/Wife \_\_\_\_\_

Son/Daughter \_\_\_\_\_

Brother/Sister \_\_\_\_\_

Father/Mother \_\_\_\_\_

Other Relative (specify) \_\_\_\_\_

Not Related:

Roomer/Boarder \_\_\_\_\_

Partner/Roommate \_\_\_\_\_

Paid Employee \_\_\_\_\_

Other (specify) \_\_\_\_\_

Sex: \_\_\_ Male \_\_\_ Female

Age at Last Birthday \_\_\_\_\_

Marital Status:

Now Married \_\_\_\_\_

Separated \_\_\_\_\_

Widowed \_\_\_\_\_

Never Married \_\_\_\_\_

Divorced \_\_\_\_\_

Highest Grade Attended at Regular School or College \_\_\_\_\_  
 Elementary Through High School (specify 1-12)  
 College (No. of Academic Years) \_\_\_\_\_  
 Never Attended School \_\_\_\_\_

3. Person 3

Relationship to Person 1

Relative:

Husband/Wife \_\_\_\_\_  
 Son/Daughter \_\_\_\_\_  
 Brother/Sister \_\_\_\_\_  
 Father/Mother \_\_\_\_\_  
 Other Relative (specify) \_\_\_\_\_

Not Related:

Roomer/Boarder \_\_\_\_\_  
 Partner/Roommate \_\_\_\_\_  
 Paid Employee \_\_\_\_\_  
 Other (specify) \_\_\_\_\_

Sex: \_\_\_\_\_ Male \_\_\_\_\_ Female

Age at Last Birthday \_\_\_\_\_

Marital Status:

Now Married \_\_\_\_\_  
 Separated \_\_\_\_\_  
 Widowed \_\_\_\_\_  
 Never Married \_\_\_\_\_  
 Divorced \_\_\_\_\_

Highest Grade Attended at Regular School or College \_\_\_\_\_  
 Elementary Through High School (specify 1-12)  
 College (No. of Academic Years) \_\_\_\_\_  
 Never Attended School \_\_\_\_\_

4. Person 4

Relationship to Person 1

Relative:

Husband/Wife: \_\_\_\_\_  
 Son/Daughter \_\_\_\_\_  
 Brother/Sister \_\_\_\_\_  
 Father/Mother \_\_\_\_\_  
 Other Relative (specify) \_\_\_\_\_

Not Related:

Roomer/Boarder \_\_\_\_\_  
 Partner/Roommate \_\_\_\_\_  
 Paid Employee \_\_\_\_\_  
 Other (specify) \_\_\_\_\_

Sex: \_\_\_\_\_ Male \_\_\_\_\_ Female

Age at Last Birthday \_\_\_\_\_

Marital Status:

Now Married \_\_\_\_\_  
 Separated \_\_\_\_\_  
 Widowed \_\_\_\_\_  
 Never Married \_\_\_\_\_  
 Divorced \_\_\_\_\_

Highest Grade Attended at Regular School or College \_\_\_\_\_  
 Elementary Through High School (specify 1-12)  
 College (No. of Academic Years) \_\_\_\_\_  
 Never Attended School \_\_\_\_\_

5. Person 5

Relationship to Person 1  
 Relative:  
 Husband/Wife \_\_\_\_\_  
 Son/Daughter \_\_\_\_\_  
 Brother/Sister \_\_\_\_\_  
 Father/Mother \_\_\_\_\_  
 Other Relative (specify) \_\_\_\_\_

Not Related:  
 Roomer/Boarder \_\_\_\_\_  
 Partner/Roommate \_\_\_\_\_  
 Paid Employee \_\_\_\_\_  
 Other (specify) \_\_\_\_\_

Sex: \_\_\_ Male \_\_\_ Female

Age at Last Birthday \_\_\_\_\_

Marital Status:

Now Married \_\_\_\_\_  
 Separated \_\_\_\_\_  
 Widowed \_\_\_\_\_  
 Never Married \_\_\_\_\_  
 Divorced \_\_\_\_\_

Highest Grade Attended at Regular School or College \_\_\_\_\_  
 Elementary Through High School (specify 1-12)  
 College (No of Academic Years) \_\_\_\_\_  
 Never Attended School \_\_\_\_\_

6. Person 6

Relationship to Person 1  
 Relative:  
 Husband/Wife \_\_\_\_\_  
 Son/Daughter \_\_\_\_\_  
 Brother/Sister \_\_\_\_\_  
 Father/Mother \_\_\_\_\_  
 Other Relative (specify) \_\_\_\_\_

Not Related:  
 Roomer/Boarder \_\_\_\_\_  
 Partner/Roommate \_\_\_\_\_  
 Paid Employee \_\_\_\_\_  
 Other (specify) \_\_\_\_\_

Sex: \_\_\_ Male \_\_\_ Female

Age at Last Birthday \_\_\_\_\_

Marital Status:

Now Married \_\_\_\_\_  
 Separated \_\_\_\_\_  
 Widowed \_\_\_\_\_  
 Never Married \_\_\_\_\_  
 Divorced \_\_\_\_\_

Highest Grade Attended at Regular School or College  
Elementary Through High School (specify 1-12) \_\_\_\_\_  
College (No of Academic Years) \_\_\_\_\_  
Never Attended School \_\_\_\_\_

7. Person 7

Relationship to Person 1

Relative:

Husband/Wife \_\_\_\_\_  
Son/Daughter \_\_\_\_\_  
Brother/Sister \_\_\_\_\_  
Father/Mother \_\_\_\_\_  
Other Relative (specify) \_\_\_\_\_

Not Related:

Roomer/Boarder \_\_\_\_\_  
Partner/Roommate \_\_\_\_\_  
Paid Employee \_\_\_\_\_  
Other (specify) \_\_\_\_\_

Sex: \_\_\_ Male \_\_\_ Female

Age at Last Birthday \_\_\_\_\_

Marital Status:

Now Married \_\_\_\_\_  
Separated \_\_\_\_\_  
Widowed \_\_\_\_\_  
Never Married \_\_\_\_\_  
Divorced \_\_\_\_\_

Highest Grade Attended at Regular School or College  
Elementary Through High School (specify 1-12) \_\_\_\_\_  
College (No. of Academic Years) \_\_\_\_\_  
Never Attended School \_\_\_\_\_

8. Additional Information on Person 1

Legal voting address (city, state) \_\_\_\_\_

Are you retired? \_\_\_\_\_

Did you work at any time last week? \_\_\_\_\_

How many hours? \_\_\_\_\_

Where (give name and address)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

How long did it take you to get to work (one way)? \_\_\_\_\_

How do you get to work (most common method):

car, van \_\_\_\_\_  
motorcycle \_\_\_\_\_  
bicycle \_\_\_\_\_  
dinghy \_\_\_\_\_  
walk \_\_\_\_\_  
bus \_\_\_\_\_  
taxi \_\_\_\_\_  
worked on-board \_\_\_\_\_  
other (specify) \_\_\_\_\_

When did you last work? \_\_\_\_\_ (mo) \_\_\_\_\_ (year)

Current or most recent job \_\_\_\_\_

Type of employer:

manufacturing \_\_\_\_\_  
wholesale trade \_\_\_\_\_  
retailing \_\_\_\_\_  
service (tourism excl.) \_\_\_\_\_  
tourist trade \_\_\_\_\_  
government \_\_\_\_\_  
construction \_\_\_\_\_  
commercial fishing \_\_\_\_\_  
self-employed (specify) \_\_\_\_\_  
other (specify) \_\_\_\_\_

Source of Income:	% of Total	% of Source	
		Keys	Elsewhere
Wages, salaries, commissions	_____	_____	_____
Interest, dividends	_____	_____	_____
Social security	_____	_____	_____
Other (pensions, alimony, etc.)	_____	_____	_____

9. Pets On-board: No.  
Dogs \_\_\_\_\_  
Cats \_\_\_\_\_  
Birds \_\_\_\_\_  
Others (specify) \_\_\_\_\_

V. SERVICE USE

1. Marina

Toilet	_____	Parking	_____
Shower	_____	Fuel/Bottled Gas	_____
Laundry	_____	Engine Repair	_____
Telephone	_____	Marine Supplies	_____
Mail	_____	Groceries	_____
Ice	_____	Pumpout	_____
		Snack Bar/Restaurant	_____

2. Transportation

Do you have in the Keys:

	No.	Parking/Storage*
car, van	_____	_____
motorcycle	_____	_____
moped	_____	_____
bicycle	_____	_____
dinghy	_____	_____
other (specify)	_____	_____

\* (dockside, onboard, street, parking lot, etc.)

Do you use commercially available:

rented vehicle \_\_\_\_\_  
taxi \_\_\_\_\_  
other (specify) \_\_\_\_\_

Public:

bus \_\_\_\_\_

3. Education

Formal:

Number of children attending school in the Keys at the following levels:

Elementary \_\_\_\_\_  
Middle \_\_\_\_\_  
High School \_\_\_\_\_  
College \_\_\_\_\_  
Other (specify) \_\_\_\_\_

Number of children of school age on-board not attending school in the Keys \_\_\_\_\_

Alternative form of education provided (specify)  
\_\_\_\_\_

Adult Education (specify) \_\_\_\_\_

4. Library

Do you possess a library card? \_\_\_\_\_

Number of visits per month \_\_\_\_\_

5. Other Community Services Used (in the Keys)

Hospital \_\_\_\_\_  
Dentist \_\_\_\_\_  
Veterinary \_\_\_\_\_  
Church \_\_\_\_\_  
Fire protection \_\_\_\_\_  
Police \_\_\_\_\_

6. What service(s) is(are) required but unavailable to you at this location?

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VI. LIVE-ABOARD LIFESTYLE

1. How long have you lived-aboard (years) as:

Year-round Live-aboard \_\_\_\_\_  
Winter Season Live-aboard \_\_\_\_\_  
Summer Season Live-aboard \_\_\_\_\_

2. How many day sails or weekend boating jaunts, on the average, do you take each month? \_\_\_\_\_

3. Why did you decide to become a live-aboard?

Factors \_\_\_\_\_  
Freedom \_\_\_\_\_  
Cost of Living \_\_\_\_\_  
Affordable housing \_\_\_\_\_  
Back to Nature \_\_\_\_\_  
Occupation \_\_\_\_\_  
Tranquility \_\_\_\_\_  
Scenic Beauty \_\_\_\_\_  
Others (specify) \_\_\_\_\_

4. What are the most significant drawbacks to living-aboard?

Cost \_\_\_\_\_  
Crime \_\_\_\_\_  
Boaters Services \_\_\_\_\_  
Laundry \_\_\_\_\_  
Community Service \_\_\_\_\_  
Shore Access \_\_\_\_\_  
Garbage Disposal \_\_\_\_\_  
Sewage Disposal \_\_\_\_\_  
Noise \_\_\_\_\_  
Water Pollution \_\_\_\_\_  
Shore Hostility \_\_\_\_\_  
Others (specify) \_\_\_\_\_

5. What do you estimate to be your boat's average monthly live-aboard costs:

Fuel \_\_\_\_\_  
Electricity \_\_\_\_\_  
Gas \_\_\_\_\_  
Water \_\_\_\_\_  
Sewerage \_\_\_\_\_  
Garbage \_\_\_\_\_  
Food \_\_\_\_\_  
Maintenance \_\_\_\_\_  
Slip \_\_\_\_\_

Insurance \_\_\_\_\_  
 Boat Mortgage \_\_\_\_\_  
 Medical/Dental \_\_\_\_\_  
 Entertainment \_\_\_\_\_  
 Clothing/Laundry \_\_\_\_\_  
 Other (specify) \_\_\_\_\_

VII. RELATIONSHIPS WITH SHORE-BASED GROUPS

1. Noise

Is there a problem between you and any of the following groups with respect to noise?

Groups	No Problem	Moderate Problem	Severe Problem
Recreational Boats	_____	_____	_____
Shore Residents	_____	_____	_____
Marina Owner/Manager	_____	_____	_____
Public Services, (police, fire, public works, coast guard)	_____	_____	_____
Other live-aboards	_____	_____	_____
Others (specify)	_____	_____	_____

Can you indicate potential solutions for problems, if they exist?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Garbage Disposal

Is there a problem between you and any of the following groups with respect to garbage disposal?

Groups	No Problem	Moderate Disagreement	Severe Disagreement
Recreational boats	_____	_____	_____
Shore Residents	_____	_____	_____
Marina Owner/Manager	_____	_____	_____
Public Officials (police, fire, public works, coast guard)	_____	_____	_____
Other live-aboards	_____	_____	_____
Others (specify)	_____	_____	_____

Can you indicate potential solutions for problems if they exist?

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3. Shore Access (for live-aboards at anchorages)

Where do you tie up your dinghy?

nearest shore site \_\_\_\_\_  
 marina facilities \_\_\_\_\_  
 commercial dock \_\_\_\_\_  
 other (specify) \_\_\_\_\_

Is there a problem between you and any of the following groups with respect to shore access?

Groups	No Problem	Moderate Disagreement	Severe Disagreement
Recreational boats	_____	_____	_____
Shore Residents	_____	_____	_____
Marina Owner/ Manager	_____	_____	_____
Public Officials (police, fire, public works, coast guard)	_____	_____	_____
Others (specify)	_____	_____	_____

Can you indicate potential solutions for problems if they exist?

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4. Sewage Disposal

Is there a problem between you and any of the following groups with respect to sewage disposal?

Groups	No Problem	Moderate Disagreement	Severe Disagreement
Recreational Boats	_____	_____	_____
Shore Residents	_____	_____	_____
Marina Owners/ Managers	_____	_____	_____
Public Officials (police, fire, public works, coast guard)	_____	_____	_____
Other	_____	_____	_____
Live-aboards	_____	_____	_____
Others (specify)	_____	_____	_____

Can you indicate potential solutions for problems if they exist?

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5. Appearance

How do you (and those on your boat) view the appearance of live-aboard boats at your location?

Unsightly  Attractive  
 Both Unsightly and Attractive  No Opinion

Can you indicate potential solutions for problem if identified as unsightly:

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6. Community Services

Is there a problem between you and any of the following groups with respect to your access to community services (transportation, schools, library, garbage, parks, police, fire)?

Groups	None	Moderate	Severe	Specify Service
Shore Residents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marina Owners/ Managers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public Officials (police, fire, public works, coast guard)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Can you indicate potential solutions for problem if identified as such:

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7. Crime

How would you describe the degree of criminal activity generated by the live-aboard population at your location?

No Crime  Less Than On Shore  Same as On Shore  More Than On Shore

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If live-aboard-generated crime is present, can you specify prevalent forms:

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To what degree do you (and those on your boat) feel you are targeted by the following groups as a source of crime:

Groups	Not Targeted	Moderate Discrimination	Severe Discrimination
Shore Residents	_____	_____	_____
Marina Owners/ Managers	_____	_____	_____
Public Officials (police, fire, public works, coast guard)	_____	_____	_____

Can you indicate potential solutions for problems if identified as such:

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### VIII. PAST AND PRESENT PERCEPTIONS OF THE FLORIDA KEYS

- Indicate the order of importance of the following features in your decision to live-aboard in the Florida Keys. Rank them with 1 as the most important decision-making factor and ignore those which are irrelevant.
 

scenic beauty	_____
clean water and air	_____
climate	_____
tranquility	_____
fishing	_____
snorkeling	_____
sailing	_____
beachcombing	_____
flora and fauna	_____
personal freedom	_____
cameraderie	_____
entertainment	_____
community services	_____
boaters services	_____
hospitality of local people	_____
cost of living	_____
occupation (work-related)	_____
financial constraints	_____

2. For each factor considered relevant above, indicate the conditions you expected to find in the Florida Keys before arrival:

Factor	Poor	Fair	Good	Excellent
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

3. For the same factors, indicate the condition found in the Florida Keys after arrival:

Factor	Poor	Fair	Good	Excellent
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**APPENDIX C: MONTHLY MARINA-TYPE FACILITIES BOAT  
COUNT MAILING FORMS**



*Department of Geography*  
3141 Turlington Hall

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University of Florida • Gainesville, Florida 32611 • (904) 392-0494

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September 27, 1988

Dear Sir:

A present and future growth issue in the Florida Keys will focus on live-aboard boats. Proposals to manage this segment of resource users will require information so that users and managers can develop equitable agreements for the live-aboard community.... Who are the live-aboards? What are their resources? What are their service needs?

The University of Florida, with funding from National Oceanographic and Atmospheric Administration through its Sea Grant College Program, and in cooperation with the Monroe County Planning Department, is undertaking a study to provide a reliable assessment of the relation between live-aboards and the waterfront growth management needs of coastal communities in the Florida Keys.

I spoke with you in April concerning our live-aboard project. You informed me that your marina accomodates live-aboards. For this reason, it has been included in our study. An important part of this study includes monthly counts of live-aboards at each shoreside facility and protected anchorage. The attached questionnaire is the first of twelve monthly contacts with you to request this information. Further, we wish to arrange a personal interview, in the future, so that we may benefit from your first-hand knowledge and opinions concerning boat live-aboards in the Florida Keys. We depend on you and fellow marina owners and managers to obtain a complete and reliable understanding of this subject.

You may be assured of complete confidentiality. The questionnaire has an identification number for mailing purposes only. Kindly mail the separate postcard so that we may know you received this letter. A pre-addressed, postage-paid envelope is enclosed for returning the completed questionnaire.

I would be pleased to answer any questions you might have. Please write or call. The telephone number is (904) 392-6233.

Thank you for your assistance.

Gustavo A. Antonini  
Professor of Geography



University of Florida/Sea Grant  
Boat Live-aboard Monthly Survey

The University of Florida is undertaking a research project to determine the needs and impact of boat live-aboards in the Florida Keys. The study includes a monthly count of live-aboard boats for the calendar year of September 1988 through August 1989. We will be contacting you by mail each month to ask you to provide us with the number of live-aboard boats at your marina. The information will be used strictly for scientific purposes and will be kept confidential.

## Definitions

(1) Boat live-aboards: owners or renters of vessels with living accommodations who use their vessel as a private, principal or secondary residence for extended periods (two months or more per year).

This definition excludes recreational boaters who live on-board infrequently (weekenders or vacationers).

(2) Seasonal (boat) live-aboards: use their boat as a primary or secondary residence for at least two months of the year but less than the entire year; they do not have to stay in one marina for the entire live-aboard season.

(3) Year-round (boat) live-aboards: use their boat as their primary place of residence for the entire year; they may dock at more than one marina during this period.

(4) Self-propelled live-aboard vessel: power, sail only, or sail with auxiliary power.

(5) Floating home: no means of on-board propulsion.

Please fill in the blanks in the following table according to the number of live-aboard boats (not people) at your marina on 31 January 1989 in each of the eight categories:-

Marina I.D. \_\_\_\_\_

	Number of Self-propelled Live-aboard Boats			Number of Floating Homes
	Power	Sail only	Sail with Auxiliary power	
Seasonal	-----	-----	-----	-----
Year-round	-----	-----	-----	-----

Please return this questionnaire to Professor Gustavo Antonini, Department of Geography, 3141 Turlington Hall, University of Florida, Gainesville, FL 32611. A stamped, addressed envelope has been enclosed for this purpose.

Thank you for your cooperation. We hope this study will be of benefit to the community of the Florida Keys.

G.A. Antonini,  
Professor of Geography,  
University of Florida.



America the Beautiful USA 15

Professor Gustavo A. Antonini  
Department of Geography  
3141 Turlington Hall  
University of Florida  
Gainesville, FL 32611

8

I have returned my questionnaire separately

---

Your name (please print)



*Department of Geography*  
3141 Turlington Hall

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University of Florida • Gainesville, Florida 32611 • (904) 392-0494

---

April 28, 1989

^F1^  
^F2^  
^F3^

I am writing to your marina again to request information on the number of live-aboard boats docked there on 30 April 1989.

This is the eighth of ten monthly contacts with you to request this information for the period 30 September 1988 - 30 June 1989. In order for the results of this study to be truly representative of overall conditions in the Keys, it is essential that each manager in the sample return their questionnaire each month.

As before, please return the questionnaire in the enclosed stamped envelope which is addressed to the University of Florida. In addition, please print your name on the enclosed postcard and return it separately.

Thank you for cooperating.

Cordially

Gustavo A. Antonini  
Professor of Geography



*Department of Geography*  
3141 Turlington Hall

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University of Florida

• Gainesville, Florida 32611

• (904) 392-0494

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May 22, 1989

^F1^  
^F2^  
^F3^

About three weeks ago I sent you a questionnaire seeking information on the number of live-aboard boats at your marina on April 30. It was the eighth of ten monthly questionnaires. As of today we have not had a reply from you.

The University of Florida, with U.S. Department of Commerce support, is undertaking this study of the relation between boat live-aboards and coastal growth management needs in the Florida Keys. Results of the project can provide an impartial basis for waterfront development.

I am writing to your marina again because of the significance each questionnaire has to the usefulness of this study. In order for the results to be truly representative of overall conditions in the Keys, it is essential that each manager in the sample return his questionnaire, even if no live-aboard boats happen to be in his marina.

In the event that your questionnaire has been misplaced, please call me collect at 904-392-6233.

Your cooperation is greatly appreciated.

Cordially

Gustavo A. Antonini  
Professor of Geography

**APPENDIX D: MONTHLY BOAT ANCHORAGE AND SEAWALL TIE-UP  
FIELD RECONNAISSANCE FORM**



University of Florida/Sea Grant Program

Boat Live-aboard Monthly Survey

The University of Florida is undertaking a research project to determine the needs and impact of boat live-aboards in the Florida Keys. The study includes a monthly count of live-aboard boats for the calendar year September 1988 through August 1989. The university, with funding from National Oceanographic and Atmospheric Administration through its Sea Grant College Program, and in cooperation with the Monroe County Planning Department will be obtaining:

- (1) a count of boats with live-aboard accomodation, including sail, powered vessels and floating homes, and
- (2) a 35 mm color slide record of the number and types of boats and floating homes,

The following locations will be surveyed monthly:

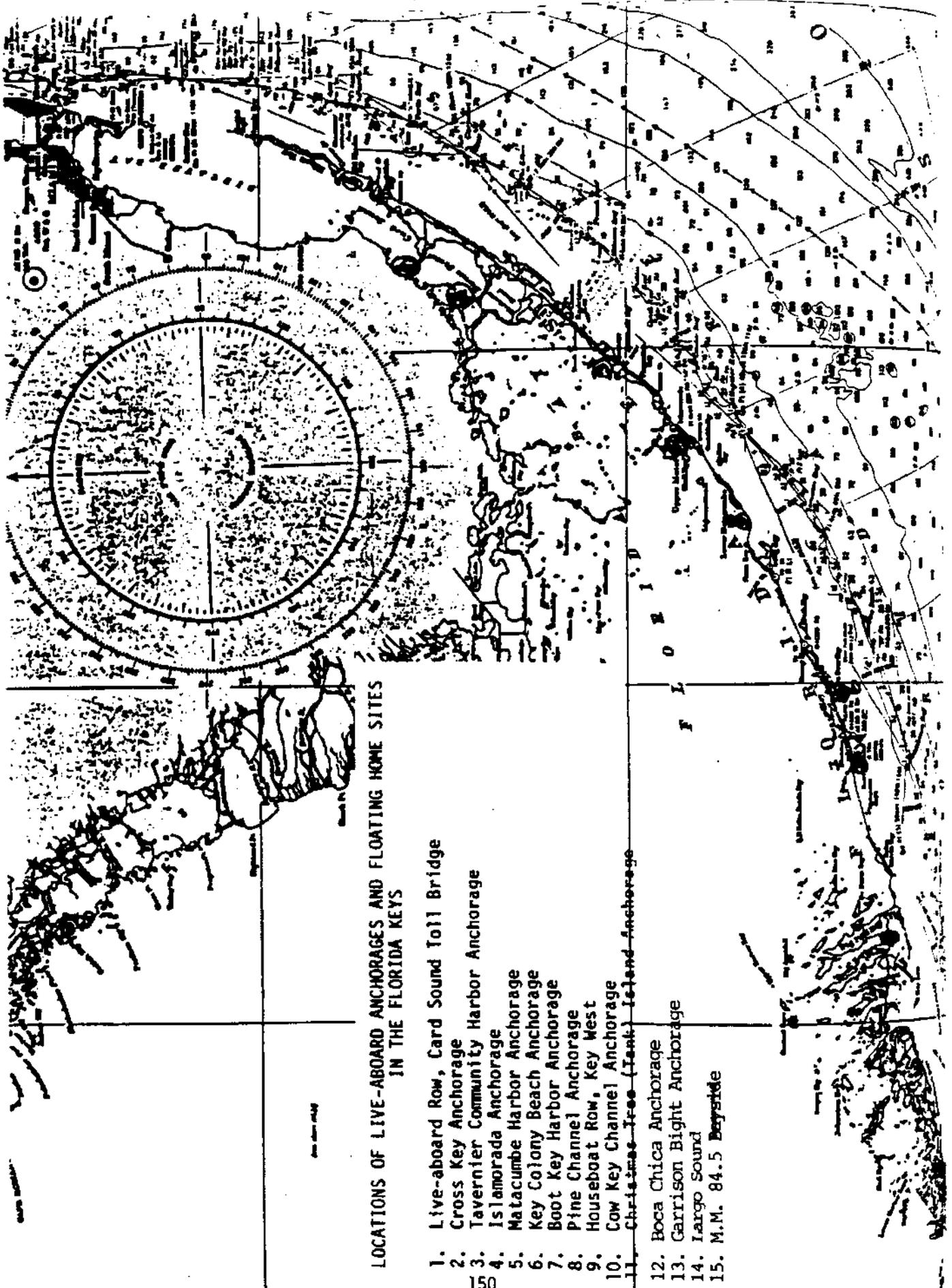
I.D.# Location

1. Live-aboard Row at Card Sound toll bridge
2. Cross Key Anchorage
3. Tavernier Community Harbor Anchorage
4. Islamorada Anchorage
5. Matacumbe Harbor Anchorage
6. Key Colony Beach Anchorage
7. Boot Key Harbour Anchorage
8. Pine Channel Anchorage
9. Houseboat Row, Key West
10. Cow Key Channel Anchorage
11. Christmas Tree (Tank) Island Anchorage
12. Boca Chica Anchorage
13. Garrison Bight Anchorage
14. Largo Sound
15. M.M. 84.5 Bayside

At this stage of the project we will limit the information strictly to a count and photographic record of the boats. You are provided with 35 mm color slide film and are requested to take photographs (1-4 slides, depending on number of boats and their distribution), to visually record the type and number of vessels at each site. Photos should be taken from the best vantage point(s). No attempt should be made to communicate with their occupants.

On the accompanying maps, in the spaces provided, and for each location, please fill in the following information:

1. Date of observation.
2. Number of boats observed in each of the following categories: power; sail (with or without auxiliary power); floating home.
3. Mark with "X" location of each boat or shade area(s) with clusters of boats.
4. Mark with "V" on maps place from which each photo is taken, indicate the photo number and mark with arrow " -----> " photo orientation.
5. Record number for each photo (slide) and any explanation under "comments" space provided.



LOCATIONS OF LIVE-ABOARD ANCHORAGES AND FLOATING HOME SITES  
IN THE FLORIDA KEYS

1. Live-aboard Row, Card Sound Toll Bridge
2. Cross Key Anchorage
3. Tavernier Community Harbor Anchorage
4. Islamorada Anchorage
5. Maticumbe Harbor Anchorage
6. Key Colony Beach Anchorage
7. Boot Key Harbor Anchorage
8. Pine Channel Anchorage
9. Houseboat Row, Key West
10. Cow Key Channel Anchorage
11. Christmas Tree (Island) Island Anchorage
12. Boca Chica Anchorage
13. Garrison Bight Anchorage
14. Largo Sound
15. M.M. 84.5 Bayside



SLIDE NO.	COMMENTS

DATE: \_\_\_\_\_

NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS		NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxiliary power)	

LIVE-ABOARD ROW, CARD SOUND TOLL BRIDGE

27°30'

155

156

U.S. NAVY (GLACES) FLORIDA CITY 14 MI

158

25

15

32

DATE: \_\_\_\_\_

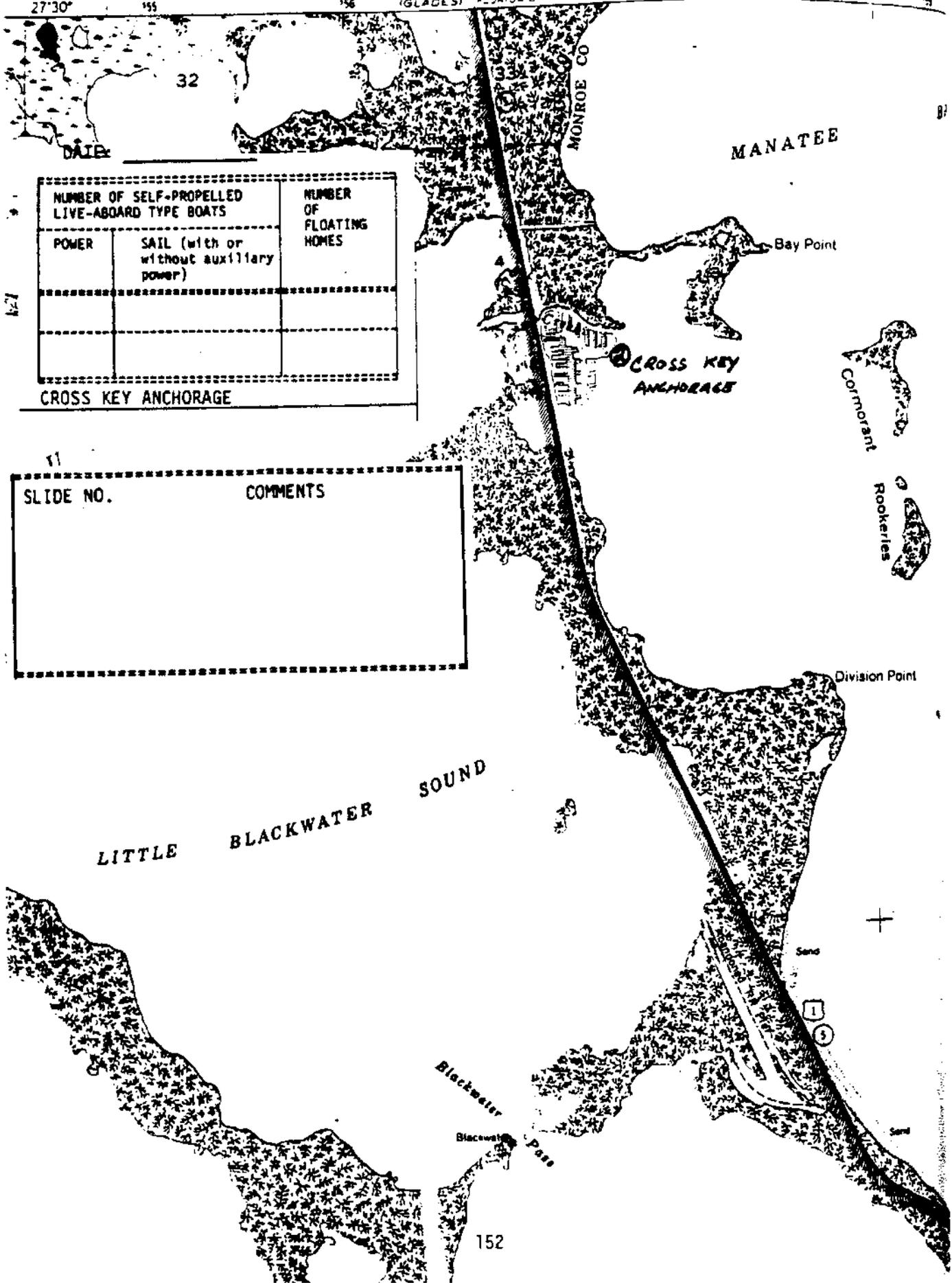
NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS		NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxiliary power)	

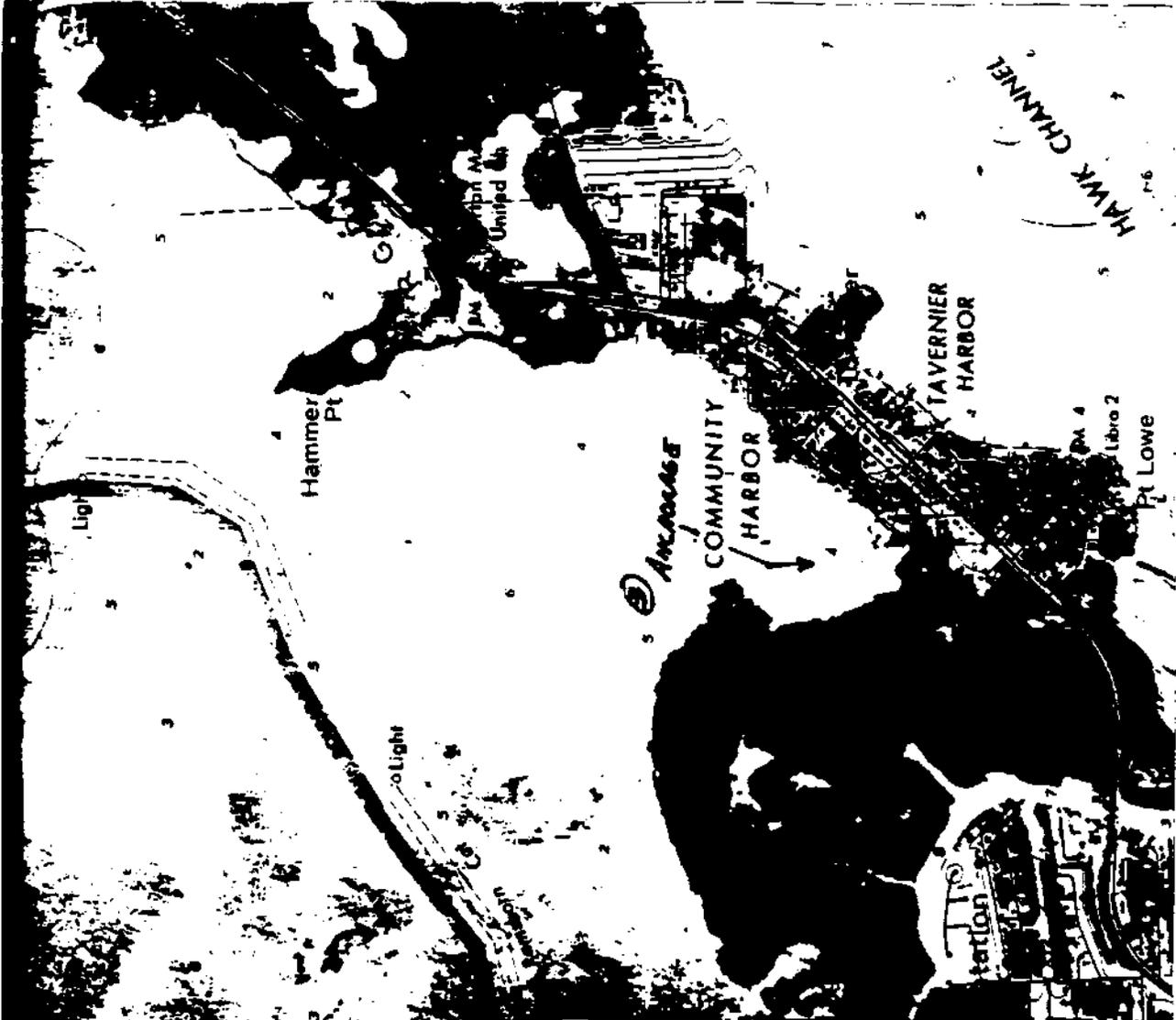
CROSS KEY ANCHORAGE

127

11

SLIDE NO.	COMMENTS





SLIDE NO.		COMMENTS	
DATE:		NUMBER OF FLOATING HOMES	
NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS	SAIL (with or without auxilliary power)	TAVERNIER COMMUNITY HARBOR ANCHORAGE	
POWER			

DATE:

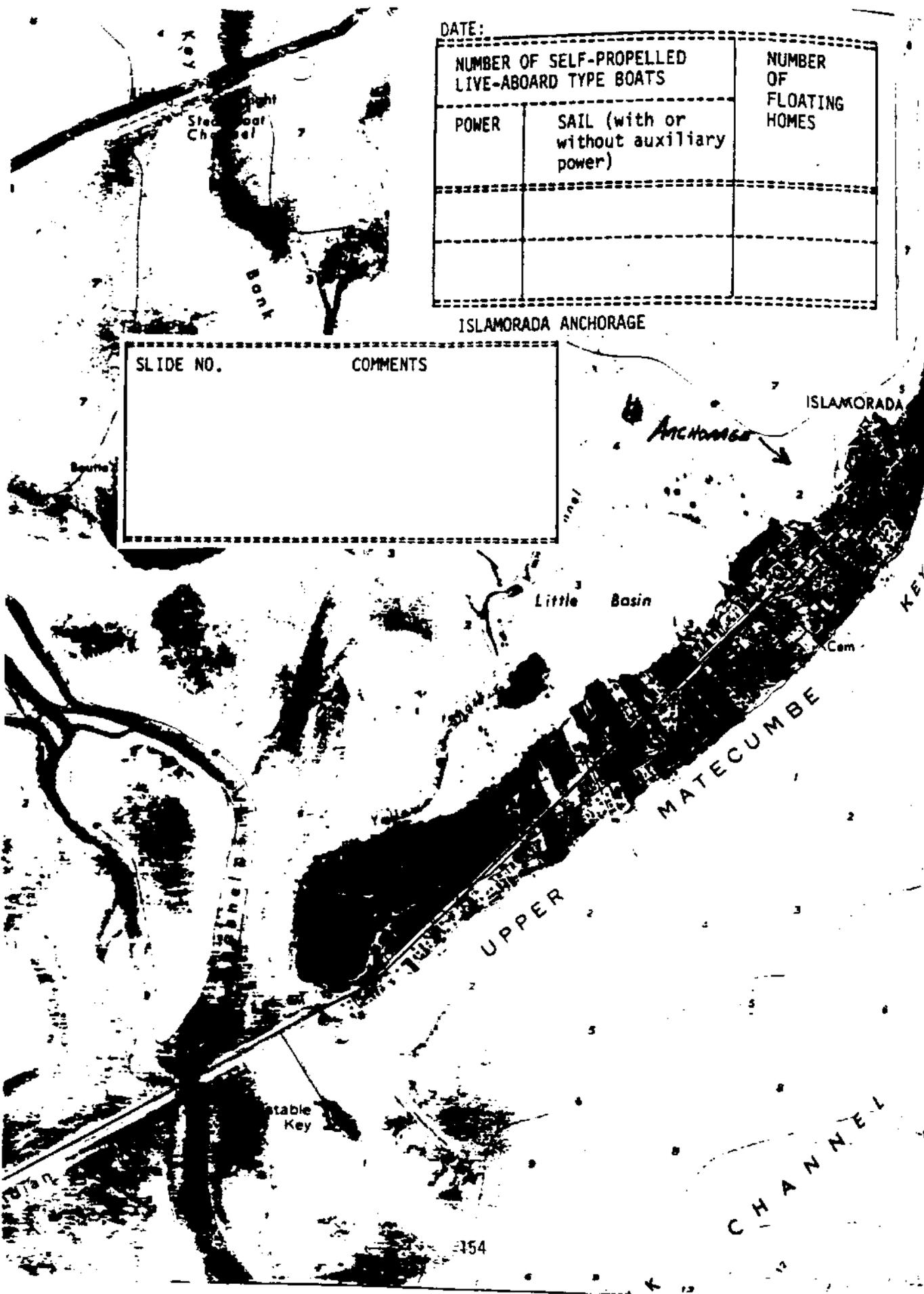
NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS		NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxiliary power)	

ISLAMORADA ANCHORAGE

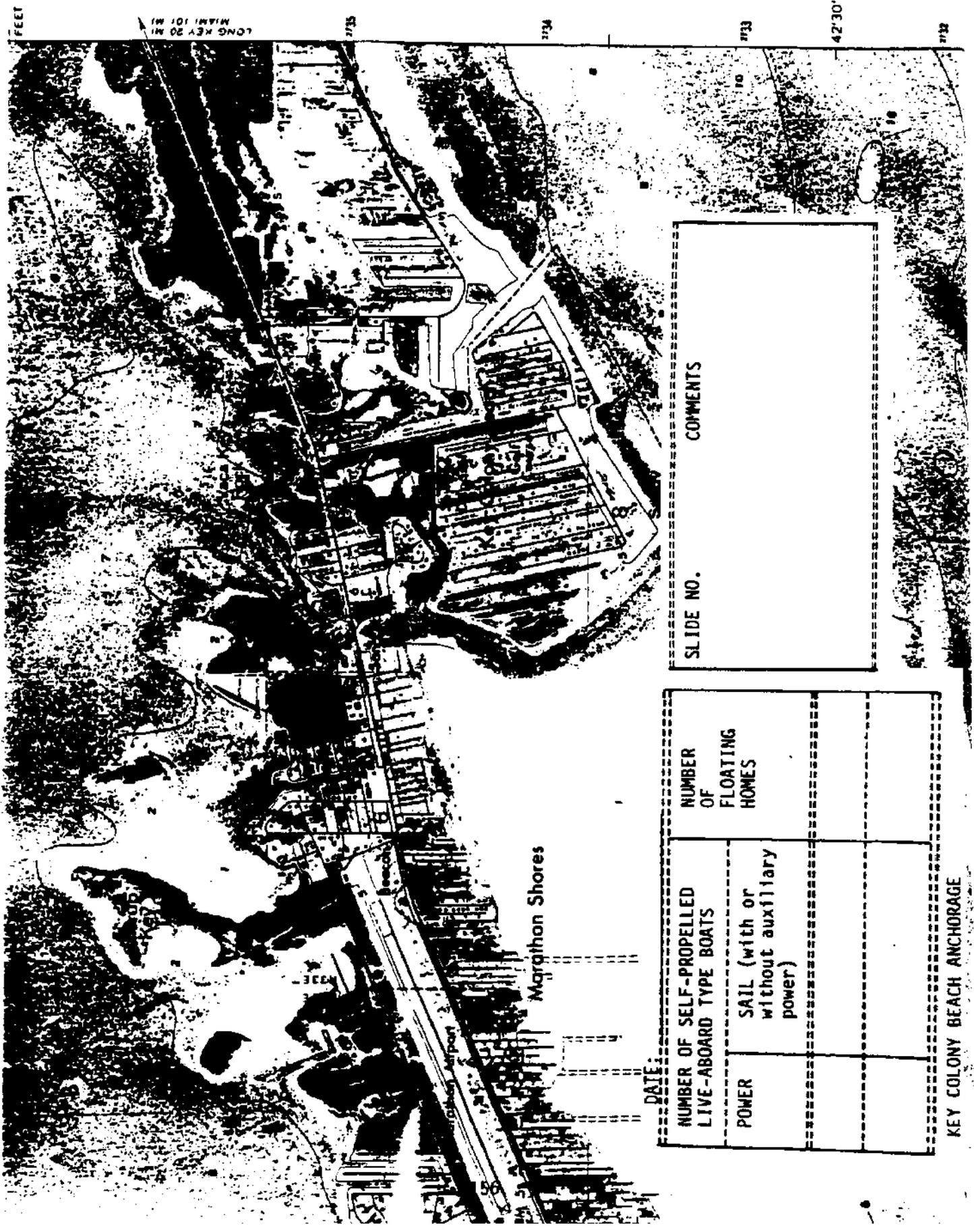
SLIDE NO.

COMMENTS

SLIDE NO.	COMMENTS







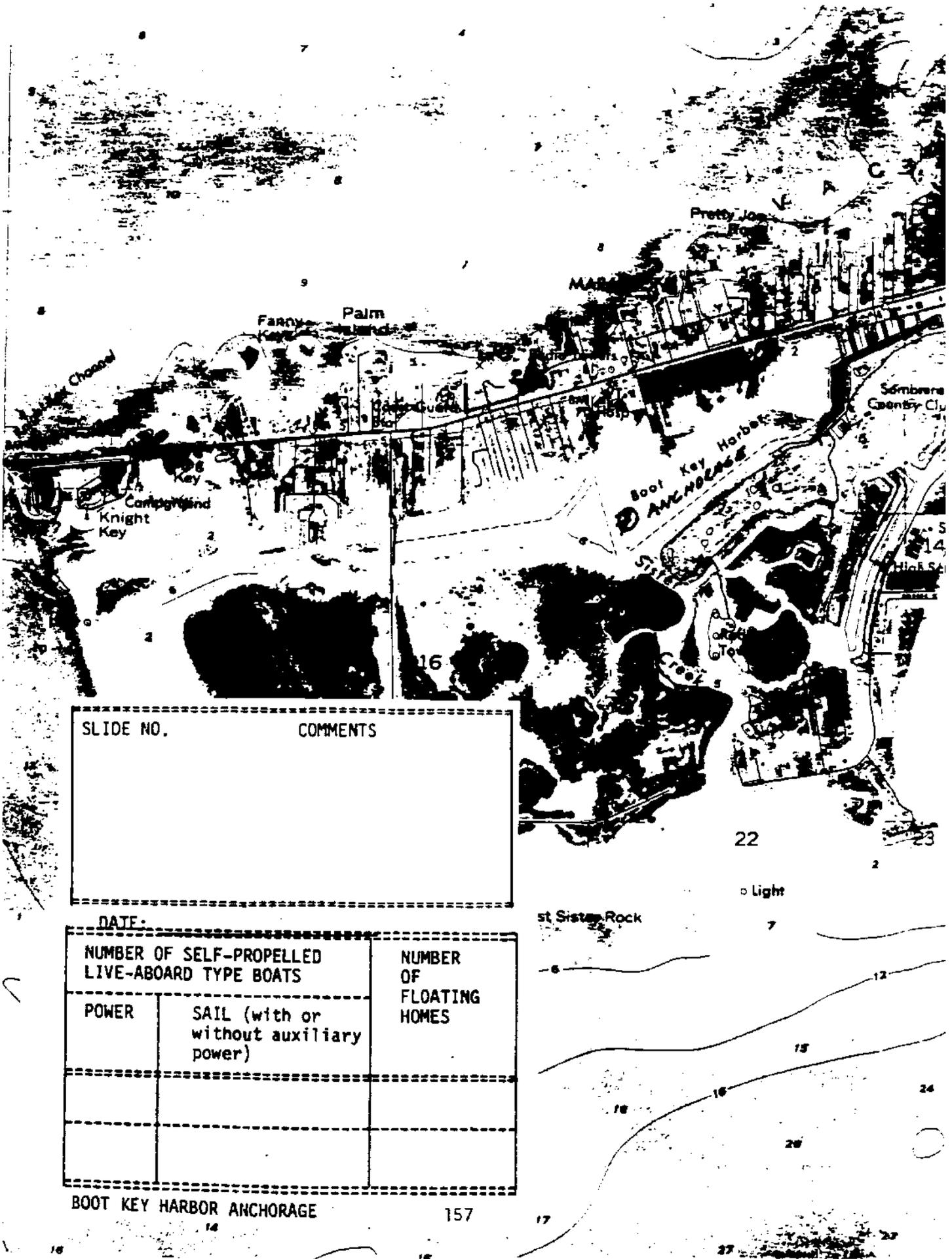
FEET  
 LONG KEY 20 MI  
 MIAMI 101 MI  
 2735  
 2734  
 2733  
 42'30"  
 2732

SLIDE NO. \_\_\_\_\_ COMMENTS \_\_\_\_\_

NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS		NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxilliary power)	
_____	_____	_____
_____	_____	_____

DATE: \_\_\_\_\_

KEY COLONY BEACH ANCHORAGE



SLIDE NO.	COMMENTS

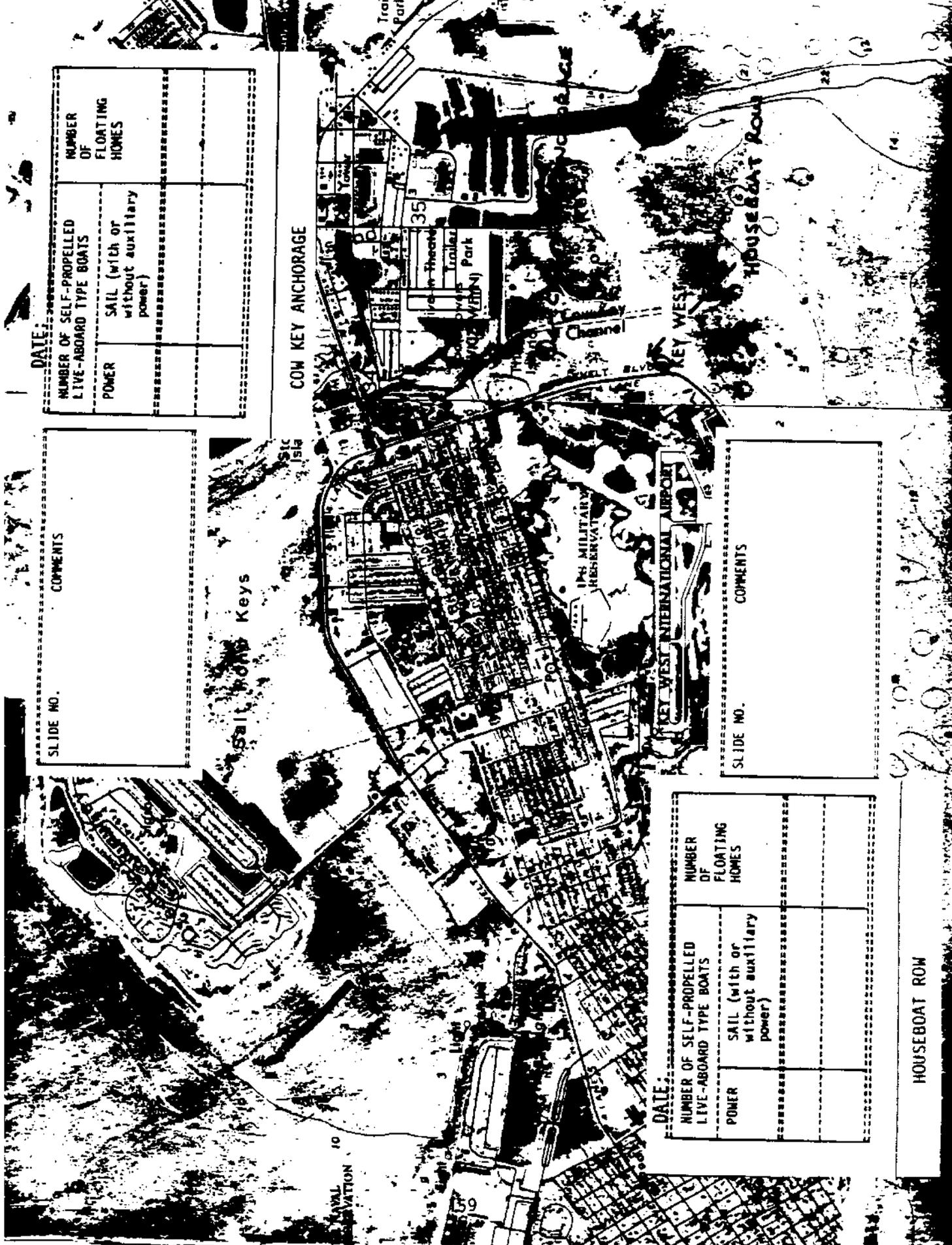
DATE: \_\_\_\_\_

NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS		NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxiliary power)	

BOOT KEY HARBOR ANCHORAGE 157

22  
 Light  
 St Sister Rock 7  
 6 12  
 15  
 16 24  
 17 20  
 27





DATE:

NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS	NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxiliary power)

COMMENTS

SLIDE NO.

COW KEY ANCHORAGE

Salt Pond Keys

DATE:

NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS	NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxiliary power)

COMMENTS

SLIDE NO.

HOUSEBOAT ROW

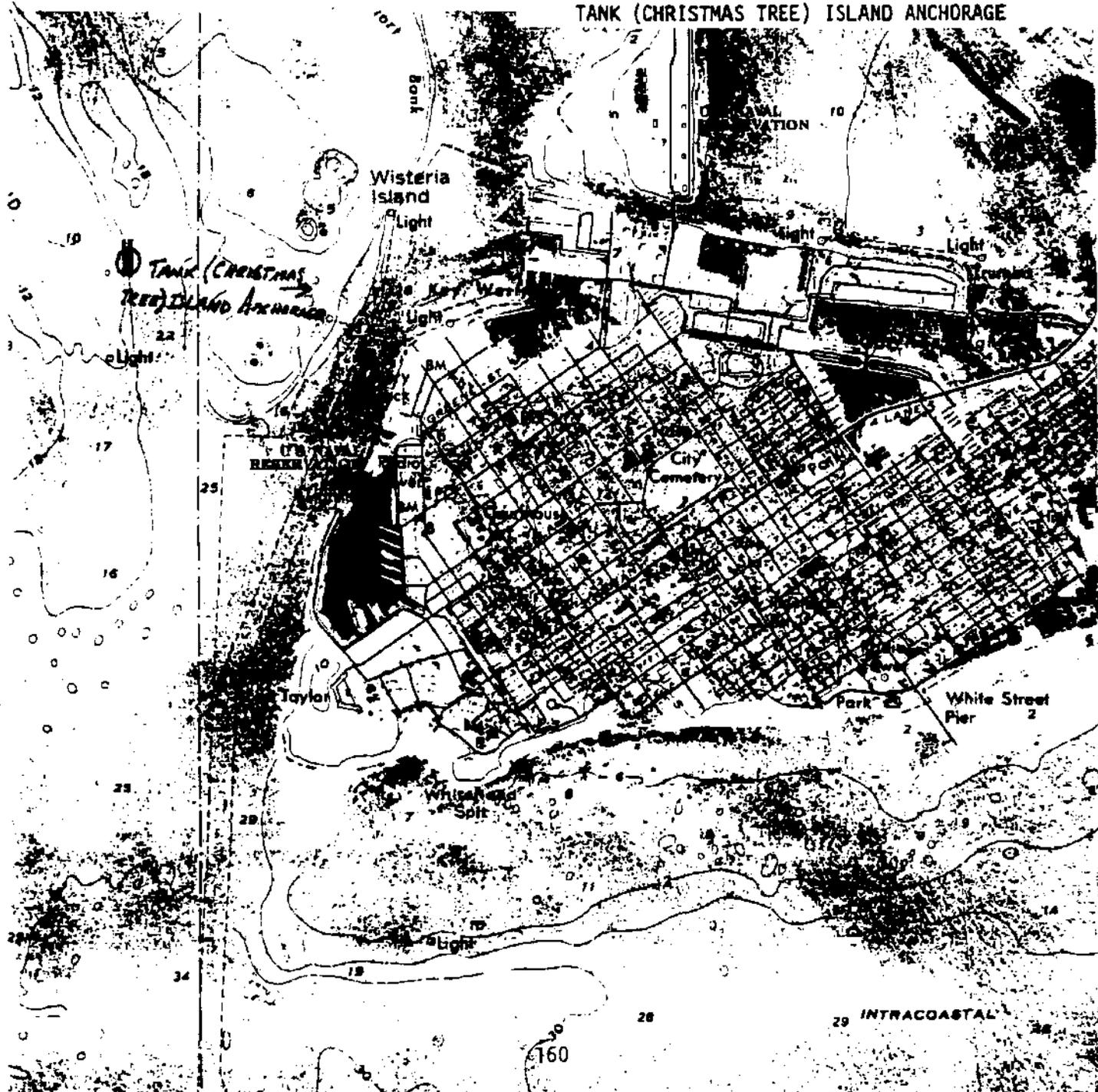
2

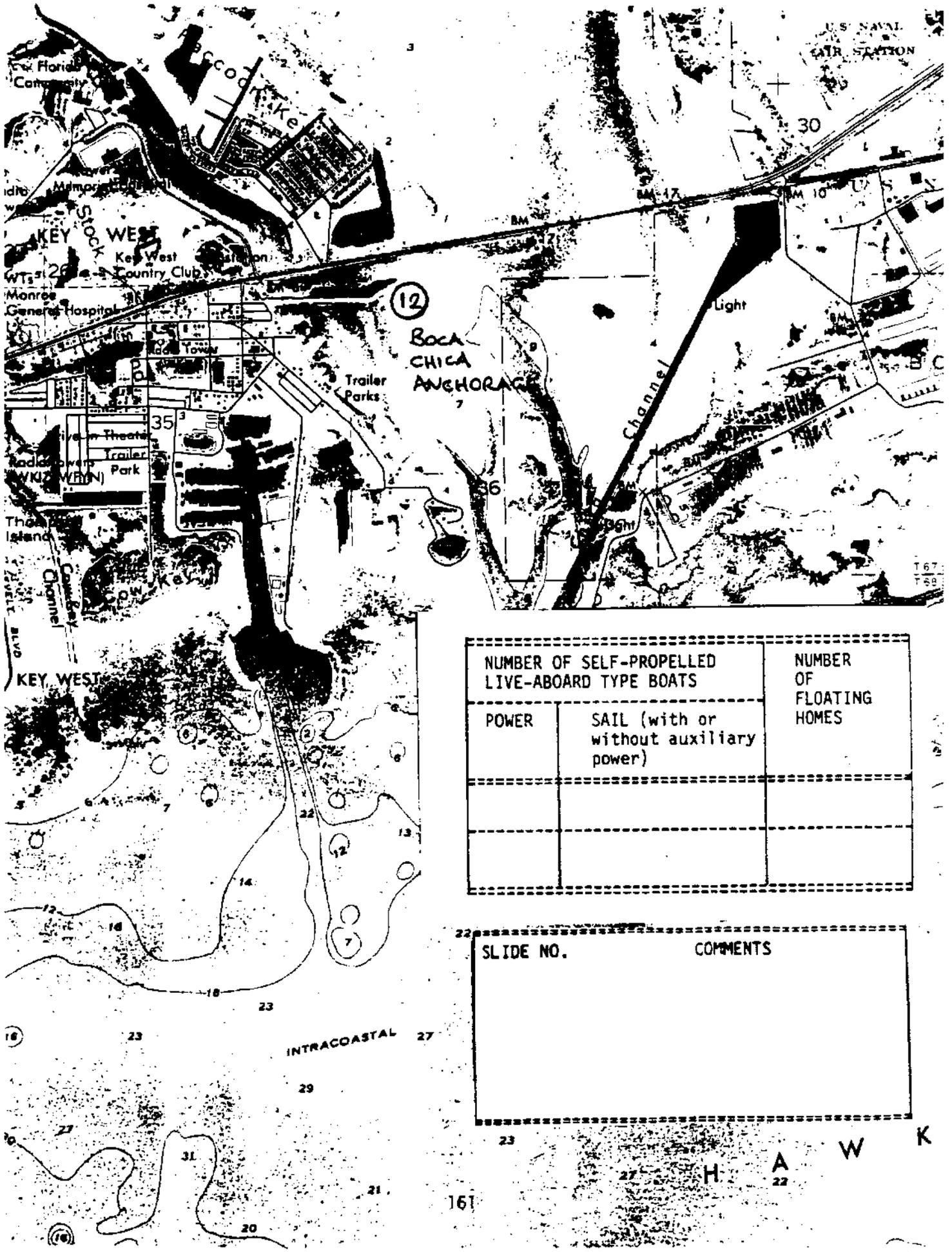
DATE:

SLIDE NO.	COMMENTS

NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS		NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxiliary power)	

TANK (CHRISTMAS TREE) ISLAND ANCHORAGE

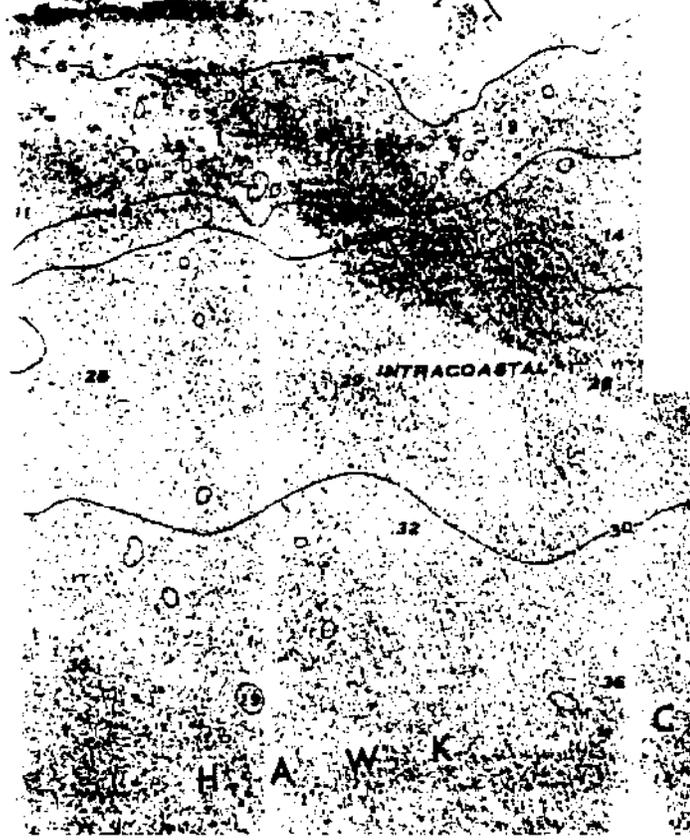
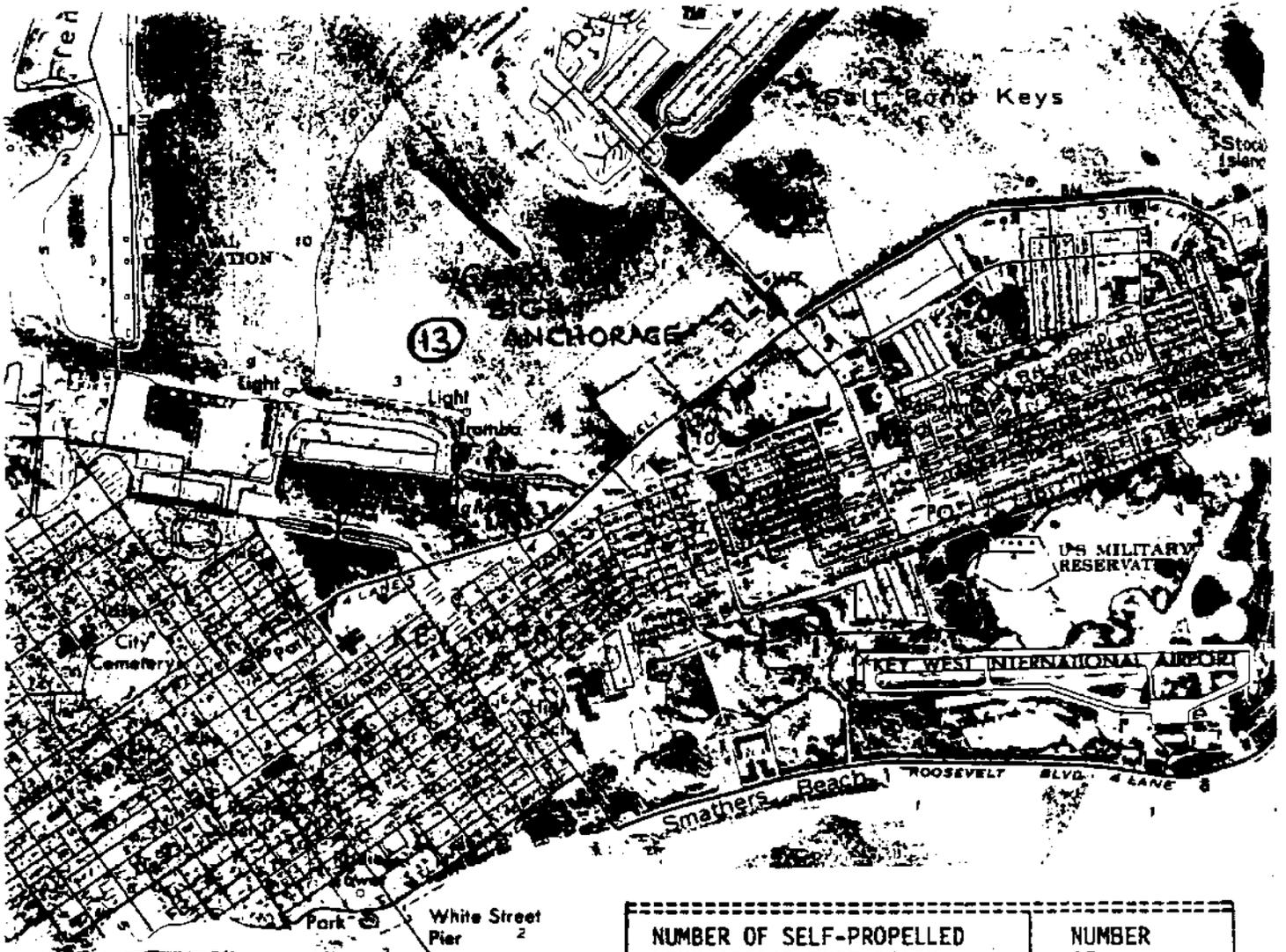




NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS		NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxiliary power)	

SLIDE NO.	COMMENTS

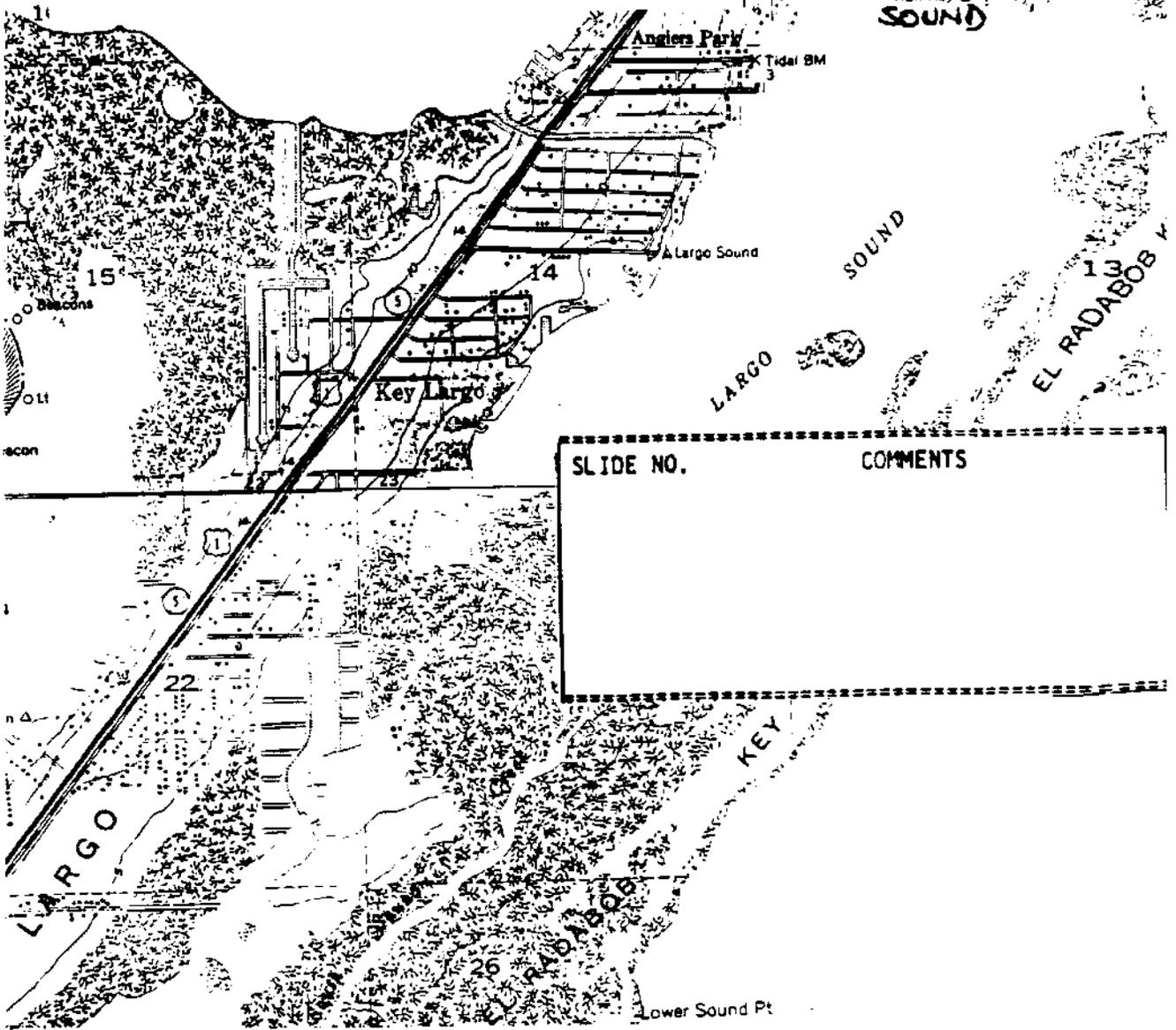
167  
168  
23  
27  
H  
A  
W  
K



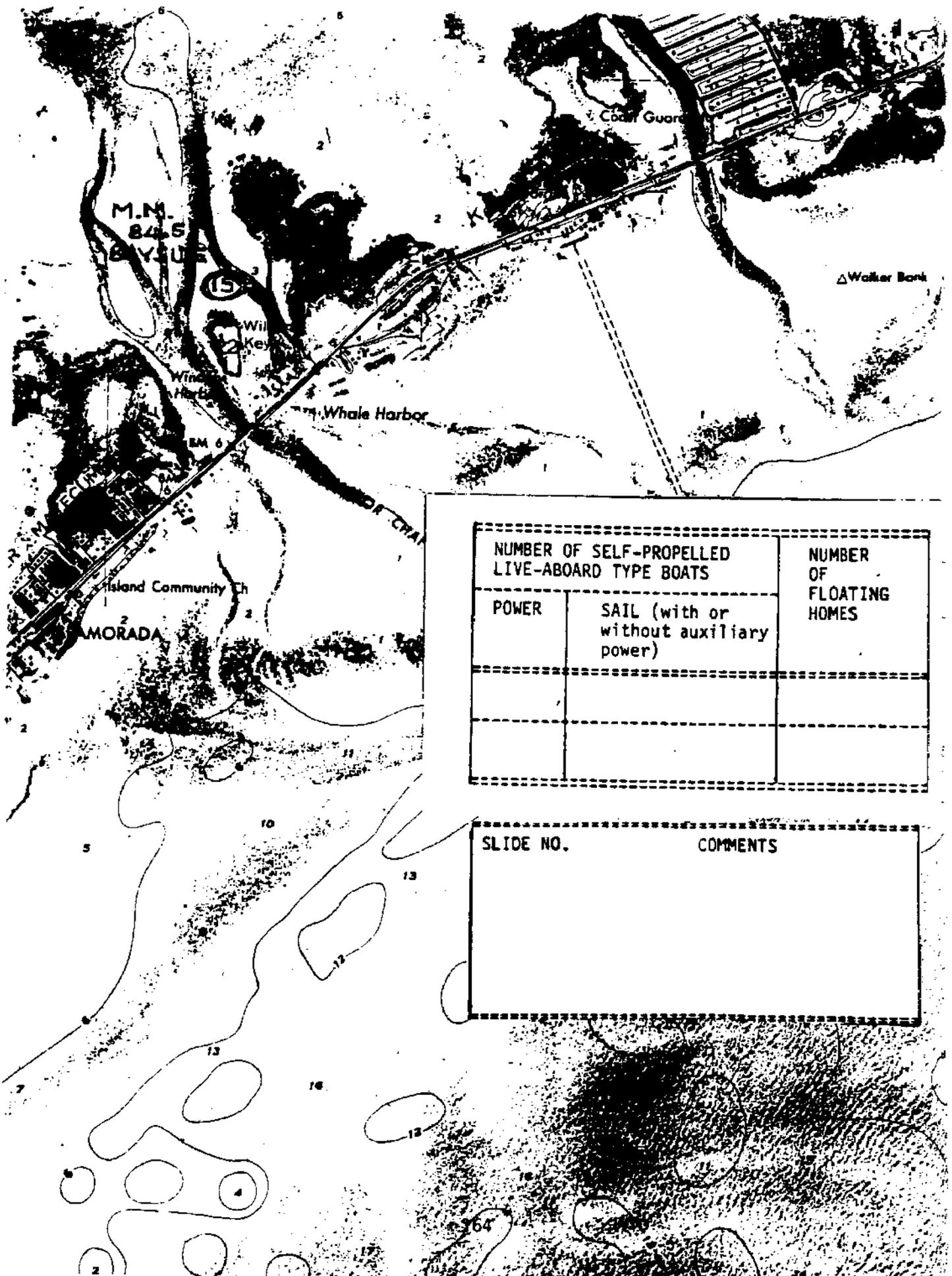
NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS		NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxiliary power)	

SLIDE NO.	COMMENTS

NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS		NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxiliary power)	



SLIDE NO.	COMMENTS



NUMBER OF SELF-PROPELLED LIVE-ABOARD TYPE BOATS		NUMBER OF FLOATING HOMES
POWER	SAIL (with or without auxiliary power)	

SLIDE NO.	COMMENTS

**APPENDIX E: MARINA MANAGER QUESTIONNAIRE**



FLORIDA SEA GRANT COLLEGE PROGRAM  
PROJECT R/C-P-15

Boat Live-aboards in the Florida Keys:  
A New Factor in Waterfront Management

Marina Owners and Managers

We are asking you to participate in a study being carried out by the University of Florida in the Florida Keys.

This study deals with the impact of live-aboard boating in coastal Florida. We hope that you will provide us with information concerning live-aboard boats at your marina so that we may relate them to other waterfront community needs.

After we have gathered this information, we will study it to determine the nature and extent of live-aboard demands on shoreside facilities and public services. We hope that this study will offer guidelines to incorporate boat live-aboards into the local planning process, and in this way, make your business congenial and profitable.

We want to be sure that the conclusions reached in this study are realistic. We place great importance on your willingness to participate in this interview and provide us with responses to the questions.

We would be pleased to answer any questions you have concerning the research procedures. All information is absolutely confidential. You may withdraw your consent to continue participation in the interview at any time without prejudice. Kindly note that no monetary compensation is made for completing the interview.

Thank you for your cooperation.

Gustavo A. Antonini  
Principal Investigator  
Department of Geography  
3141 Turlington Hall  
University of Florida  
Gainesville, Florida 32611  
(904) 392-6233

SURVEY OF COMMERCIAL SHORESIDE FACILITIES

I. QUESTIONNAIRE CONTROL

1. Questionnaire I.D. Number \_\_\_\_\_
2. Subregion:  
Upper Keys \_\_\_\_\_  
Middle Keys \_\_\_\_\_  
Lower Keys \_\_\_\_\_
3. Site Classification  
Marina \_\_\_\_\_  
Restaurant Pier \_\_\_\_\_  
Boat Yard \_\_\_\_\_  
Dockominium \_\_\_\_\_  
Private Club \_\_\_\_\_
4. Site Name \_\_\_\_\_
5. Site I.D. Number \_\_\_\_\_
6. Date of Interview \_\_\_(day) \_\_\_(mo) \_\_\_(year)
7. Time of Interview \_\_\_\_\_
8. Interviewer \_\_\_\_\_
9. Interviewee  
Owner \_\_\_\_\_  
Manager \_\_\_\_\_  
Other (specify) \_\_\_\_\_

II. FACILITIES DESCRIPTION

1. Total Number of Berths \_\_\_\_\_  
 (Occupied \_\_\_\_\_ ; Empty \_\_\_\_\_ )

Occupance (no. of boats)	Year-round Live-aboard Boaters *	Seasonal Live-aboard Boaters **	Recreational Boaters ***	Comm. Boaters	Govt. Seized Boats	Wet Stored Boats
--------------------------------	--	---------------------------------------	-----------------------------	---------------	--------------------------	------------------------

-----  
 Permanent  
 (day of  
 interview)

-----  
 Transient\*\*\*\*  
 (day of  
 interview)

- \* Year-round live-aboards use their boat as their primary place of residence for the entire year.  
 \*\* Seasonal live-aboards use their boat as a primary or secondary residence for at least two months of the year but less than the entire year.  
 \*\*\* Recreational boaters live on-board infrequently (weekends or vacations).  
 \*\*\*\* Transients may be live-aboard or recreational boaters who are berthed on a daily basis.

2. Dockage Fees

Rates (specify \$/mo, \$/ft/mo)	Year-round Live-aboard Boaters	Seasonal Live-aboard Boaters	Recreational Boaters	Comm. Boaters	Govt. Seized Boats	Wet Stored Boats
--	--------------------------------------	------------------------------------	-------------------------	------------------	--------------------------	------------------------

-----  
 Permanent  
 Renters

-----  
 Permanent  
 Owners

-----  
 Transient  
 Winter

-----  
 Transient  
 Summer

3. Channel Characteristics

Marked entry channel \_\_\_\_\_  
 Approach channel depth \_\_\_\_\_ ft.  
 Dockside depth \_\_\_\_\_ ft.

4. Repair Facilities

Lift \_\_\_\_\_  
Engine \_\_\_\_\_  
Propeller \_\_\_\_\_  
Hull \_\_\_\_\_

5. Fuel and Marine Supplies

Diesel \_\_\_\_\_  
Gasoline \_\_\_\_\_  
Lubricating oil \_\_\_\_\_  
Spare engine and hull parts \_\_\_\_\_

6. Main Dock Facilities

Type of Dock  
Fixed \_\_\_\_\_  
Floating \_\_\_\_\_  
Concrete \_\_\_\_\_  
Wood \_\_\_\_\_

Type of Facilities

Water  
Metered \_\_\_\_\_  
Specify av. mo. bill \_\_\_\_\_  
Surcharge \_\_\_\_\_  
Specify dy/wk/mo. fee \_\_\_\_\_

Electric

Voltage  
110 \_\_\_\_\_  
220 \_\_\_\_\_  
Maximum Amperage  
30 \_\_\_\_\_  
50 \_\_\_\_\_  
Metered \_\_\_\_\_  
Specify av. mo. bill \_\_\_\_\_  
Surcharge \_\_\_\_\_  
Specify dy/wk/mo. fee \_\_\_\_\_

Telephone \_\_\_\_\_  
Specify dy/wk/mo. fee \_\_\_\_\_

7. Dinghy Dock Facilities  
(for boats in nearby anchorage)

Number of spaces available \_\_\_\_\_  
Number of dinghies tied up at present \_\_\_\_\_  
Specify dy/wk/mo. fee \_\_\_\_\_

Type of services

mail, messages \_\_\_\_\_  
toilet \_\_\_\_\_  
shower \_\_\_\_\_  
parking \_\_\_\_\_  
water \_\_\_\_\_

8. Shoreside Facilities
- Showers (specify numbers)
- Men \_\_\_\_\_
- Women \_\_\_\_\_
- Toilets (specify numbers)
- Men \_\_\_\_\_
- Women \_\_\_\_\_
- Laundromat (specify numbers)
- Washers \_\_\_\_\_
- Dryers \_\_\_\_\_
- Pumpout
- Available to marina clients at no  
extra charge \_\_\_\_\_
- Charge to marina clients \_\_\_\_\_ (specify amount)
- Available to other boaters at no  
extra charge \_\_\_\_\_
- Charge to other boaters \_\_\_\_\_ (specify amount)
- Groceries \_\_\_\_\_
- Ice \_\_\_\_\_
- Restaurant \_\_\_\_\_
- Snack Bar \_\_\_\_\_
- Bait and Tackle \_\_\_\_\_
- Sail Shop \_\_\_\_\_
- Dive Shop \_\_\_\_\_
- Charter Booking \_\_\_\_\_
- Machine Shop \_\_\_\_\_
- Ship Store \_\_\_\_\_
- Clothing Store \_\_\_\_\_
- Outboard Repair \_\_\_\_\_
- Boat Rental \_\_\_\_\_
- Boat Sales \_\_\_\_\_
- Trailer Sales \_\_\_\_\_
- Carpenter Shop \_\_\_\_\_
- Parking
- Lot (# spaces) \_\_\_\_\_
- Street (# spaces) \_\_\_\_\_

### III. PROBLEMS RELATED TO INCREASED BOATING ACTIVITIES

The increase in boating in the Florida Keys has led to greater use of coastal resources. One result of this has been growing concern about maintenance of the coast's attractiveness and provision of adequate services. Concerns about boating activities center on one or more of the issues listed in the table below. We would like to know which of these issues presents a difficulty at YOUR MARINA.

Issues	Problem Issues	Rank of Importance (1,2,3 etc)	Severity		
			Severe	Moderate	Little to None
-----					
Noise					
-----					
Garbage					
-----					
Sewage					
-----					
Trespassing					
-----					
Abandoned Boats					
-----					
Narcotics Trafficking					
-----					
Petty Theft					
-----					
Assaults					
-----					
Crowding					
-----					
Loitering					
-----					
Floating Debris					
-----					
Parking					
-----					
Marina Development					
-----					
Boat Wake					
-----					
Water Skiing					
-----					
Jet Skiing					
-----					

IV. RESPONSIBILITY FOR PERCEIVED PROBLEMATICAL ISSUES

1. We would like to know YOUR MARINA's view of the responsibility of various boating groups for the issue you consider most important in Section III.

\_\_\_\_\_ (#1 ISSUE)

Type of Boater	Respon- sibility	Degree of <u>Responsibility</u>			<u>Occurrence of Problem</u>		
		High	Med	Low	W	S	Y

-----  
Recreational \*

-----  
Commercial  
(charter, fishing)

-----  
Live-aboard  
(docksides) \*\*

-----  
Live-aboard  
(anchorage) \*\*\*

-----  
Govt. boats

-----  
Type of boater  
uncertain

-----  
Drifters

-----  
Tourist

-----  
Street Traffic

-----  
Boater's Friends

-----  
Govt. Bureaucracy

-----  
Campers

-----  
Shore Residents

-----  
Boat Yard  
Managers

\*Recreational boater: lives on-board infrequently (weekends or vacations)

Live-aboard boater: uses boat as residence for extended periods of two months or more per year.

\*\* Live-aboard may be berthed docksides at a marina.

\*\*\* Live-aboard may be moored at an offshore anchorage.

2. We would like to know YOUR MARINA's views regarding the responsibility of various boating groups for the second most important issue identified in Section III.

(#2 ISSUE)

Type of Boater	Respon- sibility	Degree of <u>Responsibility</u>			<u>Occurrence of Problem</u>		
		High	Med	Low	W	S	Y
Recreational *							
Commercial (charter, fishing)							
Live-aboard (dockside) **							
Live-aboard (anchorage) ***							
Govt. boats							
Type of boater uncertain							
Drifters							
Tourist							
Street Traffic							
Boater's Friends							
Govt. Bureaucracy							
Campers							
Shore Residents							
Boat Yard Managers							

- \* Recreational boater: lives on-board infrequently (weekends or vacations)
- Live-aboard boater: uses boat as residence for extended periods of two months or more per year.
- \*\* Live-aboard may be berthed dockside at a marina.
- \*\*\* Live-aboard may be moored at an offshore anchorage.

3. We would like to know YOUR MARINA's views regarding the responsibility of various boating groups for the third most important issue identified in Section III.

(#3 ISSUE)

Type of Boater	Respon- sibility	Degree of <u>Responsibility</u>			<u>Occurrence of Problem</u>		
		High	Med	Low	W	S	Y
Recreational *							
Commercial (charter, fishing)							
Live-aboard (dockside) **							
Live-aboard (anchorage) ***							
Govt. boats							
Type of boater uncertain							
Drifters							
Tourist							
Street Traffic							
Boater's Friends							
Govt. Bureaucracy							
Campers							
Shore Residents							
Boat Yard Managers							

- \* Recreational boater: lives on-board infrequently (weekends or vacations)  
Live-aboard boater: uses boat as residence for extended periods of two months or more per year.  
 \*\* Live-aboard may be berthed dockside at a marina.  
 \*\*\* Live-aboard may be moored at an offshore anchorage.

V. LIVE-ABOARDS CONTRIBUTION TO THE MARINA ENTERPRISE

In your best judgment, how would you estimate your marina's dependence on live-aboard revenue as compared to other boaters using your facilities.

Type of boater	<u>Boater contribution</u>		
	Favorable	Adverse	Indifferent
----- Recreational boater -----			
Live-aboard (dockside) -----			
Live-aboard (anchorage) -----			
Commercial boater -----			
Confiscated boats -----			

**APPENDIX F: SHORELINE RESIDENT QUESTIONNAIRE**



**FLORIDA SEA GRANT COLLEGE PROGRAM  
PROJECT R/C-P-15**

**Boat Live-Aboards in the Florida Keys:  
A New Factor in Waterfront Management**

**Shorefront Property Owners, Renters and Managers,**

**We are asking you to participate in a study being carried out by the University of Florida in the Florida Keys.**

**This study deals with the impact of live-aboard boating in coastal Florida. We hope that you will provide us with information concerning the ways in which live-aboard boaters have affected your quality of living in this waterfront community.**

**After we have gathered this information, we will study it to determine the nature and extent of live-aboard demands on shoreside facilities and public services. We hope that this study will offer guidelines to incorporate boat live-aboards into the local planning process, and in this way, help maintain the value of your property while improving upon your recreational enjoyment.**

**We want to be sure that the conclusions reached in this study are realistic. We place great importance on your willingness to participate in this interview and provide us with responses to the questions.**

**We would be pleased to answer any questions you have concerning the research procedures. All information is absolutely confidential. You may withdraw your consent to continue participation in the interview at any time without prejudice. Kindly note that no monetary compensation is made for completing the interview.**

**Thank you for your cooperation.**

**Gustavo A. Antonini  
Principal Investigator  
Department of Geography  
3141 Turlington Hall  
University of Florida  
Gainesville, Florida 32611  
(904) 392-6233**

SURVEY OF SHOREFRONT PROPERTY OWNERS, RENTERS & MANAGERS

1. QUESTIONNAIRE CONTROL

1. Person completing questionnaire  
owner \_\_\_\_\_  
renter \_\_\_\_\_  
manager \_\_\_\_\_
  
2. Period of Residence  
year-round \_\_\_\_\_  
seasonal (winter) \_\_\_\_\_  
other (specify) \_\_\_\_\_
  
3. Type of Property  
residential \_\_\_\_\_  
hotel/motel \_\_\_\_\_  
time-share \_\_\_\_\_
  
4. Type of Residential Property  
single family \_\_\_\_\_  
duplex \_\_\_\_\_  
multi-family \_\_\_\_\_  
    3-12 units \_\_\_\_\_  
    13 or more \_\_\_\_\_  
floor above \_\_\_\_\_  
ground level \_\_\_\_\_  
facing water \_\_\_\_\_
  
5. Type of Structure  
single dwelling \_\_\_\_\_  
attached dwelling \_\_\_\_\_  
(duplex,  
townhouse) \_\_\_\_\_  
high-rise \_\_\_\_\_
  
6. Type of Water Frontage  
seawall \_\_\_\_\_  
beach \_\_\_\_\_  
mangrove \_\_\_\_\_  
dock \_\_\_\_\_  
other (specify) \_\_\_\_\_
  
7. Location Name \_\_\_\_\_
  
8. Location I.D. Number \_\_\_\_\_
  
9. Subregion  
Upper Keys \_\_\_\_\_  
Middle Keys \_\_\_\_\_  
Lower Keys \_\_\_\_\_

10. Questionnaire I.D. Number \_\_\_\_\_ (PLOT LOCATION ON CONTROL MAP OR AIR PHOTO)
11. Date of Interview \_\_\_(day) \_\_\_(mo) \_\_\_(year)
12. Time of Interview \_\_\_\_\_
13. Interviewer \_\_\_\_\_

II. PROBLEMS RELATED TO INCREASED BOATING ACTIVITIES

The increase in boating in the Florida Keys has led to greater use of coastal resources. One result of this has been growing concern about maintenance of the coast's attractiveness and provision of adequate services. Concerns about boating activities center on one or more of the issues listed in the table below. We would like to know which of these issues presents a difficulty IN YOUR OPINION in YOUR waterfront community.

Issues	Problem Issues	Rank of Importance (1,2,3 etc)	Severity		
			Severe	Moderate	Little to None
-----	Noise	-----	-----	-----	-----
-----	Garbage	-----	-----	-----	-----
-----	Sewage	-----	-----	-----	-----
-----	Trespassing	-----	-----	-----	-----
-----	Abandoned Boats	-----	-----	-----	-----
-----	Narcotics Trafficking	-----	-----	-----	-----
-----	Other Crimes	-----	-----	-----	-----
-----	Crowding	-----	-----	-----	-----
-----	Loitering	-----	-----	-----	-----
-----	Floating Debris	-----	-----	-----	-----
-----	Others (specify)	-----	-----	-----	-----

III. RESPONSIBILITY FOR PERCEIVED PROBLEMATICAL ISSUES

1. We would like to know YOUR VIEWS regarding the responsibility of various boating groups for the issue you consider most important in Section II.

\_\_\_\_\_ (#1 ISSUE)

Type of Boater	Respon- sibility	Degree of Responsibility			Occurrence of Problem		
		High	Med	Low	W	S	Y
Recreational *							
Commercial (charter, fishing)							
Live-aboard (dockside) **							
Live-aboard (anchorage) ***							
Type of boater uncertain							

- \* Recreational boater: lives on-board infrequently (weekends or vacations)
- Live-aboard boater: uses boat as residence for extended periods of two months or more per year.
- \*\* Live-aboard may be dockside berthed at a marina.
- \*\*\* Live-aboard may be moored at an offshore anchorage.

2. We would like to know YOUR VIEWS regarding the responsibility of various boating groups for the issue you consider the second most important in Section II.

\_\_\_\_\_ (#2 ISSUE)

Type of Boater	Respon- sibility	Degree of Responsibility			Occurrence of Problem		
		High	Med	Low	W	S	Y
Recreational *							
Commercial (charter, fishing)							
Live-aboard (dockside) **							
Live-aboard (anchorage) ***							
Type of boater uncertain							

- \* Recreational boater: lives on-board infrequently (weekends or vacations)  
Live-aboard boater: uses boat as residence for extended periods of two months or more per year.  
 \*\* Live-aboard may be dockside berthed at a marina.  
 \*\*\* Live-aboard may be moored at an offshore anchorage.

3. We would like to know YOUR VIEWS regarding the responsibility of various boating groups for the issue you consider the third most important in Section II.

\_\_\_\_\_ (#3 ISSUE)

Type of Boater	Respon- sibility	Degree of <u>Responsibility</u>			<u>Occurrence of Problem</u>		
		High	Med	Low	W	S	Y

-----  
Recreational \*

-----  
Commercial  
(charter, fishing)

-----  
Live-aboard  
(dockside) \*\*

-----  
Live-aboard  
(anchorage) \*\*\*

-----  
Type of boater  
uncertain

- 
- \* Recreational boater: lives on-board infrequently (weekends or vacations)
  - Live-aboard boater: uses boat as residence for extended periods of two months or more per year.
  - \*\* Live-aboard may be dockside berthed at a marina.
  - \*\*\* Live-aboard may be moored at an offshore anchorage.

#### IV. OPINION ON LIVE-ABOARDS

We would like your opinion as a property owner (renter, manager) regarding the impact of live-aboard activities on YOUR PROPERTY and RECREATIONAL ENJOYMENT OF THE SHORE.

Live-aboards at nearby anchorage:  
(favorable, adverse, indifferent) \_\_\_\_\_

Live-aboards dockside:  
(favorable, adverse, indifferent) \_\_\_\_\_

**APPENDIX G: GOVERNMENT AGENCIES AND CIVIC  
ORGANIZATIONS' QUESTIONNAIRE**

Date

Capt. John Q. Smith  
Commandant, U.S. Navy Base  
Key West, Florida 00000

Dear Capt. Smith

We are asking your organization to participate in a study being carried out by the University of Florida in the Florida Keys.

This study deals with the needs and impact of live-aboard boaters, those whose primary place of residence is a boat, on public services in coastal Florida. We hope that your organization will provide us with information concerning YOUR ORGANIZATION's provision of services to boaters, in general, so that we may relate them to boat live-aboard needs.

After we have gathered this information, we will study it to determine the nature and extent of live-aboard demands on shoreside facilities and public services. We hope that this study will offer guidelines to incorporate boat live-aboards into the local planning process, and that the information obtained will be useful to you..

We want to be sure that the conclusions reached in this study are realistic. We place great importance on your willingness to participate in this interview and provide us with responses to the questions.

We would be pleased to answer any questions you have concerning the research procedures. Please write or call. The telephone number is (904) 392-6233. You may be assured of complete confidentiality. Kindly mail the separate postcard so that we may know you received this letter. A pre-addressed, postage-paid envelope is enclosed for returning the completed questionnaire.

Thank you for your cooperation.

Gustavo A. Antonini  
Professor of Geography  
Principal Investigator



FLORIDA SEA GRANT COLLEGE PROGRAM  
PROJECT R/C-P-15

Boat Live-Aboards in the Florida Keys:  
A New Factor in Waterfront Management

ATTITUDINAL SURVEY OF GOVERNMENT AGENCIES  
AND CIVIC GROUPS

I. QUESTIONNAIRE CONTROL

1. Type of Organization

Please check appropriate category

Government:                      Federal \_\_\_\_\_  
   State        \_\_\_\_\_  
   County     \_\_\_\_\_  
   City        \_\_\_\_\_

Non-government:                Boating group \_\_\_\_\_  
   Property owners association \_\_\_\_\_  
   Communications organization \_\_\_\_\_  
   Conservation group \_\_\_\_\_  
   Merchants association \_\_\_\_\_  
   Others (specify) \_\_\_\_\_

2. Identification

Please fill in

Name of organization \_\_\_\_\_

Mailing address \_\_\_\_\_

Telephone \_\_\_\_\_

Person completing the questionnaire (Please print)  
\_\_\_\_\_

Position in the organization \_\_\_\_\_

**II. PROBLEMS RELATED TO INCREASED BOATING ACTIVITIES**

The increase in boating in the Florida Keys has led to greater use of coastal resources. One result of this has been growing concern about maintenance of the coast's attractiveness and provision of adequate services. Concerns about boating activities center on one or more of the issues listed in the table below. We would like to know which of these issues presents a difficulty in the opinion of YOUR ORGANIZATION. (If none of these problems seems relevant, kindly proceed to Section IV.)

In column A of the table, indicate with an X the issues which present most difficulty.

In column B, rank the issues you have indicated in order of importance (1-most important; 2-second most important; etc.)

In column C, indicate the severity of each of the ranked issues by marking an X under the appropriate category (severe; moderate; little to none).

Issues	A	B	C		
	Problem Issues	Rank of Importance (1,2,3 etc)	Severe	Moderate	Little to None
Noise					
Garbage					
Sewage					
Trespassing					
Abandoned Boats					
Narcotics Trafficking					
Other Crimes					
Crowding					
Loitering					
Floating Debris					
Others (specify)					

III. RESPONSIBILITY FOR PERCEIVED PROBLEMATICAL ISSUES

1. We would like to know YOUR ORGANIZATION's view of the responsibility of various boating groups for the issue you consider most important, i.e., the issue ranked 1 in Section II.

Please complete the following table.  
Indicate the most important issue in the space provided.  
In column A, indicate with an X the boating group(s) responsible for this problematical issue.  
For each boating group involved in the problem, indicate its degree of responsibility by marking an X under the appropriate category in column B (1-high, 2-medium, 3-low).  
Also indicate with an X the occurrence of the problem in winter only (W), summer only (S), or year-round (Y) in column C.

The most important issue is (fill in) \_\_\_\_\_

Type of Boater	A			B			C		
	Responsibility			Degree of Responsibility			Occurrence of Problem		
	High	Med	Low	High	Med	Low	W	S	Y
----- Recreational * -----									
Commercial (charter, fishing) -----									
Live-aboard (dockside) ** -----									
Live-aboard (anchorage) *** -----									
Type of boater uncertain -----									

\* Recreational boater: lives on-board infrequently (weekends or vacations).

Live-aboard boater: uses boat as residence for extended periods of two months or more per year.

\*\* Live-aboard may be berthed dockside at a marina.

\*\*\* Live-aboard may be moored at an offshore anchorage.

2. Please complete the following table in the same manner for the second most important issue identified in Section II. (If you identified only one problematical issue, proceed to section IV.)

The second most important issue is (fill in) \_\_\_\_\_

Type of Boater	A	B			C		
	Respon- sibility	Degree of Responsibility			Occurrence of Problem		
		High	Med	Low	W	S	Y

-----  
Recreational \*

-----  
Commercial  
(charter, fishing)

-----  
Live-aboard  
(docksides) \*\*

-----  
Live-aboard  
(anchorage) \*\*\*

-----  
Type of boater  
uncertain

- 
- \* Recreational boater: lives on-board infrequently (weekends or vacations).
  - Live-aboard boater: uses boat as residence for extended periods of two months or more per year.
  - \*\* Live-aboard may be berthed docksides at a marina.
  - \*\*\* Live-aboard may be moored at an offshore anchorage.

3. Please complete the following table in the same manner for the third most important issue identified in Section II. (If you identified only two problematical issues, proceed to Section IV).

The third most important issue is (fill in) \_\_\_\_\_

Type of Boater	A	B			C		
	Respon- sibility	Degree of Responsibility			Occurrence of Problem		
		High	Med	Low	W	S	Y
----- Recreational *							
----- Commercial (charter, fishing)							
----- Live-aboard (dockside) **							
----- Live-aboard (anchorage) ***							
----- Type of boater uncertain							

\* Recreational boater: lives on-board infrequently (weekends or vacations).

Live-aboard boater: uses boat as residence for extended periods of two months or more per year.

\*\* Live-aboard may be berthed dockside at a marina.

\*\*\* Live-aboard may be moored at an offshore anchorage.

IV. PERCEIVED ADDITIONAL SERVICES REQUIRED BY BOATERS

1. Does your organization provide a service to boaters?  
If so, please specify

2. If a service is provided,

please complete the following table as follows:  
For each boater, indicate its demand for the service by  
marking an X under the appropriate category (high,  
medium, low) in column A.  
Indicate with an X the demand period, winter only (W),  
summer only (S), year-round (Y) in column B.

Type of Boater	A Demand			B Demand Period		
	High	Med	Low	W	S	Y
Recreational						
Commercial (charter, fishing)						
Live-aboard (dockside)						
Live-aboard (anchorage)						
Type of boater uncertain						

V. FINANCIAL SUPPORT FOR ADDITIONAL SERVICES IF PROVIDED BY YOUR ORGANIZATION

Do you think that boaters in general, and live-aboards in particular, are paying their fair-share of the costs for the extra services you provide? If question not applicable, check here \_\_\_\_\_

Type of boater	Pays Fair-share	Does Not Pay Fair-share
General boater		
Live-aboard (dockside)		
Live-aboard (anchorage)		

## APPENDIX H. SANITARY SEWAGE DISCHARGE BY LIVE-ABOARD BOATS

Information obtained from the questionnaire survey of the live-aboard boat sample on per boat population and vessel facilities may be used to approximate the effect of the discharge of sanitary waste on the receiving body of water, measured in units of biochemical oxygen demand. The dissolved oxygen in the water is an important quality parameter. It is used by aerobic decomposing organisms to breakdown the sanitary waste load. If the process does not occur efficiently because of excessive discharge of waste relative to the assimilative capacity of the receiving body of water, the decomposition rate is reduced because the free oxygen supply is diminished, anaerobic organisms flourish, the residual organic waste materials accumulate, and offensive odors and water discoloration result.

These relations are partly summarized and estimated on a per live-aboard boat unit basis in this appendix. The appendix does not extend the process to the quality level of the coastal waters of the Keys. With the information made available by the study on the geographic distribution and density of live-aboard boats, on their sanitary waste loads, and on discharges and mobility patterns, it is feasible to locate potentially vulnerable water areas. A description of the procedure follows.

The basic equation is:

$$(1) \text{ Boatload} = (\text{Boat population} \times k) \text{ boat coefficient}$$

where,

**boatload** = oxygen demand of the sanitary waste discharged per boat per day into receiving body of water; dimensions are kilograms of oxygen per day per boat.

**boat population** = number of residents in live-aboard household obtained from survey; average live-aboard boat population = 1.8 persons

**k** = a generalized constant for the average oxygen required to assimilate one person's sanitary waste per day; dimensions are 0.76 kilograms of oxygen per person per day

**boat coefficient** = an estimate of the pre-treatment capacity of each boat which reduces the level of oxygen demand of sewage prior to discharge of the sanitary waste from the boat.

(2) Boat coefficient is a value assigned to each boat that depends on the number and kind of pre-treatment method onboard, whether used singly or in combination, and, on the relative use of each method. (The assumption of equal use is made.) Three use methods, of varying pre-treatment efficiencies, were evaluated and scaled approximately: (1) none or direct discharge, (2) onboard holding tank and subsequent discharge to water; 50 percent biochemical oxygen demand reduction, (3) onboard macerator with chlorination and direct discharge to water; 70 percent reduction in biochemical oxygen demand. Onboard holding tank closed system followed by pump-out at a shoreside facility is considered to be non-water impacting. These estimates do not evaluate the reduced decomposition rate of the waste load embedded in bottom sediments.