

Introducing the 1998 Marine Fisheries Census of Jamaica

SANDRA GRANT¹, MARTIN BROWN², DONNETH EDMONDSON³, and
ROBIN MAHON⁴

*¹ Fisheries Division, Ministry of Agriculture
Marcus Garvey Drive
Kingston, Jamaica*

*CARICOM Fisheries Resource Assessment and Management Program
(CFRAMP)
Belize City, Belize*

*² Statistical Institute of Jamaica
Church St.
Kingston, Jamaica*

*³ Statistical Institute of Jamaica
Swallowfield Rd.
Kingston, Jamaica*

*⁴ Fisheries and Environmental Consulting
48 Sunset Crest
Barbados*

ABSTRACT

In 1998 the Government of Jamaica undertook a census of fishing units in the marine fisheries, including vessels and fishers that fish without vessels. A two-stage process was used: a listing survey that encompassed all coastal areas; and a questionnaire census of all listed units. The questionnaire comprised 10 sections seeking information on the following subject areas: Respondent; Fisher or boat owner; Captain and crew; Fishing operations; Fishing practices; Gear used; Details of the catch; Marketing of the catch; and with regard to Pedro Bank, the damage caused by Hurricane Mitch. Information was collected from a total of 5,492 units, of which 4,107 were boats, and 1,385 were fishers without boats, including spear fishers. An unexpectedly high proportion of surveyed vessels were reported as being inactive (18%). The fishing units were distributed among 200 sites ranging in size from 1 – 300 boats/site. The median number of boats per site was 15. The vessels were predominantly canoes fishing small-scale gear: traps, lines, and nets. These data will form the basis of future development and management plans. They can support a variety of analyses many of which cannot easily be foreseen at present. Therefore, rather than attempt a complete analysis that will be published in a report, they are being set up in an accessible format in SPSS with instructions for users who wish to query the data for various purposes. This report includes basic analyses to illustrate the contents of the database.

KEY WORDS: Fisheries statistics, Jamaica

INTRODUCTION

In 1995, the Jamaica Fisheries Division started a data collection programme based on random stratified sampling. Prior to this, the Division relied on landing estimates from sample surveys (1962, 1968, 1973 and 1981). In 1994, the Division computerized its licensing and registration system and undertook an island-wide registration programme, which served as a preliminary sampling for the data collection programme. However, in order for the data collection program to provide accurate results an accurate sampling frame was needed. In 1998, the Division undertook a census to obtain an accurate sampling frame of vessels (artisanal, industrial and recreational) and gear by landing sites and fishery. The census was a collaborative effort between the Fisheries Division (FD), the Statistical Institute of Jamaica (STATIN), the Jamaica Information Service (JIS), and the CARICOM Fisheries Resource Assessment and Management Program (CFRAMP).

METHODOLOGY

Early in the process, the Jamaica Information Services (JIS) was contracted to develop an awareness programme to sensitised fishers and the public about the census. This was done to obtain the fishers' cooperation. This activity involved the development and distribution of posters to all fishing beaches and communities around the island, commercials on radio, television and the printed media. On completion of the awareness programme, the main survey was conducted.

There were two main instruments. The first was the Listing Record which in most cases was completed first and contained informant information on the boats that were known to moor at each section of coast line where boats were found to occur. The purpose of the listing record was to provide a complete list of all boats. The second instrument was the detailed census instrument or Main Questionnaire that recorded the detailed information on each boat on the Listing Record that could be found for interviewing.

Once the vessels at a site were listed, the main questionnaire was administered. The main questionnaire had nine sections:

Section 1 - information on respondent (name, address, role, education, experience);

Section 2 - information on vessel owners and users;

Section 3 - information on vessel (name, name of fishers);

Section 4 - Information on crew;

Section 5 - fishing operations (fishing grounds, operations, vessels involved);

Section 6 - Fishing practices (gas used, fishing duration, purpose, storage);

Section 7 - gear specification (gear types and usage);

Section 8 - catch characteristics (catch composition, seasonality); and

Section 9 - marketing arrangements (catch distribution)

In October 1998, Hurricane Mitch affected the southern areas of the island. There was extensive equipment damage on Pedro Bank and the Pedro Cays. Fishing equipment was also damaged on the south shelf. In order to capture the pre-Mitch situation (main questionnaire) and post-Mitch situation on the Pedro and Morant Bank, a supplemental questionnaire was developed. The supplemental questionnaire (section 10: the impact of hurricane Mitch), focused mainly on the value of damage to fishing equipment, changes in fishing activities and financial support to replace or repair equipment.

An interviewer's instruction manual was developed, which explained all the questions in the main questionnaire. The manual covered; overview of the fisheries sector, explanatory note, the interviewer's task, general survey procedures, guidelines for completing the questionnaire, the questionnaire, notes on boat size, vessel types, fishing areas in Jamaica, storage facility, gear type, and fish types.

A pre-test was conducted in July 1998. This 'early' activity facilitated extensive comments from all the parties concerned locally and abroad, particularly CFRAMP and the consultant. After the pre-test a few changes were made to the questionnaire. The manual and the control forms were finalized. There were also a few last minute changes in the questionnaire to accommodate some additional information that was needed by the Fisheries Division (FD).

To ensure that there was not an undercount, the boats as registered at beaches by parish were given to supervisors on a list supplied by the Fisheries Division. The interviewers systematically canvassed the entire length of coastline assigned to them.

The approach to analysis and access that was adopted with this census was to make the data available in a form that can be readily accessed by potential users, rather than to provide a large number of pre-analysed tables. With this approach users can query the data and obtain specific answers to their questions. Consequently, the data from this census have been made available as files that can be used by the Statistical Package for the Social Sciences (SPSS). This statistical software package provides a readily available means of accessing the data for export to other programs or for analysis within SPSS.

RESULTS

Overview of the Census Data

The purpose of the listing survey was to provide a list of all vessels as a cross check for the census. Therefore, all vessels in the listing survey should have appeared in the census, and few if any new vessels should have been encountered in the census. The listing survey recorded 3,619 vessels of which 549 were not in the census (Table 1). The census recorded 3,558 vessels of which 488 were not in the listing survey. The total number of vessels recorded by both surveys was 4,107.

Table 1. Cross tabulation of active boats by whether from census, listing record or both sources.

In Census not in LR			In LR not in Census			In LR and Census			Total
Not in use	In use	Total	Not in use	In use	Total	Not in use	In use	Total	
118	370	488	40	509	549	567	2503	3070	4107

In order to provide a database that included all the vessels encountered, the census data and the listing survey data were merged into a single file. However, for these vessels the majority of data collected in the census is missing. Few of the vessels that were in the listing survey but not in the census could be categorized as to vessel type.

Vessels were categorised as shown in Table 2. Of the 3,558 vessels in the census only 78 (2%) could not be categorised as to vessel type. Of these 23 were vessels that were not in use. For certain types of analyses that required information on the total numbers of vessels per landing site, the vessels that could not be categorized were allocated proportionally to the vessels categories based on those that could be categorized.

Vessels were found to be operating from a total of 194 fishing beaches (Figure 1). Whereas many of these are well known fishing beaches, several are here recorded for the first time.

Table 2. Numbers of active vessels by category

Vessel category	Not in use	In use	Total	% in use
Wood unmechanised < 10 m.	138	812	950	85
Wood mechanised < 10 m	79	348	427	81
Fiber unmechanised < 10 m	53	158	211	75
Fiber mechanised < 10 m	358	1402	1760	80
All mechanised 10-25 m	30	115	145	79
Other	4	8	12	67
Missing	63	539	602	90
Total	725	3382	4107	82

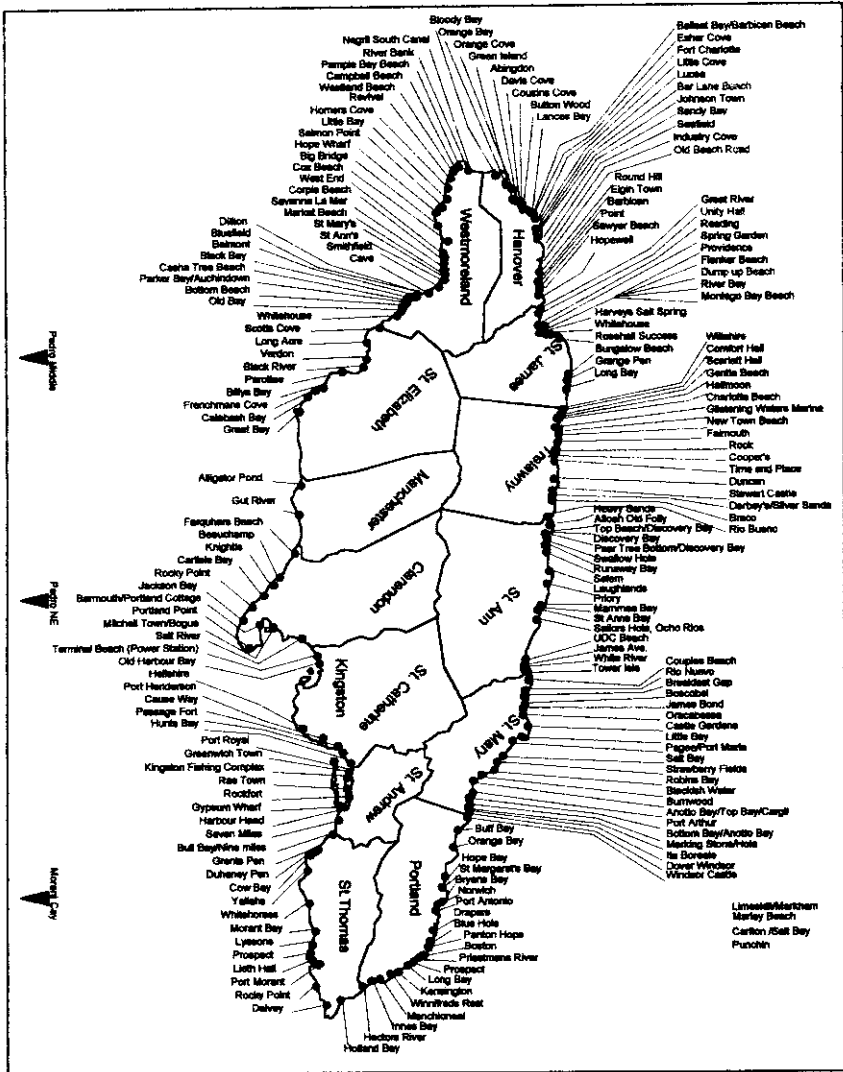


Figure 1. The distribution of mooring sites for fishing vessels in Jamaica

Characteristics of Vessel Owners, Owner/captains and Marketing

The numbers of owners, captains and owner/captains in the survey is shown in Table 3. The proportion of owners that captain their own vessels is lowest for the largest vessels and is lower for mechanised vessels in each of the two smaller vessel types.

The characteristics of the vessel owners are shown by vessel category in Table 4. The proportion of female vessel owners is highest for the mechanised fibreglass vessels < 32ft and the larger vessels. It is almost negligible for other categories.

The proportion of vessels that is rented, leased or lent to other groups of fishers is low; only 4% overall (Table 5). The number of groups to which vessels are rented, leased or lent, is seldom more than two (Table 6). The extent of these practices appears to be higher for owners with more than one vessel.

The disposition of fish caught to various purchaser groups differed considerably according to the type of fish and the parish (Table 7). For example, in St. Elizabeth where the population is relatively low, the proportions sold to vendors is high, whereas in St. James where the tourism industry is predominant, the proportions sold to hotels and restaurants is relatively high. On the Pedro Cayes, virtually all fish is sold to carrier boats.

Table 3. The numbers of captains, owners and owner-captains plus the percentage of owners who captain their vessel

Role	Wood unmech <10 m	Wood mech <10 m	Fiber unmech <10 m	Fiber mech <10 m	All mech 10-22 m	Other	Missing	Total
Captain only	68	41	14	305	27	2	99	556
Owner only	39	24	11	202	35		162	473
Owner- captains	668	251	124	736	41	5	82	1907
Percentage of owner- captains	86%	79%	83%	59%	40%	71%	24%	65%

Table 4. Characteristics of vessel owners by vessel type and parish and no-boat fishers by parish.

Vessel category	Sex		Education (percent of respondents)					Age in years				Years fishing (mean)	
	Males	Females	None	Primary	New/Junior secondary	Traditional/Comp. high	College/University	Other	No. of responses	Mean	Min		Max
Wood unmech < 32ft.	804	4	2	75	19	5	-	-	777	51	14	90	25
Wood mech < 32ft	337	7	0	68	20	11	1	-	337	48	23	83	22
Fiber unmech < 32ft	152	4	-	65	28	7	-	1	152	47	18	78	21
Fiber mech < 32ft	1263	110	1	58	31	8	1	0	1260	44	18	98	19
All mech 32-75ft	97	15	-	56	27	12	5	-	95	45	17	83	20
Spear fishers	635		0	48	35	16	0	0	626	33	13	98	12
No boat fishers	130	3	1	49	36	14	-	-	127	36	13	79	13

Table 5. The extent to which vessels are rented, leased or lent.

Type of use				Total
Rented	Leased	Lent	None of the above	
44	5	71	2,662	2782

Table 6. The number of groups to which vessels are rented, leased or lent

Number of groups	Type of use				Total
	Rented	Leased	Lent	None of the above	
1	29	5	49	4	87
2	2		11		13
3			4	1	5
4			1		1
Total	31	5	65	5	106

Characteristics of the Fleet

The distribution of vessels by vessel type and parish is summarised in Table 8. A relatively high proportion of recorded vessels were deemed to be inactive (not in use)(Table 8). This table also shows the number of individuals surveyed that were designated as "No boat fishers". These included both spear fishers and land-based fishers. Although the census has gathered a considerable amount of information on this hitherto little known group of fishers, it is not a census for these groups as it was not designed to census them, and they were interviewed opportunistically. The length frequency distribution of vessels by vessel category is shown in Figure 2. The numbers of boats targeting the various categories of fishery resources is shown in Table 9. The average numbers of crew and other workers to be found on vessels is shown by vessel category and parish in Table 10.

The Fishing Operations, Gear and Practices

The various types of gear found to be in operation are listed in Table 11. The numbers of vessels of each category and overall that use each type of gear is shown by parish in Table 12. The extent to which various combinations of gears are used by vessels is shown in Table 13. When nets are the main gear, pots are the most common second gear, but only slightly more so than lines. When lines are the main gear, pots are the most common second gear.

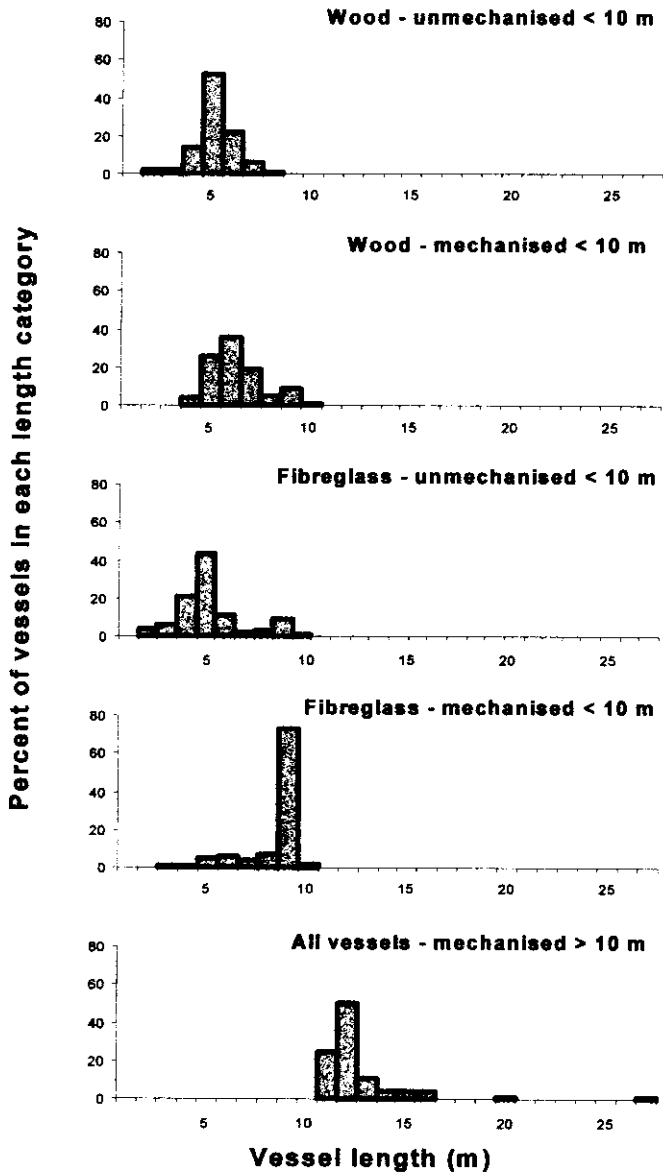


Figure 2. The length distribution of vessels in the five vessel categories

Table 8. Distribution of vessels by parish

Parish	All vessel categories					No boat fishers			
	In Use	% by parish	Not in Use	Both	% in Use	Spear-fishers	Land-based	Total	% by parish
Portland	189	6	45	234	81	77	14	91	7
St. Mary	226	7	51	277	82	122	37	159	11
St. Ann	174	5	18	192	91	88	3	91	7
Trelawny	165	5	21	187	88	157	5	162	12
St. James	196	6	27	223	88	179	34	213	15
Hanover	368	11	51	419	88	261	17	278	20
North Coast	1318	39	213	1531	86	879	110	989	71
Kingston	137	4	53	190	72	16	22	38	3
St. Andrew	85	3	27	112	76	4	36	40	3
St. Thomas	155	5	31	186	83	56	4	60	4
Westmoreland	462	14	102	564	82	33		33	2
St. Elizabeth	142	4	10	152	93	18	24	42	3
Manchester	140	4	40	180	78	18		18	1
Clarendon	362	11	83	445	81	20	7	27	2
St. Catherine	426	13	144	570	75	122	11	133	10
South Coast	1909	56	490	2399	80	292	104	396	29
Pedro Cays	146	4	19	165	88	1		1	0
Morant Cays	9	0	3	12	75			0	0
Total	3382		725	4107	88	1172	214	1386	

The Catch, Estimates of Landings, and Seasonality

The average catch/trip in kg per vessel and gear type is was asked for traps, diving, lines and nets. Note that these values are as reported by the respondents from memory and are therefore only useful as general indicators of catch. The seasonality for low/high catch by type of fishery was reported by the respondents.

The Numbers of Fishers

The numbers of individuals directly engaged in fishing in Jamaica cannot be reliably determined from the data in this survey because it was survey of vessels not fishers. However, the data on numbers of vessels (Table 2) and crew (Table 3) for the various types of vessels can provide some indication of the minimum number of persons engaged in fishing. The estimated number of crew for vessels of all types is 7,691. There are also an estimated 520 workers that go out on fishing vessels. Adding to this the 3,382 vessel captains give an overall estimate of at least 11,593 individuals actively engaged in the harvesting of fish. Many more are involved in other aspects of the industry. This is a minimum estimate because vessel owners and captains may change crew. Thus, although there may be 11,593 captain, crew and worker positions on fishing vessels, if many of these are part time, then the actual total number of individuals who derive some or all of their income from working in the harvesting subsector may be considerably higher.

Table 9. The percentage of boats targeting the main fishery types by parish

Parish	Percent of boats targeting:										Total number of boats
	Coastal pelagic	Offshore pelagic	Reef	Deep slope	Snapper	Shrimp	Conch	Crab	Lobster	Irish moss	
Kingston	14	8	14	1	62	0	0	0	1	0	142
St. Andrew	2	21	11	0	62	5	0	0	2	0	66
St. Thomas	6	16	43	1	34	0	0	0	0	0	155
Portland	3	16	53	4	24	0	0	0	0	0	174
St. Mary	1	39	44	3	14	0	0	0	0	0	233
St. Ann	3	33	48	3	13	0	0	0	0	0	174
Trelawny	4	16	60	1	20	0	0	0	1	0	161
St. James	2	33	31	0	33	0	0	0	0	0	201
Hanover	2	25	51	2	21	0	0	0	0	0	358
Westmoreland	4	27	54	1	13	1	0	0	0	0	464
St. Elizabeth	1	22	54	0	21	0	0	0	1	0	148
Manchester	0	2	65	0	32	0	0	0	1	0	140
Clarendon	2	4	71	0	17	0	0	0	5	0	366
St. Catherine	9	2	38	0	40	9	0	0	2	0	409
Pedro Cays	3	2	91	0	3	0	1	0	1	0	148
Morant Cays	0	0	100	0	0	0	0	0	0	0	9
Percent of total	3.8	17.7	50.5	1.1	24.4	1.3	<0.1	<0.1	1.0	<0.1	

Table 10. Average numbers of crew and workers by vessel category

	Wood unmech <10 m.	Wood mech <10 m	Fiber unmech <10 m	Fiber mech <10 m	All mech 10-25 m	Other	Missing
Crew	1.6	2.3	1.8	2.7	4.2	1.0	2.0
Workers	0.1	0.1	0.1	0.2	0.3	0.0	0.1
N	812	348	158	1402	115	8	539

Table 11. The types of gear found to be in use

Pots	Diving	Lines	Nets	Mullet net
Z-traps	SCUBA	Trolling	Bait net	Shove net
Jack pots	Hooka	Hand line	Beach seine	Shrimp net
Crab traps	Free lung	Palanca	Cast net	Sprat net
Diamond		Drop line	China net	Trammel
Bamboo wood		Rod & reel	Gill net	Trawl
		Long line	Lobster net	

Table 12. Percent of vessels using main gear types

Parish	Nets	Lines	Diving	Pots
Kingston	19	69	1	11
St. Andrew	47	34	0	19
St. Thomas	29	31	8	32
Portland	11	48	5	37
St. Mary	12	63	2	23
St. Ann	15	43	5	37
Trelawny	20	36	3	41
St. James	15	48	5	32
Hanover	10	53	1	36
Westmoreland	18	27	6	49
St. Elizabeth	10	21	2	67
Manchester	24	11	9	56
Clarendon	39	17	16	28
St. Catherine	60	16	8	17
Pedro Cays	1	2	10	88
Morant Cay	0	0	0	100
All parishes	24	33	6	37

Table 13. The combinations of main gear versus second gear

Type	Main gear			Second gear	
	Percent second gear	% nets	% lines	% diving	% pots
Nets	16	5	43	5	47
Lines	10	17	5	6	72
Diving	7	23	39		5
Pots	12	24	67	9	0
Total	12	16	42	7	36

The above estimate of the number of fishers in Jamaica is very close to that which is available for the Licensing and Registration System (LRS), i.e. about 12,000. However, the LRS includes some vendors and some foreign fishers licensed for the industrial conch fishery.

CONCLUSIONS

This report provides only an introductory analysis of the survey data with the aim of making the reader aware of the information that is available. These survey data can be further analysed to provide information on a wide variety of issues that are relevant to fisheries management and development in Jamaica.

There is the need for these survey data to be supported by a good system of recording information on landing sites, and of mapping landing sites. Ideally, this information would be stored in a GIS and updated regularly. However, a paper filing system with an information sheet on each landing site and a wall map would be useful to provide all Fisheries Division members with ready access to the information.

ACKNOWLEDGEMENTS

This census was funded in part by the Canadian International Development Agency through CFRAMP and in part by the Government of Jamaica. Thanks to the many vessel owners, fishers and their relatives who provided the information contained in this report. Thanks are also due to Mr. Peter Espeut for his help with designing the questionnaire.