

INTERNSHIP WITH THE PACIFIC WHALE FOUNDATION
FINAL REPORT OF INDEPENDENT STUDY FOR
UNIVERSITY OF HAWAII MARINE OPTION PROGRAM

by Teal Akeret

Duration

January 15th 1986 to May 15th 1986

Project Leader

Gregory Kaufman

Project Researchers

Mari Smultea

Lili Hagen

Robert Slade

Advisor

John Gerdes

Marine Science Teacher, M.O.P. Advisor

Project Members

All other interns, and researchers, Dean and Mike

Report Date

June 12, 1986

Introduction

From January 15th 1986 to May 15th 1986 I was an intern for The Pacific Whale Foundation (P.W.F.) in Kihei, Maui, Hawaii. I received credit for the internship as an independent study project through the University of Hawaii Marine Option Program. I learned the various steps of research from obtaining knowledge out in the field, to drawing conclusions and organizing it in the office. I worked four days a week where I would either be in the research office or out in the boat collecting data. Occasionally I helped University of Hawaii at Manoa with the project they were doing with the land station at Puu Olai. At the end of the internship I took the data from all the boat logs and plotted all the pods studied onto one map. The collective map therefore represented the whole winter calving season in which I was an intern.

I have a great desire to gain experience with researching whales. An internship with P.W.F. was the perfect answer to gaining a thorough knowledge of how humpbacks, (Megaptera novaengliae) are studied and a detailed knowledge as to how a marine scientific study is done, and what its results are worth.

I began as a volunteer for University of Hawaii at Manoa (U.H.M.) Whale Office while attending classes at the U.H.M. From there I progressed as a M.O.P. student to transfer to Maui Community College (M.C.C.) so that I

would be able to be an intern with P.W.F. while attending full time credit at M.C.C. three days a week. In this way my internship became my independent study for the completion of credits (I received the maximal 3 for my independent study) for a M.O.P. certificate.

The four months I spent with P.W.F. was always intriguing for I was always learning. As I grew better at some skills there were continually more challenges ahead I eagerly approached. I discovered the great amount of knowledge to be obtained from the rich well of information gathered from going out in the research boats and identifying whales by their fluke markings, colorations, and shapes. I will go into greater depth of just what kind of detailed information was obtained and how valuable conclusions were drawn from it.

Humans have driven whales to a point where many species are threatened by extinction. To acquire information about their living needs will help to protect the existing ones as well as to enhance the conditions for their offspring. We find out about them by tracing their migration patterns, and studying them in their feeding and calving waters. The main way to find out the specific life of a whale is to obtain knowledge from gathered information at each time it is sighted and studied. Fluke identification pictures is the main way this is done.

The internship was an incredibly valuable experience. I gained a thorough and cherished knowledge as to how the

humpback whale is researched. I learned the great value of a scientific study to gain knowledge of a species and use the information from learning about it as the key to keep it from extinction.

To understand a species and know the way in which its whole way of life works is to know the needs it requires to live. We must strive to continue to find out these needs by always gaining more knowledge of these fascinating and complex mammals. For they are one small but very important part to upholding our whole world ecosystems and the value of life.

Gather Data

The first important part of a research study is gathering the most accurate, thorough and detailed information in as much as a variety as possible. Going out in the research boats, either the Zodiac or the Boston Whaler, was a great challenge to obtain as much information as possible. As many as three people would be out in one boat at once, each responsibility for a different specific job, while all were constantly straining their eyes for more whale sightings (the boat is like a center point with 360 degrees of ocean around to be covered), whale behaviors, sizes, sexes, and characteristics.

The three basic responsibilities to boat research are photographing the whales, driving the boat and recording everything occurring while on the water. The researchers,

while being skilled photographers with much experience with timing and lighting to photographing whales, were usually the ones responsible for getting the identification shots of flukes and possible dorsal shots if it was thought to help with identifying (I.D.) the animal at a later time. "Photographing fluke identification of humpbacks has provided much information about movement and population size." (From Internship Programs, P.W.F.) I had only begun practicing photographing above the water I.D.S. while I did have experience in the water with the underwater camera. I would try to find the sex of the animals by diving (with snorkel gear) as the whale passed by getting a shot of the ventral area near the tail base. Females have three lobes in the genital area while males only have two. Fluke I.D.S. are the main way in which a whale is identified and can be traced from Alaskan feeding waters migrating to the Hawaiian calving waters and back. It is the one main way in which accumulative specific information can be found out about the humpback's behaviors.

With time and gaining experience with windy seas and larger swells, was the best way to become a competent boat driver. Learning transecting speed as well as ways to approach larger swells, with frequent starting and stopping for hydrophone drops to check for singers was only part of a driver's experience. Learning ways to approach whales slowly without alarming them and changing their behaviors while trying

to get close enough with the photographer's back to the sun for the best I.D. picture (glare can block out many important colorings and markings on a whale's fluke). Driving with a steady hand on speed control and maneuvers with the Zodiac became easier as everything fit into its own place when observing a pod of whales. "In Hawaii, humpback whales are typically seen in small groups called pods. A pod usually consists of 2 to 3 individuals, although groups as large as 15 individuals have been reported." (From Humpback Whales in Hawaii, H.S.G.P.)

Recording the boat log was one of the most challenging things that I faced. From the moment the boat is launched till the moment the boat is landed, it is the responsibility of the recorder to record everything that happens. Information could be either recorded by voice and later written up in the boatlog of the day or written and later transformed into the boat log format. Every fifteen minutes or so a boat location had to be recorded along with exact time and any new conditions that had arisen. Boat log needs to have sea state, wind state, and date, type of boat, which researchers are present and who is doing which operation. Equipment has to continually be easily accessible, and camera equipment put together as fast as the photographer needs it without letting salt water spray on it. When on a pod of whales their exact location, time of sighting, direction, number, behaviors, size (whether they are mother,

calf, adult, sub adult, yearling, or escort whale to mother and calf) all has to be recorded. Behaviors such as fluke slap, peduncle slap, head slap, fluke up dive, fluke down dive, blow, head lunge, peduncle arch, spy hop, breach, and pectoral slap are recorded, including how many times each behavior is done. These behaviors are then hopefully recorded to which fluke I.D. were taken of them so which whale was doing what behaviors is known. Many behaviors have never even been seen such as mating or a calf nursing. Every time the photographer takes a shot the frame number is recorded as well as which whale in the pod it belongs to.

Any kinds of interactions which might have any kind of effect on the whales such as boat interactions or military bombing on nearby island of Kahoolawe must be recorded. At the end of the day the boat log is officially written up by ^{the} recorder in time, pod number of the day, camera and film numbers, frame numbers, and comments. A boat summary for the day concludes any additional comments. The recorder also will plot each pod of whales and the boat trail on a map if the day has been spent in Maalaea bay.

Organizing data

In the office begins the whole filing system so all information about each whale and each day boats went out can be found efficiently. Once slides are back from being processed each roll is given a number, date, pod number

and photographer's initials which coincide with the boat log which the pictures were taken with.

As slides are labeled a card will be written for each individual pod. Each pod has been given a number on the boat log and now each animal will be given a number. Every slide will be accounted for so all slides should be listed next to which animal they are of. The best fluke (and sometimes dorsal for especially mothers) shot/s will be circled on the card to show which is the best ID shot/s of the animal. Underwater I.D. and sex shots will also be placed on the card for further information about the pod. All I.D. shots will then be categorized by the percentage of white their fluke contains in a catalogue book of which season they were taken.

Every I.D. will then be checked against previous seasons to see if it is a resighted whale and if it is, how many times it was resighted. Therefore each resighted whale will show which dates it was seen, which film numbers were taken of it, and where it was located with how many animals. Behaviors can then be found through the film roll number filing system. "Because a certain percentage of these animals are resighted each year, mark and recapture techniques are employed to help delineate the size of the North Pacific population." (From Internship Programs, P.W.F.)

A keen eye is needed for resighting animals. Glare, water splashing, and the angle of a fluke shot can all ^{be} misleading

looking for a resight. Using scars, dots, black and white shapes and percentages, Fluke shape and fluke ridge characteristics as well as sometimes barnacles can help find a resighted fluke, therefore sometimes eye strain is involved looking at slides for these detailed qualities which can be surprisingly similar in a number of whales.

Important conclusions and observations can be drawn from resighted animals. During the course of a season a certain whale may be seen with many other whales however a season before it might have been sighted with one of the same whales as the ongoing season. An escort is a whale accompanying a mother and calf. A mother and calf can have several escorts (usually male), and conclusions from resights can show things like how a mother and calf can have a primary escort and how long throughout a season, or how long in a season a specific whale will sing, etc.

When out in the boat several hydrophone drops will be done to see if any nearby humpbacks are singing. In the height of the season singing is almost always heard ranging from low to high intensity. When the location of a strong singer is found, the hydrophone will be dropped and the recording session of several songs will begin. Each time the animal surfaces (usually with a blow) the number of blows is recorded and all the whale's behaviors till it dives. A singing session is usually anywhere from seven to fifteen minutes. A dive will start the session while

a blow will end it. Several sessions are recorded in a row. Tape counter numbers are taken down at the beginning and end of a session as well as any time the whale shows a behavior. Also recorded are any boat or airplane or other whale interactions. Often while recording a singer other whales will be heard singing in the distance. In one day the song can sound greatly different although it is basically the same song. The song changes gradually in the breeding season as well as from year to year. Sometimes the song will range from elephant, to bird, to blurps and growls and eerie whines. Singers are usually males, however female singers have been observed. Songs are differentiated from other social or feeding noises between whales. I will never forget diving with my snorkel gear to hear a singer. The variety and beauty of the song holds one in captivation.

The Land Station

When I helped U.H.M with their project when the research team with earthwatchers came to Maui, they played a tape of feeding sounds of Alaskan Humpbacks to the Humpbacks in Hawaiian waters. Four people were needed on the hill. One researcher operated the Theodilite to give the latitude and longitude fixes of whales and boats with another person recording the information with paper and pencil. Another researcher called out behaviors and a person operated the microcomputer in which behaviors of whales and comments were directly programmed. A session would begin with

recording animals behaviors from the landstation, and then the boat would send message by radio to land station^{When} they had begun the playback, while behaviors continued to be recorded. Through accumulative information of the season, conclusions could be drawn as to the effects of the playback on the whales. Accumulative information is very important to this kind of study for if twenty whales immediately went the opposite direction or breached instead of just once, that would seem the playback had that effect upon them.

Drawing Conclusions and Projects

From the rich source of information gathered over the years, important questions that have arisen begin to get answered. P.W.F. noticing and informing public of how mother and calves and whales in general avoid areas with jet skis will possibly have an effect on hotels that are aware of this problem when deciding to have jet skis or not. Organizations like P.W.F. need to have an effect on the interactions between whales and humans because even though we want whales existence to continue, we might be doing many things to prevent their recovery. It is organization like P.W.F. to make us aware of these problems while it is up to us to respect what they tell us.

Specific projects from the kinds of questions from observing the whales, is a way of finding conclusions about them. For instance, a project on mothers and calf resights will show how long a calf and mother stay together. I did a project

to see the seasonal distribution of whales in Maalaea Bay.

Method

I plotted all the pods from 85 boatmaps (See ex. Figure 1 of Boat Map) whose size and make up (whether mother and calf were present) onto one map. (See Figure 2) I also compiled Table 1, showing the amount of times different kinds of pods studied in each quadrant. Table 1 shows the individual makeup of each pod of whales in each quadrant. Table 1 also shows how many of each kind of pod were sighted in total. Table 1 shows 433 pods were studied and is in direct correlation with Figure 2. I also made a Table showing the amount of times the boat entered each quadrant to find the percentage (see Table 3) of researched whale pods in each quadrant. Figure 3 is to give a general look of pod distribution in groups of pod sightings to give a view of heavier populated areas not in correlation with boat presence in quadrant. Figure 3 shows where P.W.F. did most research and found most I.D.S. in the 1986 winter season.

Results

Throughout the 1986 winter season P.W.F. researched approximately four hundred and thirty three pods of whales. Pods of whales which later affiliated into one were only counted by their previous pod numbers to help keep from recounting the same whales. However the pods plotted on the final map will contain many of the same animals that were resighted. Therefore the total animals shown on Table

1 contains many resights in the figure. One hundred and seventeen pods contained mother and calf.

The highest concentration of pods was found to be in quadrants three, four, and five. Quadrant Three contained eighty four pods, fifty six which were non mother calf and twenty eight containing mother and calf. Quadrant four contained seventy eight pods total, with fortyseven non mother calf pods and thirty one mother calf pods. Quadrant five contained fifty pods, thirty-five were non mother calf and fifteen were with mother and calf. Quadrant nine was the next highest concentration of pods with forty-one pods. Thirty one were non mother calf, and ten were mother calf.

Next to be considered with this concentration level of the distribution study is the fact that all quadrants were not researched the same amount or under the same conditions. Looking at Table 2 we can see that quadrant three was the most frequented since boats both launched and landed there. One hundred and ninety-seven times the boats entered the quadrant. Quadrant four was next most frequented by the research boats. Eighty eight times the boats entered that quadrant. Quadrant five was next most frequented with seventy-eight entrances. Quadrant ten was next frequented the most with seventy-two entrances.

Once knowing the pod numbers and the boat frequency in every quadrant, we can find the occurrence index which somewhat compensates for the variables in the amount of

times a different quadrant was entered. Quadrant twenty one had the highest index of 1.5, which means in one entrance more than one pod was found. Also to be considered is the fact that a pod could be sighted from another quadrant and specifically entered to research the pod. Quadrant twenty and nine were next highest in occurrence of whales. Both had indices of 1.0. Quadrant four contained .89 in the occurrence index. Quadrant twelve contained .79 in the occurrence index. Quadrant twenty-two contained .73 in the occurrence of whales index. These findings drastically change the overall look of where whales frequented the most. Looking at Table 1 we find we are shown only the highest concentration of whales that were researched.

Discussion

Many different biases are contained in these statistics. For one it is the choice of researchers, with considerations of weather conditions and water conditions to decide how far out and which transect lines to travel. Concentration of findings was around Keawakapu the boat launching and landing area. The percentages can show a likely chance that whales will be present in a certain quadrant, but time and season is not showed on the map. Highest concentration of pods was found to be within $2\frac{1}{2}$ nautical miles from shore. It is also important to note that quadrant size varies in the way the quadrants were drawn, and quadrants three, four, and five are of the larger area size.

This study was basically one of distribution to see where the pods were found and what kind and how many they were. It is the first time P.W.F. plotted this kind of boat map and therefore the first time a seasonal distribution of the pods was determined in this way. It is important to see these results to know where they are researching and to take in consideration other areas to concentrate their studies. Figure two can also be used to compare to the areal study which showed where pods were seen as well. Looking at the areal study, concentration of mothers and calves were seen further out than three miles offshore. This would show a contrast in findings from the map plot and areal studies. Therefore it is important to have a variety of research methods

to get a more accurate look at the results found in each. This pod distribution study can be done in a seasonal basis and can show possible contrast to where the percentages of whales are found in different seasons. It was an educational experience for me to see how there are many kinds of conclusions to be drawn from a study, where its specific findings are, and what biases the report contains.

Internship

P.W.F. has shown me the twenty-four a day, job. Spending great amounts of time with the researchers, and occasionally staying overnight in their house in Kihei, I've experienced the late hours of writing up boat logs, getting equipment ready (washing salt from boat and camera equipment) for the next day. Then to get up before the sun to prepare the boat and pack it up with camera equipment, hydrophone recording equipment, watertight chest for supplies, snorkeling gear, and things needed such as life vests, and a sea anchor. The eager hope for calmer waters each morning so sighting, photographing and underwater visibility will be good.

The researchers actually living their hard work and loving it at the same time. I found there is great organizational responsibilities and safety responsibilities and an incredible amount of research information to be responsible for.

The researchers constantly were setting forth new

challenges in finding out about a mammal with great concerns for its recovery. As the 1982 season P.W.F. assessed the apparent effects of military activity within part of the humpback's breeding grounds. "Three years of data indicated that up to 33% of the whales in the study area were displaced by military activity with the target island of Kahoolawe." (Internship Program, P.W.F.) With findings like these we see how important it is this information is found out and released to the public to have something done about it. The military stopped bombing on Kahoolawe for the height period of whale presence during the season.

When "Humphrey" the humpback whale swam up the Sacramento River in the very beginning of the season, the only thing which could turn Humphrey around was a recording of social sounds by whales collected from researched data that U.H.M had. That was what lead Humphrey back to the ocean, and hopefully to life. With the help of organizations like P.W.F. laws become passed. ~~For instance~~, no boat can go closer than 300 yards near a whale when in the 1979 Maalaea Bay calving grounds line. Outside this line boats may not go closer then 100 yards. Aircraft cannot go lower than 100 ft. while in a horizontal distance of 300 yards from a humpback whale. These laws were passed because from studied research high boat traffic can keep whales from certain areas. This will help from harassing the whales and limiting their chances for growth. This season P.W.F. noticed a small but

definite upswing in the humpback's presence in Hawaiian waters. These findings and laws are crucial to making sure people do not inhibit the recovery of the humpback whale till a point where it can not comeback at all. "Men on the other hand, have dealt with whales in a blindly ignorant way. Only after two and a half million whales have been slaughtered in the past fifty years, and with several great whales near extinction, have we just begun to question the whale's role in the earth's ecosystem." (Salute to A Gentle Giant, Gregory Kaufman)

P.W.F. has been my first real step in the direction of direct study of marine science, and I would love to continue in studies like this one greatly. I learned about the great never ending hours of hard work to endure as well as fun in researching the life of a mammal they love. For it is up to them and all the other whale researchers to be their key to recovery. "The element we are now confronted with is time. We must define the necessary biological patterns to ensure the humpbacks recovery. Unless research continues at a stepped up pace, we will lose the race with time and also one of the greatest animals to ever inhabit this planet." (Salute to a Gentile Giant, Gregory Kaufman) Researchers hold a great weight indeed.

I will never forget the first time I saw a calf eye to eye as I dove down with my snorkel gear to take a picture of it. In that moment I found such a connection

as I had never felt before. It is the connection that will make you keep on with the nonstop struggle for their fight for existence. I too became hooked on whales with the goal to help save them.

References

- 1) Humpback Whales in Hawaii, by University of Hawaii Sea Grant program.
- 2) Salute to a Gentle Giant, by Gregory Kaufman.
- 3) Internship Programs, by Pacific Whale Foundation.

Acknowledgements

I would like to thank The Pacific Whale Foundation for accepting me for the full season internship. I can not thank them enough for all they have shared. Greg and Kristi, you are doing an incredible job! Thankyou for all you've taught me and my boat experiences with Mari, Lili, Robert, Mike, and Dean, Greg, (Yeh for Australian reps) have been an experience I will never forget. Thank you to other interns for being so wonderful; Rose, Lorraine, Nadia, Mike, Celina & Charlie.

I would also like to thank advisor John Gerdes for taking my project on and guiding me towards completion of my Marine Option Program Certificate.

I would also like to thank University of Hawaii Whale Office. Especially Joseph Mobley and Anjanette Perry. And the U.H. research team on Maui.

I would also like to greatly thank Annie Orcutt and Sherwood Maynard from the Marine Option Program, UHM, for advising me towards, and helping me with this project.

TABLE 3

Occurrence Index

Quadrant	Total Pools	Total Boat Entrances	$\frac{\text{No. Pools}}{\text{No. Boat Entrances}}$
1	2	15	.13
2	17	37	.46
3	89	197	.89
4	78	88	.64
5	50	78	.39
6	11	28	.71
7	5	7	.67
8	12	18	1.0
9	41	41	.24
10	20	72	.35
11	14	40	.79
12	23	29	.33
13	11	33	.50
14	2	4	.74
15	17	23	.37
16	11	30	.21
17	6	19	.67
18	2	3	.67
19	6	9	1.0
20	9	9	1.5
21	3	2	.73
22	4	11	0
23	0	9	0
24	0	1	0
25	0	0	0
26	0	2	0
27	1	3	.33

Boat Map

Feb. 26th 1986
(Zodiac)

Figure 1

Pod 1 = 3 ADULTS
Pod 2 = MILKIE
Pod 3 = 2 ADULTS
Pod 4 = MILKIE

Lili - Photographer
Celina - Driver
Teal - Recorder

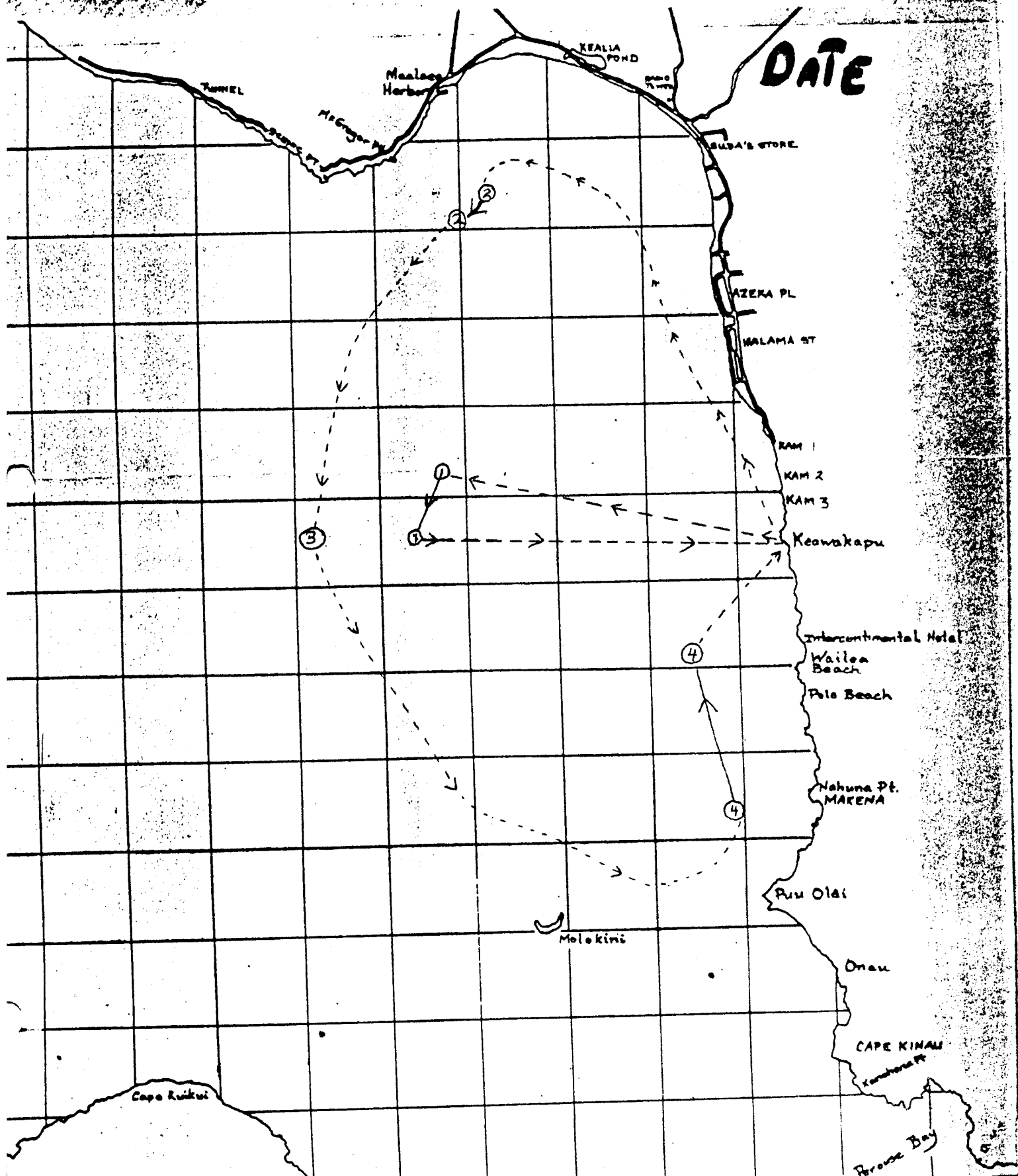


Figure 2 M = Mother C = Calf E = Escort AN = Animal

M/C = • M/C/E = + M/C/2E = * M/C/3E = ○ M/C/4E = ◊ M/C/5E = ⊕ M/C/6E = ⊗ 1AN = 2AN = 3AN = *
 4AN = ○ 5AN = • 6AN = + 7AN = * 8AN = ⊙

Whale pod distribution and Composition in Quadrants One through Twenty-Seven. From 85 boat maps from January 15 1986 to May 8 1986

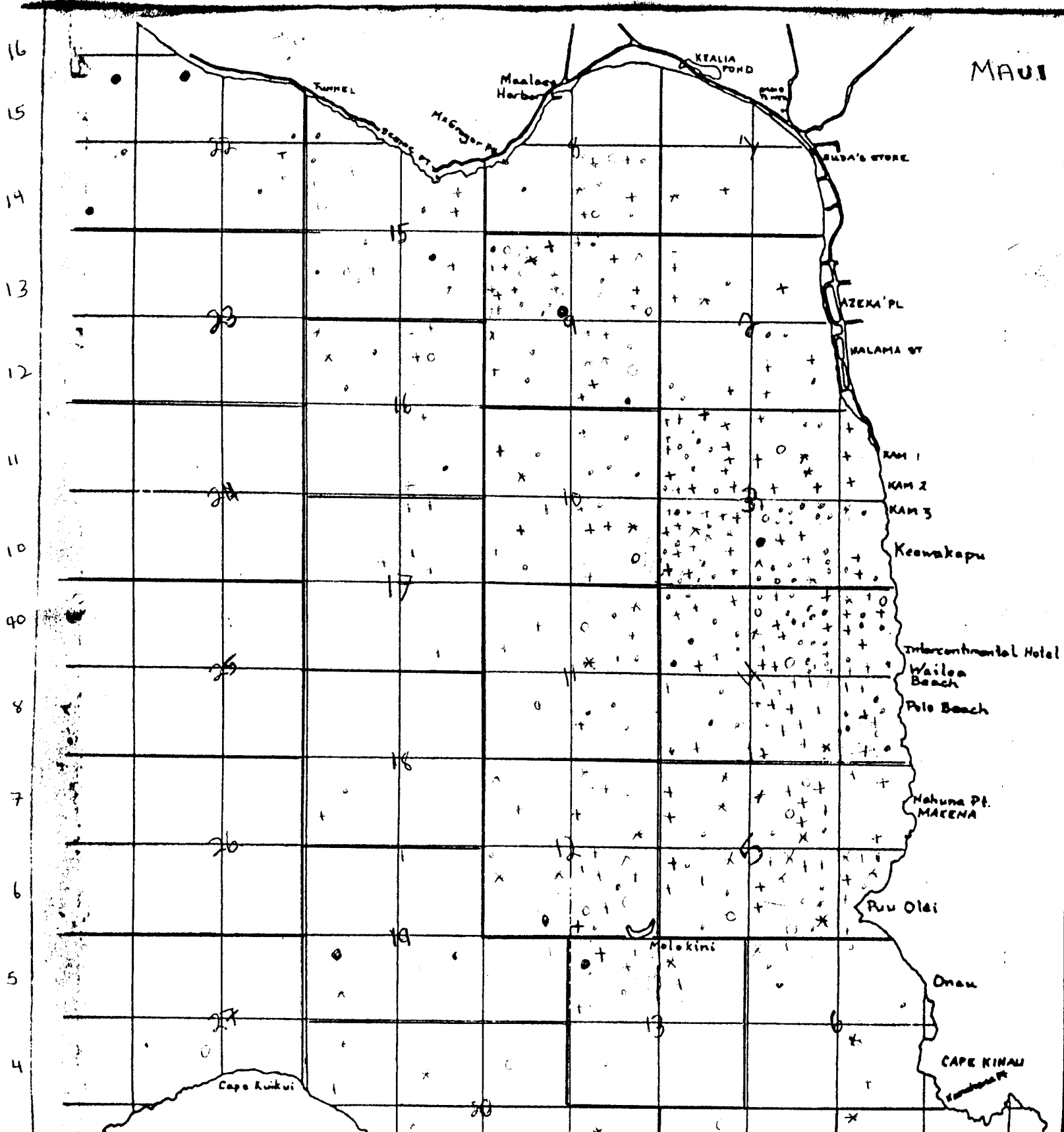
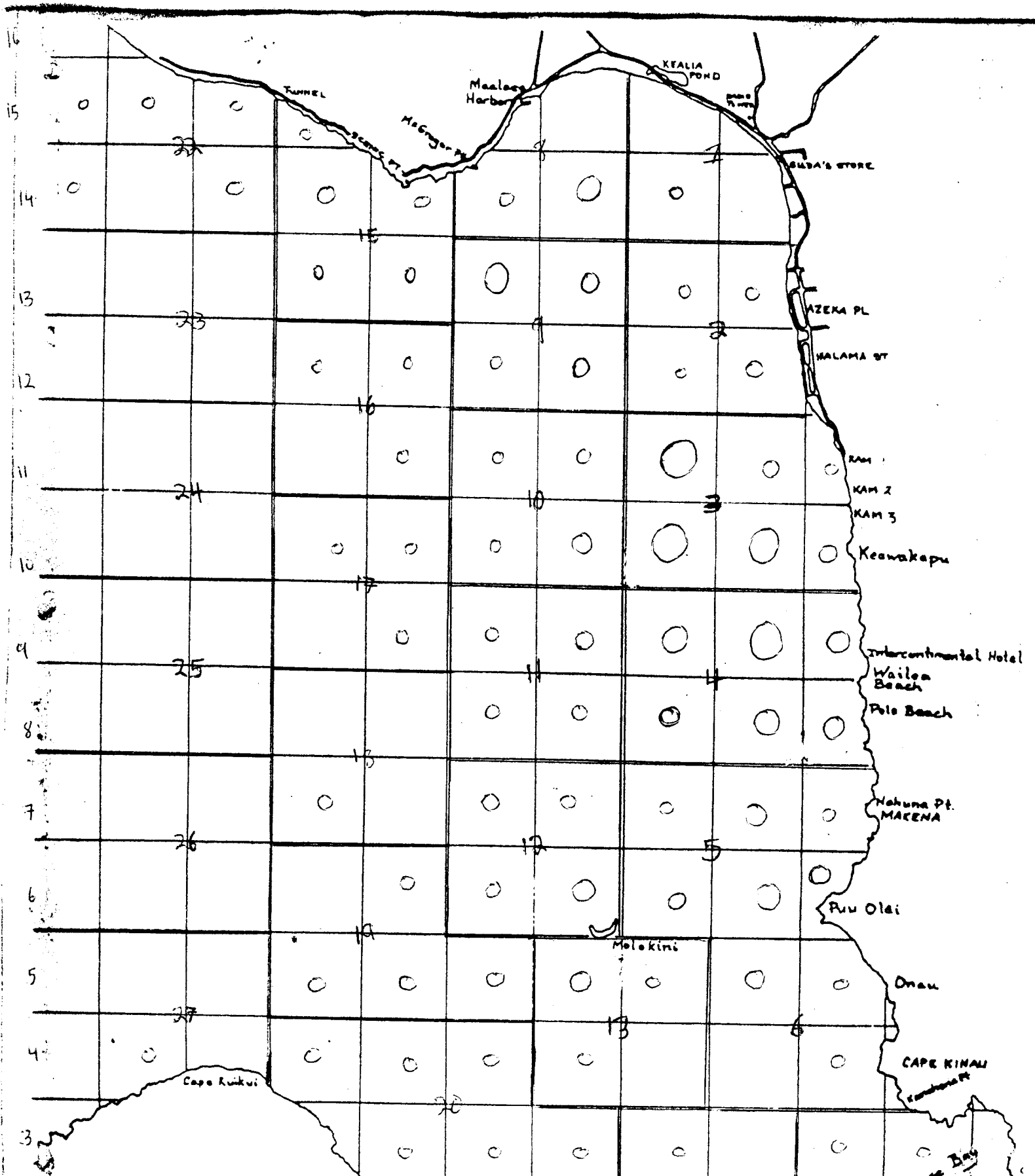
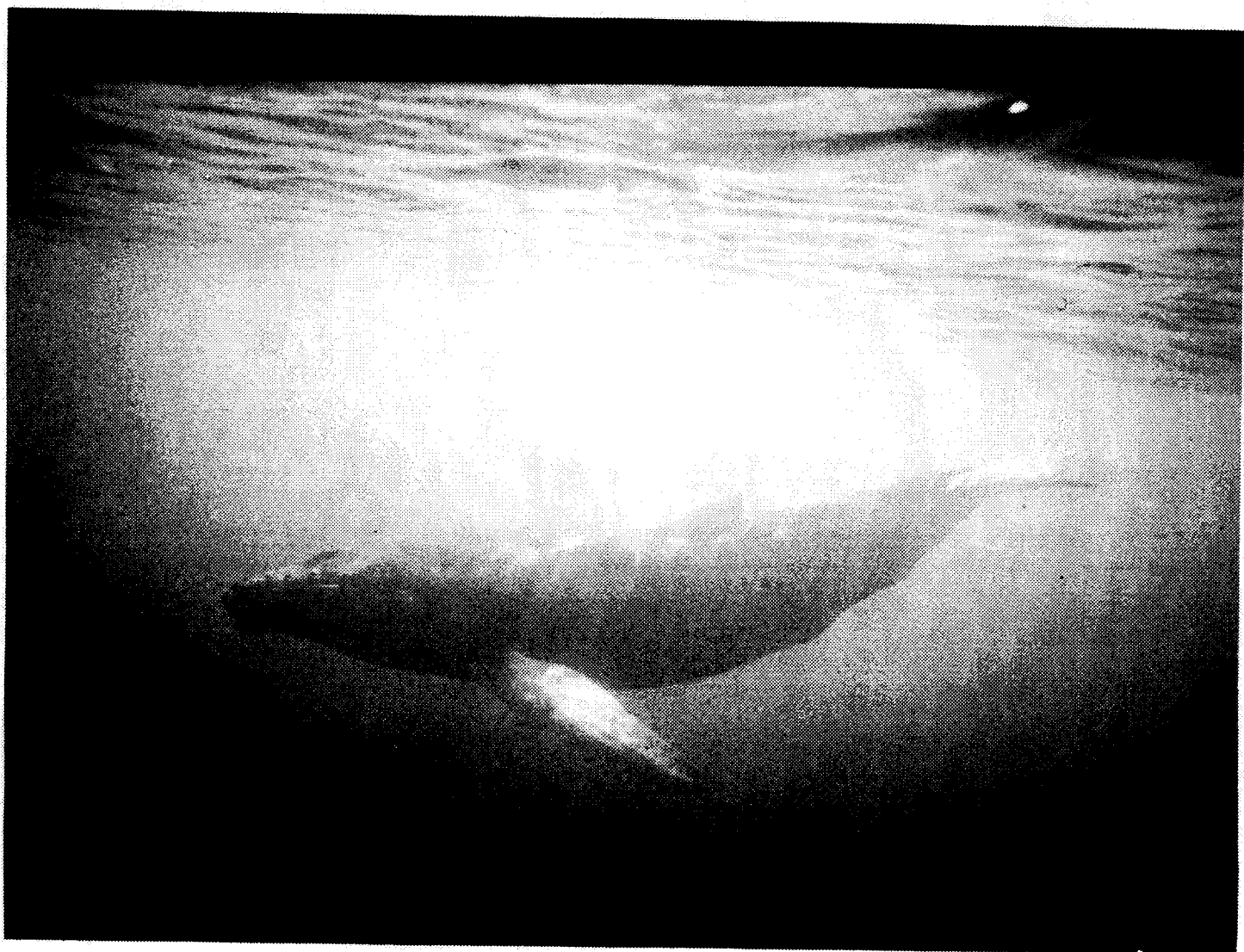


Figure 3

Whale pod groupings represented by circle size - From 85 boat maps
 in individual sections of quadrants - 1986 Winter Season
 in Maalaea Bay

1-5 pods 6-10 pods 11-15 pods 16-20 pods 21+ pods





"First Time Eye to Eye"

Photo by Teal Akeret
© P.W.F.