THE PROCUREMENT AND USE OF ABALONE IN SOUTHEAST ALASKA

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ABSTRACT

This report describes the non-commercial procurement and uses of abalone in Southeast Alaska. Patterns of harvest and use in the communities of Hydaburg, Klawock, and Craig are described and discussed in Part I of this study. Descriptions of use in Ketchikan and Sitka, which will supplement this report as Part II, will be distributed at the Board of Fisheries meeting.

Basic information on abalone procurement, uses, and users are provided at the request of the Alaska Board of Fisheries to assist them in evaluating proposals on changes in shellfish regulations. Since 1977 increases in commercial harvesting of abalone in the waters near Hydaburg, Klawock, and Craig have raised concerns among local residents.

Twenty to forty percent of the households identified in each of these communities were selected randomly for interviews. The interview format was guided by the list of criteria developed by the Boards of Fisheries for identification of customary and traditional uses.

Hydaburg, Klawock, and Craig exhibited long-term, consistent patterns of abalone use by the majority of residents interviewed. In all

three communities, shorepicking, or the combination of shorepicking with pole or gaff techniques, were the primary methods of harvest. These techniques were consistent with historical practices reported to have existed at the turn of this century. In the communities of Craig and Klawock, snorkel gear was used by a few residents along with shorepicking methods.

Abalone picking occurred as part of a practice of gathering a variety of invertebrate and plant resources from the intertidal zone. Gathering generally took place in the spring and summer months and the number of efforts was limited by environmental and economic constraints. The use of a wide variety of other local resources was found in all three communities.

By mapping areas used for harvesting abalone it was determined that harvesting generally occurred within a twenty-five mile radius of each community. Boundaries established by the Board of Fisheries to protect areas used by local communities were found to transect and exclude many of these areas.

The number of non-commercial harvest efforts per year has remained relatively constant through the past ten years. Harvest data reported in interviews indicate that annual harvest levels have declined since commercial harvesting began near Prince of Wales Island in 1977.

Methods of storing and preparing abalone fluctuated through time

depending on the availability of the resource and the technologies used by the residents. Sharing and trading of abalone within and outside the communities existed but at a lower level than in past years due to decreases in annual harvest levels.

Some of the major concerns and issues expressed by residents included:

1) Concerns about decreasing non-commercial harvest levels and the health of abalone populations in light of recent large commercial catches.
2) Concern over the perceived lack of knowledge of abalone populations, distributions, life cycles, and migrations.
3) Concern over the lack of enforcement of commercial abalone regulations.
4) Belief that the existing boundaries did not adequately protect non-commercial use areas.
5) Concerns over the effects of current possession limits on established harvest practices and distribution of the resource.

INTRODUCTION

Description of Study

This report is a description of non-commercial procurement and uses of abalone in Southeast Alaska by the communities of Hydaburg, Klawock, Craig, Ketchikan and Sitka. Information was collected during the fall of 1981 and winter of 1982, amounting to eight weeks of field-based studies on the five communities. These studies were conducted at the request of the Alaska Board of Fisheries to provide information on the non-commercial uses and users of abalone in Southeast Alaska. Information on uses of other local resources within these communities which was collected concurrent with this effort will be discussed in this report only as it relates to abalone use. This research, conducted through the Division of Subsistence, Alaska Department of Fish and Game, is the beginning of an effort to document contemporary non-commercial uses of local resources by communities in Southeast Alaska.

Background

The pinto abalone (Haliotis kamtschatkana) of Southeast Alaska is presently in considerable demand by both non-commercial and commercial

users. Little information exists on the past and present harvest levels and uses of abalone for non-commercial purposes. However, commercial harvests of abalone in Southeast Alaska increased from a sporadic annual harvest averaging 4,000 pounds prior to 1978, to a maximum of 357,000 pounds in 1979, then declined slightly to 270,000 pounds in 1980 (Koeneman and Larson, 1980). A regulated take of 130,000 pounds was allocated for the 1981 commercial abalone season.

As a result of concerns expressed by local communities, some of the waters near the communities of Craig, Klawock, Hydaburg, Sitka and Ketchikan were closed to commercial abalone harvesting in 1979 (Alaska Department of Fish and Game 1981 Shellfish Regulations 5 AAC 38.134. Closed Waters) and were designated as subsistence harvest areas. Since these closures, additional concerns have been voiced about the lack of available abalone by the communities within the study area. Two major conflicts are perceived by local abalone users. First, members of the non-commercial user groups argue that over-harvesting by commercial users has decreased their catch success. Secondly, in some areas, non-commercial shorepickers contend their harvest levels are declining due to reduction of abalone recruitment into the intertidal zone resulting from over-efficient harvesting by non-commercial SCUBA divers in offshore waters.

The research problem is to define the extent and characteristics of contemporary and historical utilization of abalone by the residents of Hydaburg, Klawock, Craig, Ketchikan and Sitka.

Purpose of Study

This study was designed to describe basic information on abalone procurement, users and uses in the vicinities of five selected communities of Southeast Alaska. This information will be made available to the State Board of Fisheries to assist them in evaluating proposals relating to changes in shellfish regulations. The study may also be of value to the individual communities when considering impacts of future development within their immediate areas.

Objectives

Specific objectives of the research included:

1. Description of the general demography of households interviewed in the communities.
2. Description of household and community uses of abalone.
3. Description of the methods, means and seasons used for picking abalone and ways these skills have been transmitted through generations.
4. Estimations of quantities of abalone harvested during recent years.
5. Identification and mapping of abalone harvest areas.
6. Description of the annual round of resource use and it's

relation to abalone picking.

7. Description of general patterns of distribution and sharing of abalone.
8. Summary of the history of regulatory policies and procedures of the abalone fishery.
9. Description of means of handling, preparing and storing abalone.
10. Collection of opinions and concerns about abalone populations from the communities.

METHODOLOGY

Information was collected from the five communities to be studied in two phases. Part I consisted of in-depth interviews with households in Hydaburg, Klawock, and Craig. Part II involved written surveys that individuals completed while obtaining a permit to pick abalones in Ketchikan and Sitka, supplemented with interviews conducted with local households. A literature review of published and unpublished information regarding the Southeast Alaska region and communities being studied and their uses of abalone and other resources was on-going throughout the project.

Part I

Interview Methods

Interviews were conducted with randomly selected households during the fall of 1981 in the Southeast Alaska communities of Hydaburg, Klawock and Craig on Prince of Wales Island (Figure 1). Twenty to forty percent of identified households were contacted in each community. Households were defined as groups of people living in separate dwellings during the

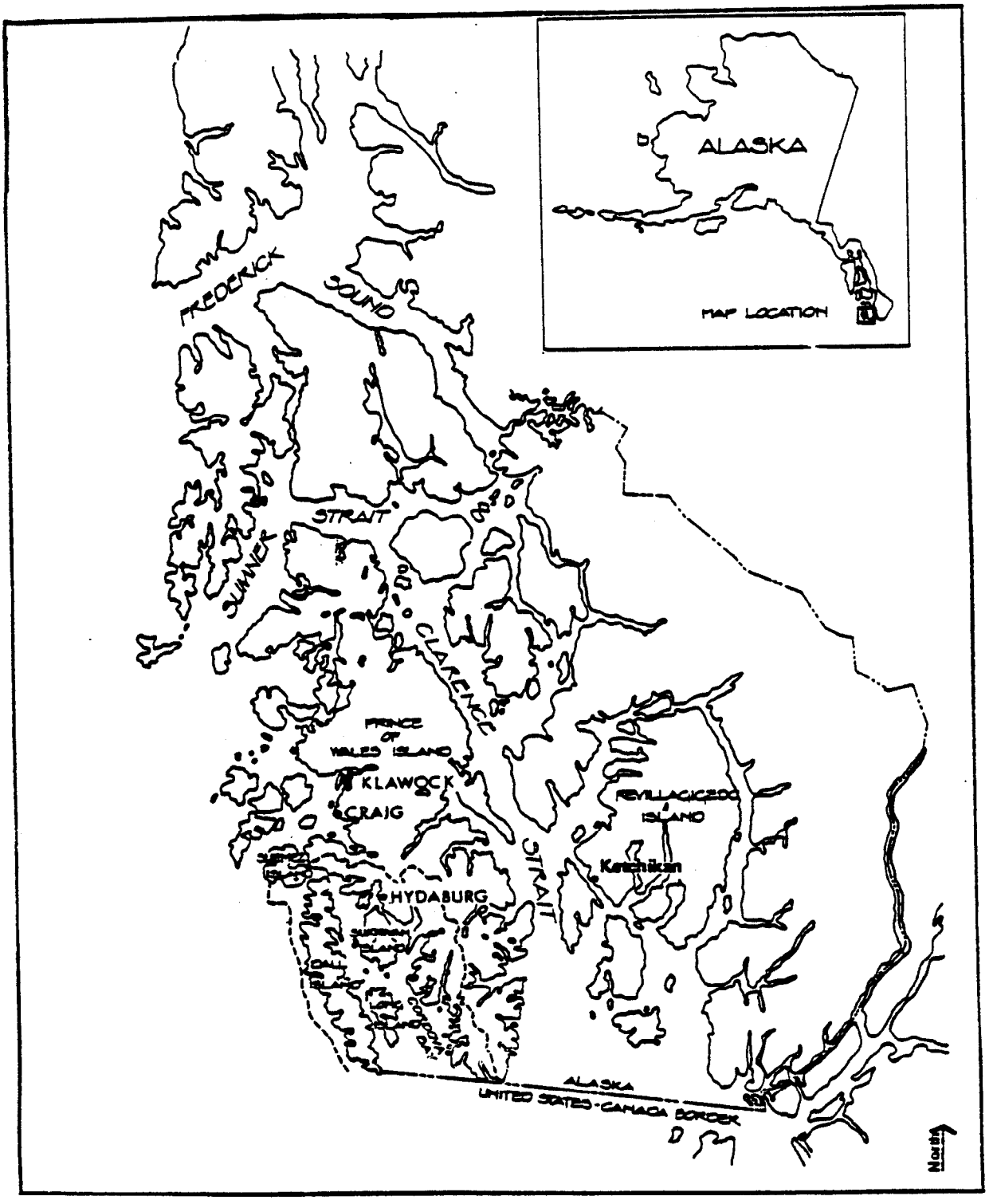


FIGURE 1
LOCATIONS OF COMMUNITIES STUDIED IN PART I:
HYDABURG, KLAWOCK AND CRAIG, ALASKA

period of this study.

Prior to initiation of field work each community was appraised of study objectives and proposed methodologies; comments were incorporated into the research plan. Local fish and game advisory committees, city councils, village corporations and local community organizations were contacted and meetings held to introduce the project and request permission to carry out the study objectives. Local fisheries biologists and the area Fish and Wildlife Protection Officer were helpful in providing orientation to local conditions before the initiation of field work.

Data were gathered in the three communities by use of informal and structured interviews (Appendix A) with randomly selected households. A percentage of existing households were selected for interviews using maps of the community. If after numerous attempts a household was unavailable for interview, another household was selected from an alternate list.

Interview format varied from an informal discussion of abalone picking and activities of the year to a structured outline of specific questions, depending on the household's receptiveness during the interview. Although the character of the interview varied, in all interviews information was requested on the procurement and use of abalone, including methods, seasons, means, locations of harvest areas, harvest size, sharing, trading, and means of preserving and preparing. General information on household composition, residency, household income

and other food-gathering activities was also collected. Interview questions were guided by the list of criteria developed by the Boards of Fisheries and Game for the identification of customary and traditional uses (Appendix B).

Interviews were usually held at times when many of the household members were present. This usually resulted in one member of the household leading the conversation with comments interjected by others that were interested, and allowing interaction from a variety of members within the household. Most interviews lasted over one hour and occasionally continued for two to three hours.

Generally, desired information came out naturally from casual conversations with the major exception of estimated quantities of abalone picked per year. Some of the households (notably those with low catch success) actually counted the number of abalones gathered and were able to discuss numeric quantities with little trouble. Many of the households contacted did not count individual abalone but recalled their catch in terms of number of buckets, tubs or sacks. One example of converting "bucket" units into numbers of individual abalone follows.

One household reported that a single trip had been made in the previous year to pick abalones. Picking from shore for 1.5 hours during a low tide yielded four large buckets of abalones. Further questioning regarding harvest and preparation practices indicated that each 5-gallon bucket, nearly full of abalones, provided approximately one meal for the

family of 16 individuals. The average serving size of 6 abalones per person resulted in consumption of approximately 100 abalones per meal. Therefore, it was estimated that the year's harvest of 4 buckets provided 4 meals, totaling approximately 400 abalones, for the household.

Similar approximations could be made when talking to households who had not counted the number of abalones they picked per year but knew exactly how many jars or cans they had preserved as well as the number of fresh meals eaten that year. Ranges of abalones harvested were averaged and reported as the mean for that range.

Comments on previous years' harvest levels often came out in conversation and were documented. Households were also asked to recall approximate harvest levels for the years 1981, 1980, 1977 and 1972, which correspond to one, two, five and ten years ago respectively. Harvest levels for 1981 and 1980 represented the rate of harvest success since commercial harvesters became active in the Prince of Wales Island area, while 1977 and 1972 reflect harvest success prior to commercial use of the resource in this area.

Limitations, Delimitations, Assumptions

To meet deadlines for information needed for the Board of Fisheries' March 1982 meeting, it was necessary to collect information from these

communities in the fall and winter months. This restrictive time table was limiting since it did not permit the researcher to observe and discuss the annual cycle of uses and levels of harvests during the year as they were happening.

The fall and winter months did prove to be an appropriate time to contact people at home. Nevertheless, caution should be used when assessing the randomness of sampling methods. The amount of time spent in each community allowed for only 21 to 41 percent of households to be interviewed rather than the entire community. Although numerous attempts were made to contact randomly selected households, many alternate households were interviewed in order to reach an adequate percent of the community. This method of convenience may have biased the sample by excluding certain active households who were unavailable for interviews during the study period.

Because of similar time constraints, not all communities that use abalone in Southeastern were studied. Interviews indicated that Metlakatla is surrounded by good abalone habitat and that communities north of Sitka, such as Pelican and Elfin Cove, may use abalone found on the west coast of Yakobi and Chichagof Islands and Lisiansky Inlet.

While this study period was timed appropriately to meet with people in their homes, it was a very poor time to observe abalone harvesting activities. With the exception of hardy SCUBA divers in Sitka and Ketchikan, most abalone picking was found to take place during the spring

and summer months.

Use of verbal or written report data unsubstantiated by the researcher's observations is limiting but this tool of recording information based on an individual's memory has been used often and successfully by a variety of sciences. The numbers reported in this study were intended to document trends or patterns rather than exact levels. It is the researcher's belief that information received from interviews were expressed sincerely and numeric values accurately reflect abalone harvest patterns.

It is important to note that regulations that prohibited the possession of more than 50 abalones per person and a minimum size limit of 3 inches (3.5 inches in District 13 only) have been important in influencing patterns of abalone harvest. Additional understanding is needed on the roles individual members within the household have during the abalone harvest.

Part II

Survey Methods

Part II of this study was initiated prior to this researcher's involvement with the project. A permit system was established at the 1981 Spring Board of Fisheries meeting requiring abalone permits for residents of the Sitka area (District 13), and Ketchikan area (Districts

1, 2, 5, and 6). The permit required an individual to record the location, harvest method and number of abalone harvested. At the time of permit application, people were asked to complete a survey-questionnaire regarding their use of abalone. The written survey format was similar to the interview format developed for Part I (Appendix C). Commercial Fisheries Division staff administered the permit-survey out of the area offices in Ketchikan and Sitka.

Since the permit system was new many residents were not aware of the regulation and did not receive a permit or complete the survey. Responses from Sitka numbered over 250; in Ketchikan only 50 people obtained permits and less than 30 completed surveys. To increase the data base in Ketchikan, a survey form was mailed out to permit holders who had not previously submitted one (Appendix D). An additional twenty-five respondents from Ketchikan were added to the sample in this manner. Surveys were coded and entered into the University of Alaska Computer Network and analyzed using the Statistical Package for the Social Sciences (SPSS). Frequencies and cross-tabulations were run on user groups, harvest numbers and selected information on the users.

In addition to the surveys, ten interviews with known abalone pickers were held in both Sitka and Ketchikan using the same format described in Part I. These interviews complement the surveys by providing a broader understanding of abalone uses and users.

Limitations, Delimitations, Assumptions

The permit-survey system was not instituted until the summer of 1981, and many abalone users were unaware of the regulation. Caution should be used when assessing seasons and use levels from the survey data since the permit system was not functioning during the spring, which has been reported to be a very active harvest period. Information gathered from the permit survey should not be compared directly with interview information, since the researcher was not present during the survey to provide background information and clarification during the survey process. A much broader understanding of use patterns was obtained from the interview techniques.

LITERATURE REVIEW

History of Abalone Use in Southeast Alaska

Abalone use in Southeast Alaska was initially documented in the reports of early explorers and traders who encountered the Tlingit and Haida cultures during the 18th and 19th Centuries. While abalones are indigenous only to the western coastal zone of Southeast Alaska, use of this resource for food, decoration of clothing, artwork, ceremonial purposes and tools extended outside this zone due to an active trading network throughout the region.

Food

Early accounts of life on the outer islands of Southeast Alaska stress the importance of shellfish in the diet of indigenous cultures. Although salmon was a staple food, the island salmon runs were significantly smaller than those on the mainland and the island diet was diversified by incorporating a variety of seafoods, including shellfish (Stewart, 1977).

During voyages along the northwest coast in 1788 and 1789, John Meares commented on the use of shellfish, including abalone, as a traditional native food (Drucker, 1955). Through interviews with elders from Southeast Native populations, Drucker (1948) verified that abalone was a traditional food of Haida, Tsimshian and Tlingit Indians who were geographically located near the resource. Abalone use was not limited to Native cultures in proximity to its natural coastal habitat. Inland Indians procured abalone and other coastal foods during regional trading gatherings. For example, during an annual gathering on the lower Nass River in British Columbia, coastal Tlingit, Haida and Tsimshian traded abalone and other seafoods for eulachon and mainland resources offered by the Niska and Gitksan Indians of inland British Columbia (People of 'Ksan, 1980).

Decoration of Clothing and Artwork

The utility and desirability of abalone extended beyond its nutritional value to its use as decoration for clothing and artifacts, as noted in the following passage by Livingston Jones (1914):

> In former years their dress was gorgeously adorned with beads, buttons and abalone. At one time the abalone shell was to the natives what diamonds are to the white people. Many carvings were inlaid with it. To this day it is highly prized, and used for ornamentation. In the days of slavery slaves were traded for it. (p. 70)

Blankets and cloaks elaborately ornamented with abalone buttons were desirable and very expensive (Jones, 1914).

The extent of decorative use is described by Stewart (1973).

> The shimmering multicolors of the blues, greens and purples of the mother-of-pearl glimmered with a unique beauty, and gave lustre and richness to a great many [native] carvings. The shell would be cut into sections and inlaid as eyes, nostrils, of teeth in a mask or on the face on a carved wooden bowl. The frontlet of a chief's head-dress often glittered with the shining, colorful material and so did many rattles and spoons. Small pieces of abalone decorated a woman's labret, or larger sections hung from clothing, around the neck as a pendant, or were made into magnificent earrings for a woman of rank.

Totem poles are often found housing large pieces of abalone depicting eyes and teeth of various creatures. In social ceremonies the wealthy man sponsoring the occasion usually had a speaker who addressed the audience, announced the potlatch gifts and delivered notices the host wished to communicate. The speaker always carried a staff as a badge of his office. Many of the staffs were vertically organized as in totem poles, but in a smaller scale, and inlaid with abalone shells (Gunther, 1966).

The native pinto abalone of Southeast Alaska has a small and somewhat brittle shell which limited its suitability for these decorative purposes. Southeast artists recognized the potential for decorative work in the larger, flat shells of green abalone and other species obtained

from California and the Pacific Northwest through trade (Stewart, 1973). According to some accounts, "extensive use of green abalone shell seems to date only from the period of trade, via the white man's sailing ship, with California, the Pacific Islands and Japan" (Holm, 1965:18).

Other accounts credit the Indian people with traveling great distances to trade for the larger species of abalones (Bancroft-Hunt and Forman, 1979).

> The Chinook tribes acted as middlemen between southern Northwest Coast Indians and tribes from the Columbia River area. Skins, dried salmon and fish oil were traded for such items as California abalone. Northern Tlingit Indians were known to travel by canoe 1000 miles (1600 km) to trade in Puget Sound. (p. 13)

Through one or both of these means of trade, abalone from California and the Pacific Northwest was obtained and used for decorative purposes in lieu of the brittle shell of the local species.

Tools

Both the Haida and Tlingit were (and are today) skilled fishermen. Nine thousand years of survival on the Northwest coast resulted in accumulated knowledge and experience in producing hoods, spears, nets and traps adapted to capturing fish of particular environments. The island peoples fished for salmon in the open ocean, streams, and lakes. The

abalone shell was used as a lure in combination with a wooden or bone hook. The large abalone flasher was tied into the line just in front of the hook and pulled along through the water. Today, polished metal flashers used by commercial fishermen have the same effect as the glittering abalone shell did for the Haida and Tlingit Indians of pre-contact days (Stewart, 1977). Fishing hooks were also carved from the larger and stronger shells of abalone (Howorth, 1978).

No detailed studies of contemporary, non-commercial uses of abalone by communities of Southeast Alaska are known to exist. Recent planning documents for communities within the study area have acknowledged abalone use and have mapped general areas of abalone harvest (CH2M Hill, 1981).

The Ecology of the Pinto Abalone

Little biological information specific to the pinto abalone (Haliotis kamtschatkana) of Southeast Alaska is available. Within Southeast Alaska it is known to inhabit the outside coastal waters from Dixon Entrance north to Icy Straits. Outside of Southeast Alaska it is found in British Columbia and as far south as Point Conception, California (Parker, 1973).

In 1947, Dr. G. Hanna of the California Academy of Sciences conducted a species study of the shores of Prince of Wales and Baranof Islands. This work prompted Robert Livingston (1952) of the U.S. Fish and Wildlife Service to conduct a short study on size-weight

relationships and percent meat recovery for the pinto abalone off the coast of Prince of Wales Island near Craig and Klawock. His primary purpose was to determine whether abalone existed in commercial quantities in this area. Livingston's research provided the following conclusions:

1) commercial quantities of abalones did not exist in the areas investigated;

2) greatest concentrations of abalones occurred in areas with active water circulation and extensive kelp beds;

3) the size of individual abalone was small compared to individuals of the same species found in warmer water and other species distributed to the south. Pinto abalones collected near Prince of Wales Island averaged 97 mm (3.8 in) in diameter with a total weight of 4.6 ounces and shelled weight of 4.8 ounces.

Livingston (1952) also noted that abalone was eagerly sought by Alaskans for home consumption.

In Southeast Alaska the pinto abalone is thought to be on the northernmost edge of its habitat and is primarily found in patchy aggregations (Livingston, 1952; Quayle, 1962). James Parker (Alaska Department of Fish and Game, 1973) reported additional size-weight relationships for pinto abalone and estimated that sexual maturity began

at approximately 65 mm (2.5 in) in length. In 1975 a study of pinto abalone in captivity at a constant water temperature determined food preferences, maximum daily consumptions and shell growth rates (Paul, et al., 1975).

The most recent research specific to the Alaskan abalone was presented to the Alaska Board of Fisheries in January, 1981 (Koeneman and Larson, 1980). This study covered spawning periods and water temperatures, annual growth rates, and commercial harvest data for the waters near Ketchikan and Cordova Bay. The pinto abalone in this area was found to be a relatively slow-growing and long-lived species; it was estimated that it took eleven years for an abalone to grow to 102 mm (4 inches).

Biological information is presently not available for many aspects of life history, abundance and distribution of the pinto abalone in Southeast Alaska.

Natural Predation

Natural predators of the abalone that have been observed by interviewed residents include sea otter, land otter, mink, various rockfish, starfish, octopus, rock crabs, various birds, and humans. The relationship of sea otter populations to abalone abundance is particularly interesting in light of the perceived decline of abalone

availability at a time when otters are increasing in numbers in Southeast Alaska.

While exploring the Alexander Archipelago, Lisiansky (1803-1806) stated that although the Tlingits of Sitka shot sea otter, he felt their use could not have destroyed many. He noted that "they [sea otters] still abound in the Tlingit area" (Lisiansky, 1814:179). Lisiansky's voyage from Russia occurred at the beginning of the sea otter decline to near extinction due to the slaughter by the Russians, British, Americans and Tlingits, who did much of the hunting (Drucker, 1955). Exact numbers of sea otters occurring along the outer coasts of Southeast Alaska prior to extinction were unknown; logs of pelts shipped to Russia from Sitka by Alexander Baranof however, indicated the number of otters killed increased from 1,200 in 1798, to 2,000 in 1800 and 15,000 in 1804 (Elliott, 1875).

The effect of the fur trade on the sea otter population was drastic. It may also have caused an inverse effect on abalone in the area. Sea otters are famous for their voracious appetites and fondness for large quantities of abalones, sea urchins and other shellfish. A study was conducted in California on the effects of sea otter predation on a habitat which was previously void of sea otters and abundant with abalone. A group of sea otters introduced to a nearby area worked through the area and left only shellfish that were inaccessibly tucked away in deep cracks (Howarth, 1978). The natural balance that exists between sea otters and abalone is not completely understood. Some

scientists speculate that in areas inhabited by sea otters, abalone may occur only in inaccessible cracks and crevices and not on the unprotected surface of rocks (Ricketts and Calvin, 1968).

When the sea otter (Enhydra lutris) was completely exterminated from Southeast Alaska in the 1800's, an effective predation pressure was removed from the abalone population. Between 1965 and 1972 the Alaska Department of Fish and Game reintroduced sea otters to the western coasts of Chichagof, Baranof and Prince of Wales Islands. In 1978 their population in Southeast Alaska was estimated at 600 (Schneider, 1978). Local communities report increased sightings and numbers of sea otters as well as migrating herds along the western coasts. Effects of increasing sea otter populations on the occurrence of abalone in Southeast Alaska can only be inferred.

FINDINGS

General

The findings section has been subdivided in order to present field information in an organized and efficient manner. The section begins with a general discussion of harvest methods, harvest habitat preferences, and a history of regulations for the five communities studied. Information gathered in the individual communities are presented in "Results: Part I" (Hydaburg, Klawock, and Craig) and "Results: Part II" (Ketchikan and Sitka).

Description of Harvest Methods

The task of harvesting abalone is usually referred to as picking. Picking abalone is not always as easy as one might expect: while stalking this creature may be fairly simple, the hunt requires some knowledge of where abalones choose to reside. Once prime habitat is located, it takes some experience and a keen eye to spot a group. Abalone are generally hidden underneath kelp beds or may have algae or marine animals (often barnacles) growing on the shell which help them to blend in with their surroundings. Even with these natural camouflages, many humans, as well as other animals, quickly learn the skills of abalone picking.

Interviews with people in five communities in Southeast Alaska indicated that most people seek out abalone in the following habitats:

1) the intertidal zone (minus 2 to 3 foot tides) to 40 feet deep;
2) rocky shorelines or ocean bottoms covered with boulders of various sizes;
3) areas of extensive kelp beds;
4) protected passages leading to the open ocean and influenced by ocean swells;
5) the leeward side of a rocky island or point that received heavy surf action causing active water circulation.

Areas reported to be poor habitat in searching for abalone or locations where only small abalones and sparse populations occurred include:

1) shores or bottoms composed of mud, sand or shells;
2) inland waters that did not experience an ocean swell;
3) waters that did not support extensive kelp beds;
4) areas that had been worked commercially for abalone;
5) areas that had large populations of sea otters.

Human non-commercial abalone pickers in Southeast Alaska have been grouped into the following categories for the purpose of this report.

Shorepickers

Affectionately called "rock hoppers" (usually by pickers who fall

into other categories), most shorepickers interviewed relied on very little mechanical assistance once they had located a rocky area where abalone were found. General needs and limitations of shorepickers were stated as follows:

1) a sea-worthy vessel with skiff in tow or a sturdy skiff to get to the rocky off-shore islands; with some minor areas of exception in the case of Sitka's road system, most shorepickers find it necessary to get away from a community where the waters are usually protected in order to find rocky areas that are influenced by ocean swells;

2) good weather with little to no surf;

3) a low (minus 2 to 3 foot) tide that falls during daylight hours;

4) sufficient time in conjunction with good weather and low tides to spend picking; conflicts may exist with other seasonal fishing and gathering activities (e.g. sockeye fishing) or seasonal commercial practices (e.g. commercial fishing).

Once the timing of the above factors are correct and an abalone site has been identified, the average time a shorepicker spends harvesting is 2 hours. This time can be spent in a variety of ways, from hiking along the tide line looking under piles of kelp and rocks, to hanging off the

bow of a skiff and picking from a steep, rocky cliff, depending on the shoreline terrain. Abalones can generally be picked by hand, but an abalone iron is occasionally useful for removing tightly-secured individuals.

The use of a sharp object (spear or gaff) on the end of an 8 to 10 foot pole is one modification of shorepicking that was described as being used long ago, as well as in recent times, by several long term residents of Prince of Wales Island (one individual for over 100 years). This method, in combination with a skiff and calm, clear waters, extends the spatial range and time period in which a shorepicker can gather abalones. There are numerous techniques which make this system work well, all of them requiring a considerable amount of skill. The pole and sharp object (spear, gaff or cockle rake) are used to reach into the water and flip the abalone off of its hold. The animal is then either speared, gaffed, netted or raked and brought to the surface.

Abalones were not always the only resources harvested while shorepickers worked the intertidal zone or a low tide. Other items taken at this time are discussed in a subsequent section of this report.

Snorkel Pickers

The use of snorkel equipment was usually combined with the protection of a wet or dry suit, and allowed an individual to remain

comfortable in the water for several hours. Snorkeling was usually more efficient than shorepicking since the person was able to be in the water. It was found to take place in three different modes:

1) The snorkeler picked abalones in a manner similar to that of the shorepicker, with the exception that he was able to walk through the water and occasionally dive underwater while reaching for prey. The same limitations that existed for the shorepicker hold, except the snorkeler has a much expanded range to pick from, a greater time period to take advantage of the low tide, and access to shore line areas inaccessible to shorepickers. A seaworthy craft comparable to one needed by shorepickers and SCUBA pickers is also needed.

2) Snorkelers also worked in a diving mode by swimming down to the bottom, picking and returning to the surface for air. If coordinated with low tides this technique allows one to expand vertical range even more. It also permits a person to pick farther away from the shore and surf as well as pick at times when tides may not be very low. The burden, of course, is that one can only stay under as long as you can hold your breath.

3) Snorkels were commonly used in combination with SCUBA gear, allowing the picker to swim along the surface looking for abalone beds and even picking abalones in shallow water without using up valuable air needed for the SCUBA.

The financial investment in equipment for snorkelers may range from $500 to $1,000, depending upon the type of suit that is purchased. The remaining gear is not nearly as expensive. As is true with the other user groups, a vessel is usually required for transportation.

SCUBA Pickers

The SCUBA picking technique is by far the most effective in that the harvester is able to:

1) find abalone in wide range of habitat;
2) spend considerable time under water picking regardless of the tides;
3) pick in seasons when low tides do not occur (in fact, higher tides are usually preferred);
4) pick at times of less than ideal weather and surf conditions;
5) harvest at times that are convenient to the diver, rather than at times dictated by environmental factors.
6) harvest by the other two methods if so desired.

SCUBA pickers were found to prefer seasons when waters were clear, kelp growth was at a minimum and the weather was relatively calm. Late winter and early spring usually are best for these conditions, although many SCUBA pickers are known to harvest year-round as well. SCUBA picking requires a sturdy craft, a substantial investment in diving gear ($1,000 to $1,500), and a supplier who can service the equipment and refill the air cylinders.

Summary of Abalone Regulations to Date

Commercial Fishing Regulations

Regulations regarding the commercial take of abalone in recent years were established in response to an increase in commercial take beginning in 1977. These regulations are listed chronologically.

1977

A permit system was established for all commercial fishermen which stipulated the following:

1) abalone had to be a minimum of 3½ inches;
2) sublegal-sized abalone, inadvertently taken, were to be returned to rocks similar to those inhabited by abalone;
3) use of gaff and spears was prohibited.

1978

Requirements were unchanged from 1977. During the summer of 1978 waters on the eastern side of Dall Island to the Barrier Islands on the south (District 3) were closed to commercial abalone fishing by emergency closure. The closure was instituted in response to concerns expressed by local residents and management biologists about the impact of the commercial fishery in Cordova Bay. This was a temporary closure which was redefined the following year by the Board of Fisheries.

1979

1) Permits were required.

2) Minimum size limit changed from 3½ to 3-3/4 inches.

3) Allowable equipment included diving gear and abalone irons.

4) Waters were closed to commercial take:

   a) District 1, north of the latitude of Kirk Point; District 2, north of the Chasina Point;

   b) District 3, south of the latitude of Cape Lynch and east of a line from Cape Lynch to Cape Ulika to Point Sta. Gertrudis to Point Cangrejo to Reef Point to Shipwreck Point;

   c) District 5, south of the latitude of Cape Decision and west of 134° W; District 6 south of the latitude of Cape Decision; and

   d) District 13, south of the latitude of Neva Point light and north of the latitude of Dorothy Narrows.

(Refer to Figures 9, 18, and 27.)

1980

Regulations unchanged from 1979.

1981

The regulations remained the same as 1979 and 1980 except that a guideline harvest range of 100,000 to 125,000 pounds was established.

Subsistence Abalone Regulations

Regulations for the take of subsistence abalone have remained the same from 1977 to 1980 with the exception of a change in District 13 of minimum size from 3 to 3½ inches. Regulations for all districts are as follows:

1) possession limit is 50 abalone per person;
2) minimum legal size is 3 inches except in District 13 where legal size is is 3½ inches;
3) commercial abalone fishermen must return their permit before subsistence picking.

An addition to the above, regulations were added in 1981 to require residents of the Sitka and Ketchikan districts to obtain a permit and return a log of their catch for 1981.

Results: Part I

Part I presents information gathered through interviews with randomly selected households in Hydaburg, Klawock and Craig. Data collected from each community are organized as follows: 1) the general history and description of the area; 2) the household; 3) the harvest of abalone; and 4) preparation, storage and distribution of abalone. The community of Hydaburg is described first because it was found to practice only one harvest technique, that of shorepicking. For the sake of efficiency, patterns which were described in detail for the community

of Hydaburg (specifically the nature of abalone shorepicking) will not be redescribed if they occurred as well in the communities of Craig and Klawock. Similarities will be noted among communities and descriptions applicable to several communities cross-referenced. In discussions of Craig and Klawock, patterns or trends which differ from those in Hydaburg will be emphasized.

Hydaburg

History and Area Description

During the 17th Century, possibly as a result of population pressures, a group of Haida people migrated northward from the Queen Charlotte Islands into Tlingit territory on southern Prince of Wales Island. Through the years there was a gradual migration northward of people from various Haida settlements, punctuated by skirmishes between the Tlingit and Haida. Nevertheless, the mid-1800's numerous Haida villages were established on the southwest coast of Prince of Wales Island and the offshore islands. At the suggestions of the Federal Government and the Presbyterian Church the three largest villages, Hawkan, Klinkwan and Sukkwan, combined in 1911 to form the present community of Hydaburg so a centralized school could be built and other social and institutional changes could be made (Bureau of Indian Affairs, 1978; CH2M Hill, 1981; and Alaska Department of Community and Regional Affairs, 1981).

The community of Hydaburg was established and is presently located 46 air miles southwest of Ketchikan on the southwest coast of Prince of Wales Island (Figure 1). The environment is influenced by warm ocean currents and a mild, wet climate. The mean winter temperature is 36° F and the summer mean is 58° F (Alaska Department of Community and Regional Affairs, 1981). The habitat of this island area does not support large populations of terrestrial mammals typical of mainland environments. Moose are not found on the island, and most terrestrial hunting activities are limited to deer and waterfowl. People of Hydaburg rely heavily on a wide variety of resources from the sea (refer to "Discussion Section" below).

Since the establishment of Hydaburg in 1911, the population has fluctuated (Table 1). The cash economy of the community has been almost solely dependent on commercial fishing and cannery industries whose levels of operations have varied substantially. Between 1911 and 1950 an increase in jobs provided by fishery and cannery operations was associated with a population increase; conversely, declining fishery and cannery operations during the 1950s and 1960s was associated with a drop in population below 1930 levels. During the past ten years (1970 to 1980) the population has increased by 78 percent, possible in part due to reasonably good fishing seasons and the prospects of expanded economic opportunities. In 1981 90 percent of the employed residents were commercial fishermen (Alaska Department of Community and Regional Affairs, 1981).

TABLE 1
POPULATION TRENDS IN HYDABURG
1930-1981

Year:	1930	1940	1950	1960	1970	1981
Population:	319	348	353	251	214	381

Source: City of Hydaburg, 1978.

The subsistence economy of Hydaburg throughout this same period has played an important stabilizing role. The average family has relied heavily on traditional food procurement methods. Although Hydaburg's per capita income monetary has been low, government transfer payments (such as food stamps or welfare benefits) contribute only about 7 percent to the overall community income (CH2M Hill, 1981).

In 1981 Hydaburg is a community of almost 400 people, 85 percent of whom are Alaska Natives and have spent most of their lives in the area (United States Census, 1980). Access from other parts of Alaska is limited to float planes or private boat. Although in 1981 roads did not connect Hydaburg with any other communities, Sealaska Corporation and Haida Corporation are proposing to construct a road from Hydaburg to the mouth of the Natzuhini River which connects with the Prince of Wales Island road system and the Alaska Marine Highway System. Present employment opportunities other than commercial fishing are limited to a small staff of government service workers and Haida Seafoods Cannery employees (numbering 35 seasonally). Future commercial development is planned for timber holdings of Sealaska Corporation and Haida Corporation road construction and expansion of Haida Seafoods Company.

Out of 110 individual households identified in Hydaburg, interviews were conducted with 34 randomly selected households (31 percent). Ninety-four percent of the households contacted regularly used abalone (Table 2).

TABLE 2
USE OF ABALONE BY 34 HOUSEHOLDS IN HYDABURG (1981)

	Active Harvesters	Use, but do not harvest	Do not Use
Percent of Respondents	70	24	6

Households which were not active in harvesting abalone usually consisted of older residents who had difficulty in getting out or residents who did not have a boat or skiff to get to abalone areas. Only 6 percent reported that they did not use abalone regularly. This figure includes residents who were new to the community and had not had the opportunity to harvest.

Households that were interviewed totaled 131 individuals; household size ranged from 1 to 15 persons and averaged 4.1 persons (Table 3). Households were composed of a wide range of ages (Figure 2). Most families included parents ranging from 30 to 50 years with one to three offspring. The remainder of the households were usually older couples

TABLE 3
NUMBER OF PERSONS PER HOUSEHOLD
INTERVIEWED IN HYDABURG (1981)

Number of Households:	29*
Range of Household Size:	1 - 15
Mean Number of Persons per Household:	4.1
Standard Deviation:	2.6

*Five households gave no response.

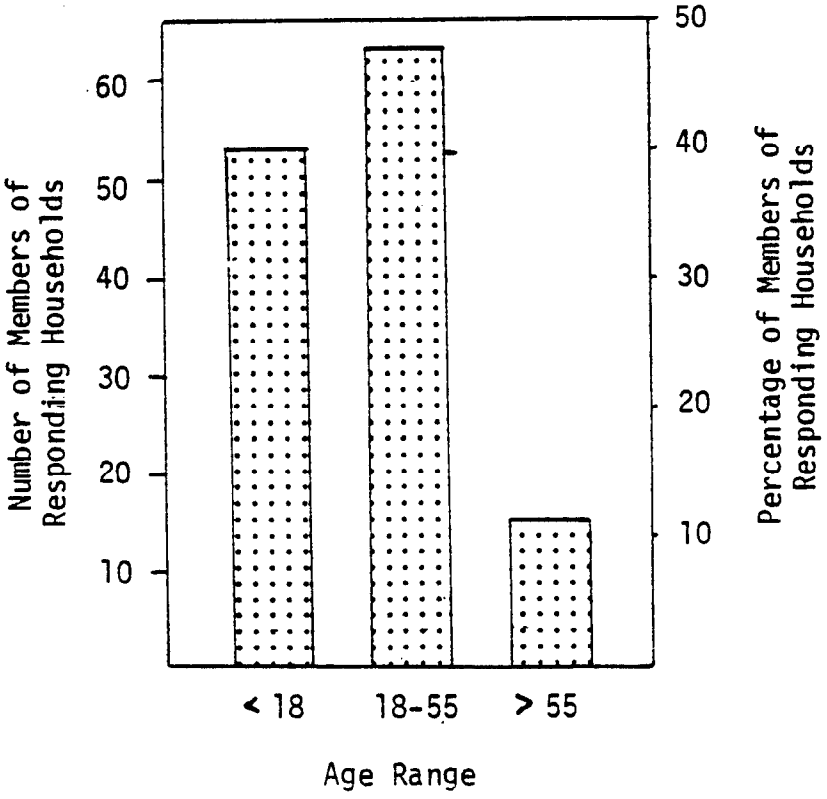


FIGURE 2
DISTRIBUTION OF HOUSEHOLD MEMBERS BY AGE RANGE
IN HYDABURG (1981)

who had a home of their own or sometimes lived with their offspring.

The majority of the people interviewed had been raised and spent much of their lives in Hydaburg. Although people had often moved away for a few years, attending to educational pursuits, military service or employment opportunities, most eventually returned to Hydaburg and have always considered it their home. The older residents (i.e. over 70 years in age) may have spent their entire lives in the Prince of Wales Island area but resided in other villages before Hydaburg was established in 1911. The upper range of residency for Hydaburg in the figure is limited to seventy years (Figure 3). Long term residents began picking abalone as soon as they were old enough to participate in low tide gathering with their family or relatives and have continued the practice throughout their lives (Figure 4). A comparison of the figures shows a slight decrease in years of experience picking abalone versus years of residency in Hydaburg, probably due to the age factor and years spent away from home. This comparative data is provided for the heads of household only.

Since most people were involved in the fishing industry and there are very few opportunities to find renumerative employment in other areas, most heads of household were employed part-time (Figure 5). Some individuals were able to combine several forms of seasonal employment in order to work full time, but the large majority were seasonally involved in wage employment. Household income ranges in 1981 for households interviewed in Hydaburg are indicated in Figure 6; the median reported income range is $10,000 to $15,000 per year.

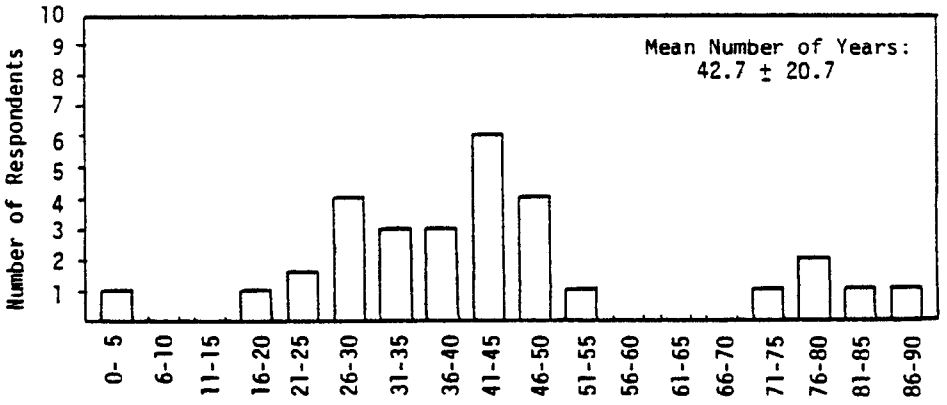


FIGURE 3
YEARS OF RESIDENCY IN HYDABURG
FOR HEADS OF HOUSEHOLDS (1981)

(Years of residency greater than 70 represent residency in other Prince of Wales Island communities prior to establishment of Hydaburg).

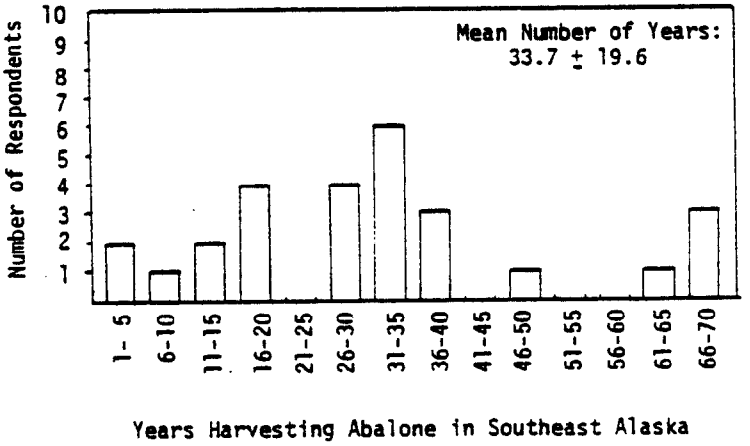


FIGURE 4
NUMBER OF YEARS OF ABALONE HARVESTING
EXPERIENCE IN SOUTHEAST ALASKA AMONG
HEADS OF HOUSEHOLDS IN HYDABURG (1981)

(Years of harvesting experience may exceed years of residency in Hydaburg for individuals who have resided in other Southeastern communities).

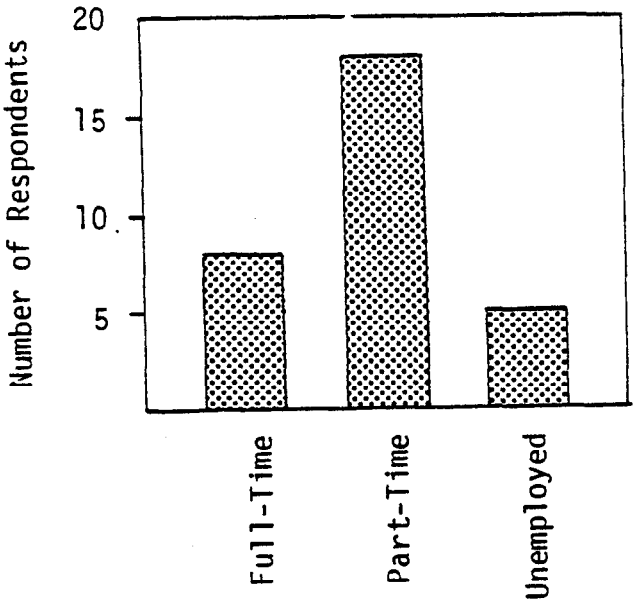


FIGURE 5
EMPLOYMENT STATUS OF HEADS OF HOUSEHOLDS
IN HYDABURG (1981)

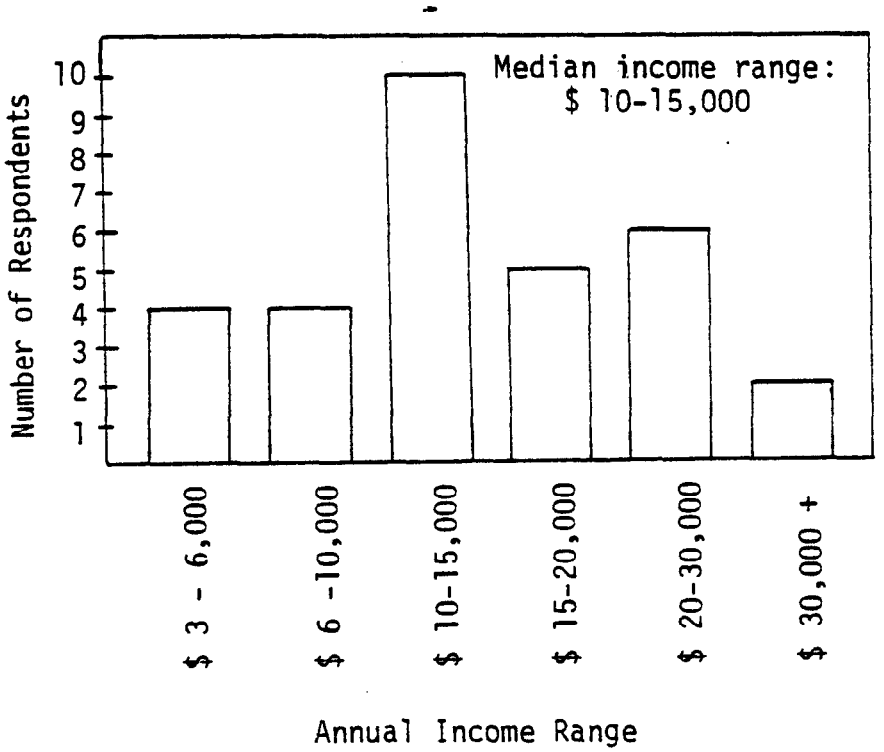


FIGURE 6
ANNUAL INCOME RANGES FOR HOUSEHOLDS
IN HYDABURG (1981)

Of the households interviewed that were active abalone pickers (70 percent of total sample), all used a form of shorepicking. Seventy-one percent of shorepicking households reported being strictly shoreline pickers, harvesting only abalone that were exposed at low tides. The 29 percent remaining used a combination of low tide shoreline and pole and gaff techniques to obtain their supply of abalone. Numerous pickers in this latter group voiced a frustration in not being able to find abalone above the water line at their favorite spots in recent years,and therefore chose to use the pole technique in order to reach the deeper abalone they could see through clear water. Cockle rakes were also mentioned as a tool used for extracting abalone from under the water's surface. There were no reported commercial abalone fishermen in Hydaburg. Only one head of household interviewed did any type of SCUBA diving. This person limited his SCUBA diving and snorkeling to underwater mechanical repair and an occasional pleasure dive to explore the ocean bottom. All of the abalone he harvested were shorepicked. Compressed air to fill SCUBA cylinders is a precious commodity since tanks must be flown to Ketchikan in order to be filled.

Picking does not usually take place in the immediate area of the community. It is necessary to boat to an area that is prime habitat for abalone. The reported means of transportation to the desired harvesting sites are listed in Table 4.

TABLE 4
MEANS OF TRANSPORTATION TO HYDABURG ABALONE HARVESTING SITES
(1981)
(n=28*)

	Means of Transportation		
	Fishing Boat	Skiff	Fishing Boat & Skiff
Number of Respondents	1	15	12
Percent of Respondents	4	54	42

* Six households gave no response.

Since all the households interviewed were shorepickers, environmental limitations played an important role in the seasons and opportunities they had available for picking. Figure 7 describes the seasonal availability of minus 2 and minus 3 foot tides that occurred during daylight hours through the year of 1981 and the number of households that harvested during each month of that year. The range of responses to the question of how low a tide was needed to pick abalone was minus 2 to minus 4 feet with an average of minus 2.89 feet (Table 5). Only 5 to 8 minus 3 foot tides per year were found to occur during daylight hours in 1980, 1981 and 1982. The 6 minus 3 foot tides occurring in June and July, 1981 are depicted in Figure 7.

The number of times a household was actually able to take advantage of suitable minus tides was found to be limited by several factors. First, the frequent storms that passed through the area from the Gulf of Alaska often make shorepicking impossible. Secondly, the concurrence of suitable minus tides with other subsistence and commercial activities

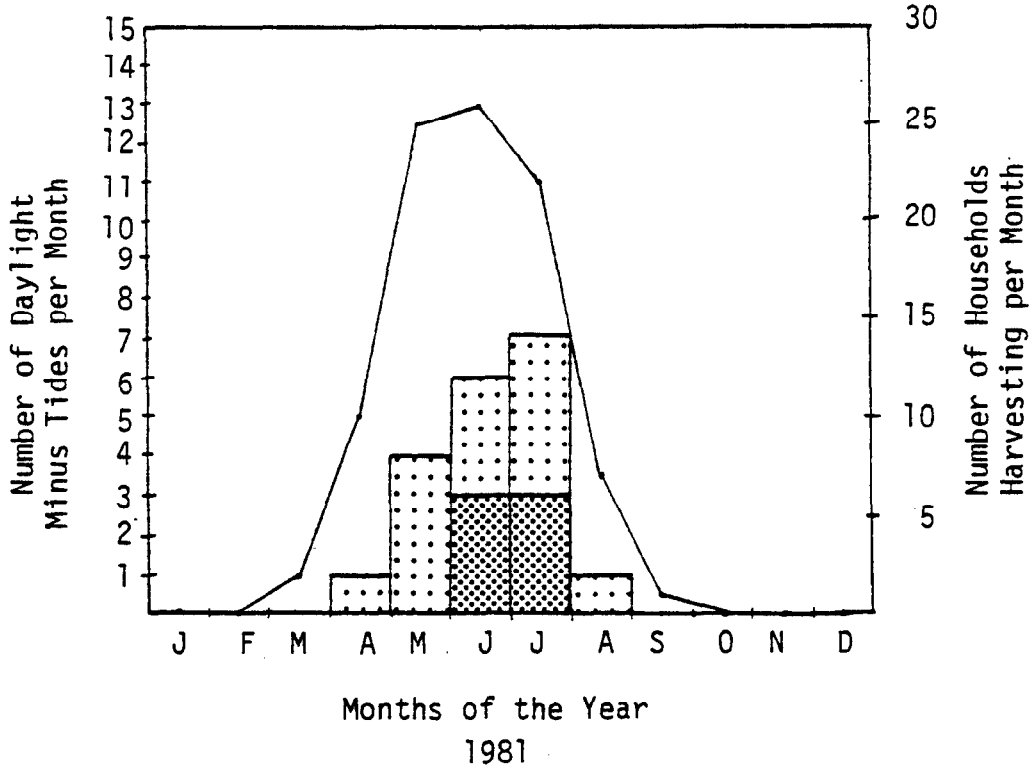


FIGURE 7
NUMBER OF HOUSEHOLDS IN HYDABURG HARVESTING ABALONES PER MONTH IN 1981, COMPARED WITH THE NUMBER OF MINUS 2 (LIGHTLY SHADED) AND MINUS 3 (HEAVY SHADING) DAYLIGHT TIDES PER MONTH OF 1981.

TABLE 5
DEGREE OF MINUS TIDE PERCEIVED NECESSARY FOR HARVESTING BY HYDABURG ABALONE PICKERS (1981)

Number of Respondents:	28*
Range of Minus Tide:	-2 to -4'
Mean Minus Tide:	-2.89'
Standard Deviation:	0.42

*Six households gave no response.

further restrict the scheduling of abalone harvest efforts. Figure 7 shows a dramatic decrease in harvest efforts between the end of June and the month of August even though suitable daylight minus tides existed.

The subsistence sockeye season and the start of commercial fishing are highly valued activities which were given preference during late June and July; abalone picking was generally concentrated in the late spring and early summer months of 1981. Finally, it was generally believed that water temperature affected the availability of abalone from the shoreline; during the low water temperatures of winter abalone were believed to be found at greater depths (i.e. not readily harvested by shorepicking techniques) than during the spring and summer months.

With these limitations considered, Table 6 depicts the mean number of efforts per year all interviewed households reported for 1981, 1980, 1977, and 1972. The mean number of efforts per year ranged from approximately 2 to 3.5 and the average number of hours spent actually abalone picking was 2 hours per effort. These two hours were the maximum total amount of time most people said they had to gather before and after the minus tide. It is important to understand that even though only 2 hours were actually spent harvesting abalone, most of a day was devoted to the tasks of locating and traveling to the site, harvesting, and preparing the catch.

It is interesting to note the fluctuation of harvest effort that has taken place in the last ten years (plotted as a solid line in Figure 8).

TABLE 6
DESCRIPTION OF HYDABURG ABALONE HARVEST CHARACTERISTICS
1981, 1980, 1977 and 1972

Harvest Year	Number of Respondents	Mean	Standard Deviation	Median	Range
		Number of abalone harvested per year			
1981	18	236.0	306.3	87.5	2 - 1200
1980	17	230.1	239.4	135.0	12 - 700
1977	19	373.2	194.7	400.0	50 - 800
1972	22	382.0	180.7	400.0	80 - 800
		Number of harvest efforts* per year			
1981	18	2.7	4.8	2.0	1 - 22
1980	18	3.4	4.8	2.0	1 - 22
1977	19	2.4	2.5	2.0	1 - 12
1972	22	1.9	7.1	2.0	1 - 4
		Number of abalone picked per effort*			
1981	18	128.4	149.7	52.5	1 - 400
1980	18	126.9	127.4	77.5	3 - 400
1977	19	235.9	139.7	200.0	13 - 500
1972	22	238.6	124.9	225.0	25 - 450

* Mean hours per effort for 26 respondents equalled 2.0 ± 1.0 hours.

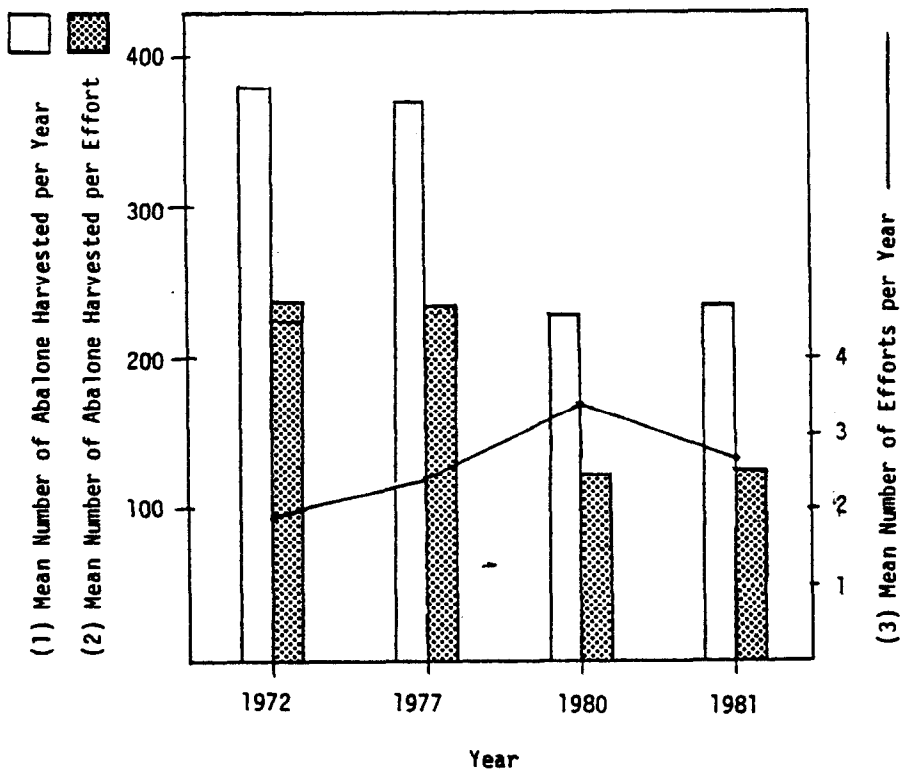


FIGURE 8
COMPARISON OF (1) MEAN NUMBER OF ABALONE HARVESTED PER YEAR, (2) MEAN NUMBER OF ABALONE HARVESTED PER EFFORT, AND (3) MEAN NUMBER OF EFFORTS PER YEAR FOR HYDABURG ABALONE PICKERS DURING THE YEARS 1972, 1977, 1980 AND 1981.

(Number of hours per effort averaged 2.0 ± 1.0; n=26).

Long term residents recall traditionally harvesting for abalone approximately twice in a year, usually once in the spring and once in early summer in coordination with the minus tides. The mean number of efforts per year for 1972 and 1977 reflect this two effort per year average. In 1980 the average number of efforts per year began to increase. Numerous households explained with frustration that because of decreased annual catch success in 1979 and 1980, they increased their number of efforts in an attempt to harvest quantities of abalone comparable to those taken in 1975 and 1972.

Table 6 and Figure 8 also show the mean annual harvest figures and the mean catch per effort for the past ten years. Even though an increase in effort occurred around 1980, the catch per effort was not great enough to bring the total annual harvest up to previous levels. Many households attempted to bring their annual harvest level back up to customary levels by this method of increased efforts for two years. When that proved to be ineffective, some reverted back to previous effort levels and some gave up picking abalone totally, saying they were frustrated with the low catch per effort rate they were experiencing. Of the households that continued abalone picking in 1981, there was a slight improvement in catch success over 1980 but it did not compare with levels of harvest or catch per efforts of 1977 and 1972.

The downward trends through time of total catch and catch per effort are depicted in Figure 8. The mean annual harvest per household per year for 1972 and 1977 was approximately 380 abalones; in 1980 and 1981 annual

catch dropped by 60 percent to approximately 230 abalones (Table 6). The catch per effort also declined by 54 percent from approximately 237 in 1972 and 1975 to approximately 127 in 1980 and 1981 (54 percent decrease) (Table 6). The data are also influenced by the slight decrease in households that actually went picking in 1981.

Long term residents compared abalone picking in the "old days" to clam digging today.

> "One simply went out and got abalone without much difficulty. We would go to the same group of rocks year after year and pick what we needed. We just picked the large ones [over 4 inches] and left the small ones so they could grow up ... our parents taught us to leave the littler ones, besides they're too much work to clean for what you get."

Many households interviewed had experienced a feeling of competition over abalone rocks with other non-commercial users in the past several years, a feeling that had not existed five and ten years ago.

Most households had not noticed a significant change in size of abalone that they had picked in 1980 and 1981 versus 1972 and 1975. If they were found in a location, the abalone seemed to be an acceptable size for most households. However, numerous favorite sites were found to be void of any abalone.

The legal size for non-commercial abalone harvested in the Hydaburg

area was 3 inches. It was found that most households did not actually measure each abalone but selected the "large ones." Most people preferred "large" abalone which was determined to be approximately four inches in width or larger, by comparing collected shells and their measured lengths. Many people thought a three inch abalone was too small and usually did not pick them for these reasons:

1. They were taught as children to leave the small ones and just pick the larger "adult" abalone.
2. The effort that goes into shucking (cleaning) the abalone is better rewarded by selecting the larger ones.
3. Many people expressed a concern for the health of the population and felt by picking just the large individuals and leaving the smaller, there would be abalone left for future years.

Three households were exceptions to this rule and preferred the smaller (3 inches) abalone over the larger even though the net amount of meat per catch was considerably smaller. These people felt the meat of the smaller animals was far more tender and tasty than the larger four inch abalones and did not feel taking a few of the smaller abalone would hurt the population.

From 1972 to 1981 there were over 30 different areas of use, ranging from 6 to 50 miles in distance from Hydaburg (Figure 9). All were located in the inside waters east of Dall Island, Cordova Bay and

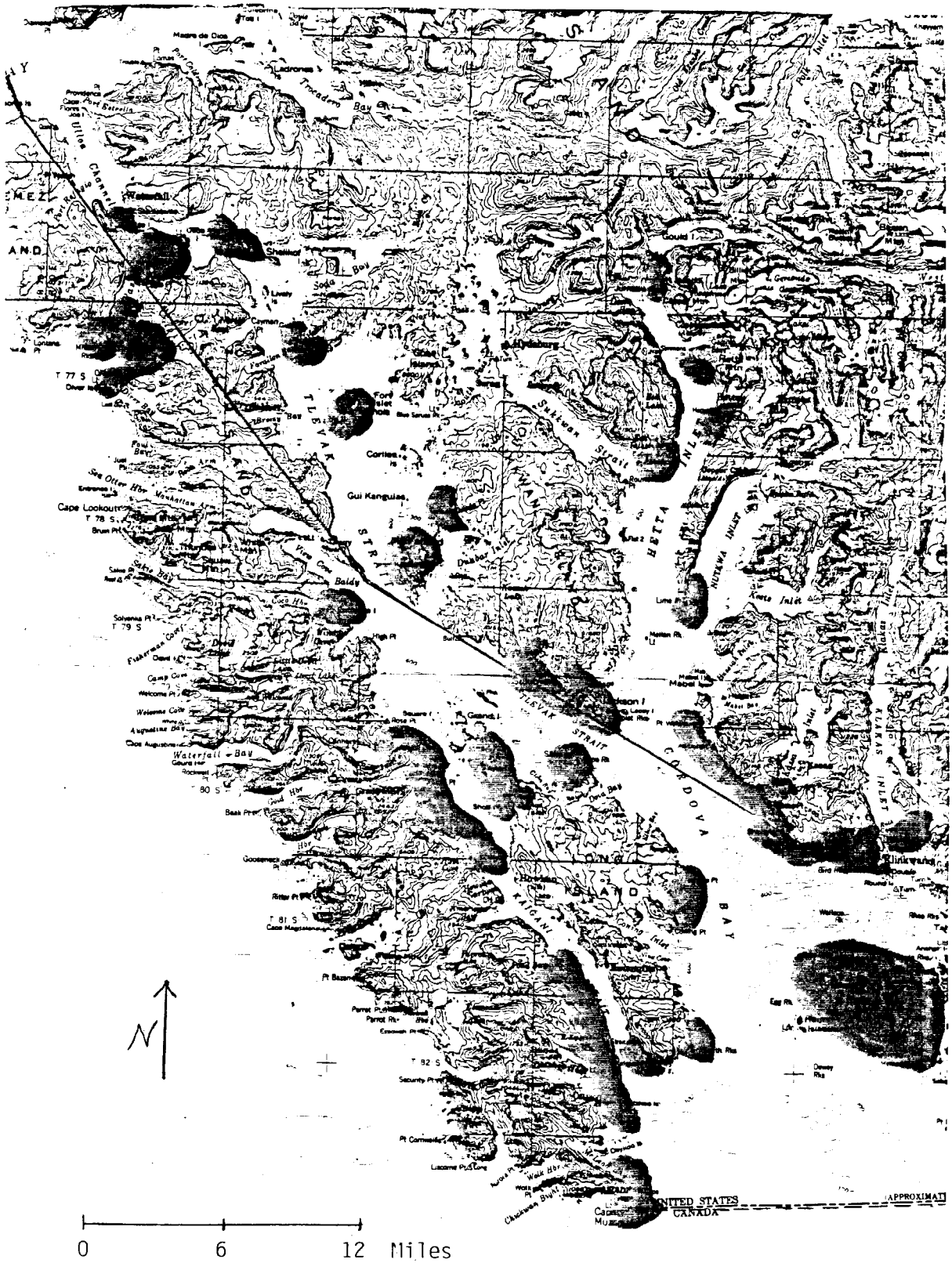


FIGURE 9
ABALONE HARVEST SITES, HYDABURG (1972 to 1981)

(Harvest sites are identified by shaded areas. Areas east of the solid line are closed to commercial harvest).

passages that lead to the open Gulf of Alaska. Most households interviewed used sites that were located at least 20 miles north or south of Hydaburg in areas exposed to open ocean swells and currents; others reported using the inside, relatively protected waters of Hetta Inlet. Many of the sites used were located near the abandoned village sites from which Hydaburg was created (i.e. Howkan, Klinkwan, Koianglas, and Sukkwan). Families mentioned that many of the places that they had gone to for abalone were also popular spots for their parents. While not all areas were secret, many people had one spot that they tried to keep to their family. During 1980-81 people have been moving around in search of new areas more often than in the past, upon discovering that their secret spot was void of abalone.

The solid line drawn through Figure 9 denotes the regulatory limit for commercial abalone fishing areas. Areas north and east of this line are closed to commercial harvesting. Over two-thirds of the locations identified as harvest sites for Hydaburg pickers were found to be either on the boundary line or within the area open to commercial abalone fishing. All of the traditional sites which were reported to be highly desirable lie near the boundary line or within the commercial harvest area (e.g. Barrier Islands, Shipwreck Point, Jackson Island, Meares Passage, and Bob's Bay). Many households also reported that some of these key places were not worth going to anymore and that different locations had been sought out; some of these alternate areas were located farther inside (e.g. the Hetta Inlet area) where smaller size abalone were reportedly harvested.

Preparation, Storage and Distribution

Abalones were consumed in a variety of ways. Fried whole abalone steaks seemed to be a favorite preparation method. Abalones were added to chop suey, fried rice, spaghetti, and chowder. They were ground, fried and served as appetizers with other seafoods.

The number of times a household ate abalone throughout the course of a year greatly depended on the quantities that it was able to harvest and store. Most households stated that they would like to eat abalone year-round and have done so occasionally in the past. The annual harvest for the year directly affects how the household prepares and stores the abalone. Seasons in which meals including abalone are served, number of meals per year, storage techniques, and sharing of abalone are all interrelated and are ultimately dependent on the annual harvest size. Since the annual harvest has decreased over the past few years, all of these factors have changed through time. Practices in 1981 are presented in Table 7.

TABLE 7
ABALONE MEALS IN HYDABURG
(1981)

Number of Abalone per Person per Meal (n=27*)		Number of Meals per year (n=24*)	
Range	2-10	Range	1-36
Mean	5.26	Mean	9.21
SD	1.23	SD	9.86
Median	5	Median	6

*Seven households gave no response

*Ten households gave no response

The number of abalone meals per year exhibited a wide range among sampled households. Most households felt as though they ate fewer meals which included abalone in 1981 compared to five and ten years ago, but did notice an increase in 1981 as compared to 1980. Two households stated that they had the same number of meals because they only ate them fresh two times per year. One household actually increased its catch over previous years and had abalone three times per month during the year.

Figure 10 depicts a comparison of seasons in which abalone were harvested and seasons in which abalone meals were served throughout 1981. The number of abalone meals served per month reached its peak during the summer months, coincident with and immediately following harvesting, and then declined throughout the fall. Most households stored abalone to serve after the harvesting season was over.

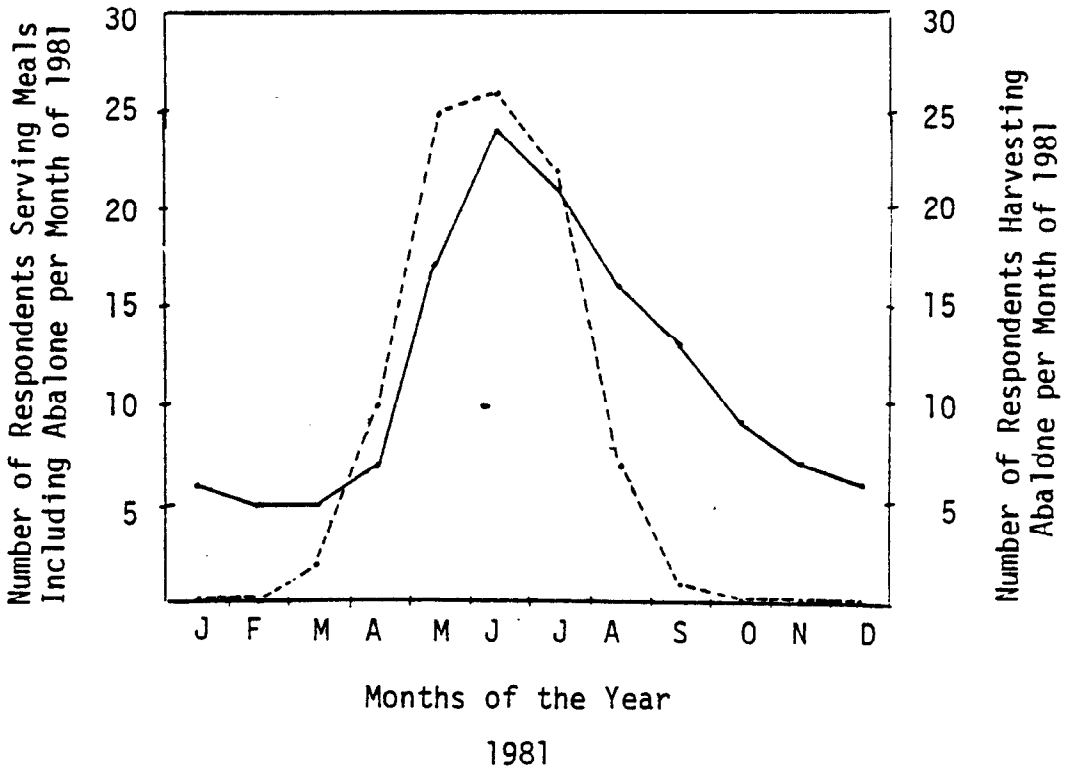


FIGURE 10
COMPARISON OF THE NUMBER OF RESPONDENTS FROM HYDABURG SERVING MEALS INCLUDING ABALONE FOR EACH MONTH OF 1981 (SOLID LINE) WITH THE NUMBER OF RESPONDENTS HARVESTING DURING EACH OF THESE MONTHS (DOTTED LINE).

Patterns of storage and use described by long term residents varied between households. Many recalled active years when enough abalone was stored to last almost throughout the year, usually becoming depleted after December due to celebrations that occurred at this time. A few households previously used abalone only when it was available fresh and have stored it by freezing only in the past ten to twenty years.

Storage methods have also fluctuated through time. In previous years when electric power was either non-existent or limited, abalone was canned or occasionally smoked to provide a year-round supply. Today, because of the availability of electricity, many households rely on freezing. However, increasing costs of electricity in the area have caused some people who have typically used freezing as a main means of preservation to can abalone again. Table 8 describes preserving techniques utilized in 1981. Information in Table 8 is interpreted as follows: of all the people that used abalone, 11 percent used "all" of their abalone harvest fresh, 70 percent used "some" of their harvest fresh, and 11 percent used "none" of it fresh. Of all people using abalone 3 percent froze "all" of it, 41 percent froze "most" of it, and 56 percent froze "none" of it. Most households ate some abalone fresh during the harvest season, then preserved the balance by freezing or canning. Smoking and pickling were very infrequent.

TABLE 8
MODES OF USE AND STORAGE FOR HARVESTED ABALONE
Hydaburg (1981)
(Percentage of Households Utilizing Abalone in the Specified Manner.)

	"All" (100%)	"Most" (75%)	"Half" (50%)	"Some" (25%)	"None" (0%)
Fresh	11	0	0	70	19
Frozen	3	41	0	0	56
Smoked	0	0	0	3	97
Canned	11	33	0	11	44
Pickled	0	0	0	3	97

Twenty-four percent of the households interviewed used abalone regularly but were not active pickers because of age or an inability to get out to the areas. These people depended on others to share their harvest. The decline in annual catch success has led to many households decreasing the amount of surplus abalone that is shared. Numerous active households regretted that they were not able to share as many abalone as in previous years, especially with households who were unable to harvest their own. Even with fewer abalone taken per year, a considerable amount of sharing took place between families and friends (Table 9). Active harvesters shared abalone with an average of 2.8 family-member households and 1.8 non-family households in the community of Hydaburg. Sharing outside the community was extended to an average of 1.1 family-member households and 0.3 non-family households.

TABLE 9
MEAN NUMBER OF HOUSEHOLDS RECEIVING ABALONE
FROM ACTIVE HARVESTERS IN HYDABURG (1981)
(Recipients include family and non-family households
within and outside of the community.)

Recipient Household	In Hydaburg	Ouside Hydaburg
Family	2.8	1.1
Non-Family	1.8	0.3

Abalones were valuable trading commodities, especially with people who did not have direct access to this resource. A trade network between communities of western Prince of Wales Island and friends or relatives in Ketchikan or Metlakatla seemed to be fairly strong. Items such as abalone and herring spawn (which were usually in limited supply or unavailable in more easterly communities) were traded for eulachon oil obtained from Ketchikan or Metlakatla and probably originating in British Columbia. Preserved or fresh abalone was always considered a precious item and often brought high returns depending on where it was traded.

After shucking, most people discarded the abalone shells. A few local artists and craftsman have used the shell as inlay in wood carvings and occasionally jewelry if a very small piece is needed. The shells of the California green abalone are most commonly used because of their larger size, brighter colors, and strength.

Klawock

History and Area Description

The Spanish explorer Ortiga first wrote about Klawock in 1853 while exploring the Prince of Wales Island for trading prospects. At that time he named it "La Galeria" (the galley) probably because it was surrounded by water during high tides. Klawock and numerous other Tlingit villages located on the west and northwest coast of Prince of Wales Island in pre-contact days were important population centers for the Tlingit clans of that area. Some of the distant relatives of people in Klawock are believed to have originated from the village of Tuxekan, an abandoned traditional Tlingit winter village to the north. Other names used to describe the village of Klawock in later years were Klawerak, Tlevak, Clevak, and Klawak.

In 1868 a trading post and salmon saltry were established in Klawock by George Hamilton; by 1878 Klawock was the site of the first cannery in Alaska. Soon after several canneries were operating simultaneously in Klawock taking advantage of the extensive salmon runs that use to be found in the area (Alaska Department of Community and Regional Affairs, 1981; Pacific Rim Planners, Inc., 1977; and Roppel, 1978).

Population growth in the area has been greatly affected by fluctuations in success of each fishing season. As in Hydaburg, the poor fishing seasons in the 1960s and early 1970 was correlated with a population low of 250 in the recent history of the area (Table 10).

TABLE 10
POPULATION TRENDS IN KLAWOCK 1880-1980*

Year:	1880	1900	1910	1930	1939	1950	1960	1970	1980
Population:	261	131	241	437	455	404	251	213	404

* Source: Alaska Department of Community and Regional Affairs, 1981

Today Klawock has a population of nearly 450, 66 percent of whom are Tlingit Indians (United States census, 1980). It is located on the west coast of Prince of Wales Island approximately 45 air miles west of Ketchikan (refer back to Figure 1). Access to and from other parts of Alaska is by float or wheel plane and the Alaska Marine Highway System, which connects to Hollis on the east coast of Prince of Wales Island. A 23 mile road connects Hollis to Klawock with 7.5 additional miles of road to Craig. Other road systems connect Klawock to Thorne Bay on the east coast of the island and a road to the south comes within a few miles of Hydaburg. There is no direct ferry service to Klawock, but a small boat harbor provides moorage for private boats. The area is influenced by warm ocean currents and is typified by a mild, wet climate similar to Hydaburg which lies south along the western coast of the island.

While the cash economy of the community has historically been dependent on the fishing industry, recent developments have diversified the economy. A saw mill was constructed in 1971 on the road between Klawock and Craig. The mill processes timber that presently is being harvested northeast of Klawock by Sealaska Corporation. The mill has provided some wage employment for local people. Two lodges have also

opened catering to visitors, many of whom are sportsmen seeking fish and game. The subsistence economy of Klawock has played an important stabilizing role in relationship to the wage economy that has fluctuated in recent history.

The Household

Of the 75 individual households identified in Klawock, interviews were conducted with 31 randomly selected households which represent 41 percent of the total community. Eighty-four percent of the households contacted used abalone regularly for non-commercial purposes (Table 11). No known commercial abalone fishermen were thought to reside in the community of Klawock.

TABLE 11
USE OF ABALONE BY 31 HOUSEHOLDS IN KLAWOCK (1981)

	Active Harvesters	Use, but do not harvest	Do Not Use
Percent of Respondents	68	13	19

Households which were not active in harvesting abalone but used it regularly consisted of older residents who were unable to pick or residents who lacked transportation to get to abalone areas. One household that did not own a skiff said they were unable to get to abalone sites and therefore did not harvest abalone. Users who did not harvest represented 13 percent of the households and depended on active pickers to share their catch. Nineteen percent of the households stated

they did not regularly use abalone; half of these households stated they had picked and used abalone in previous years. The remainder of this group were either new to the area or had no interest in abalone. Uses of other local resources were discussed with households that did not use abalone. It is important to note that not all households responded to each question. This resulted in a slight fluctuation of sample size for each question.

Household size ranged from 1 to 8 persons and averaged 4.3 persons (Table 12). The majority of households interviewed were composed of mostly middle-aged parents with children (Figure 11). The remaining households were older couples who lived separately from their children.

Years of residence recorded for the heads of households interviewed in Klawock appeared to be evenly distributed (Figure 12). A slightly larger group of households was found to be new to the community within the last five years in comparison with Hydaburg. As in Hydaburg, many households that consider Klawock their family home had moved away for periods of time to participate in opportunities not available in Klawock at that particular time. Also, many households were composed of family members who maintained long-term relationships within the community. Some households made frequent moves between Craig and Klawock. Years of residency spent in Craig by these households was combined with residency in Klawock since the communities are separated only by a seven mile road.

Figure 13 depicts the years spent by heads of households harvesting abalone in Southeast Alaska; a long-term pattern of use that was fairly

TABLE 12
NUMBER OF PERSONS PER HOUSEHOLD
INTERVIEWED IN KLAWOCK (1981)

Number of Households:	28*
Range of Household Size:	1 - 8
Mean Number of Persons per Household:	4.3
Standard Deviation:	1.9

*Three households gave no response.

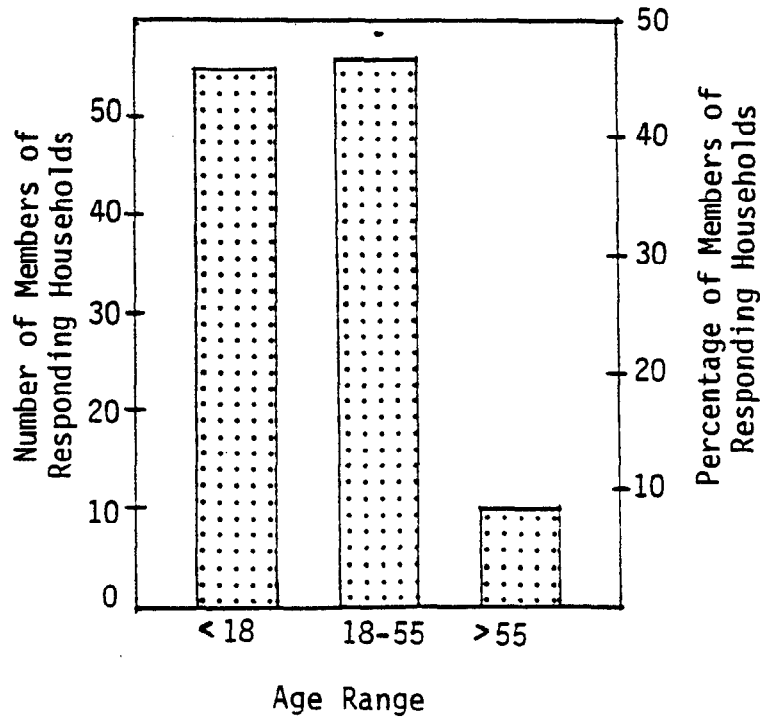


FIGURE 11
DISTRIBUTION OF HOUSEHOLD MEMBERS BY AGE RANGE
IN KLAWOCK (1981)

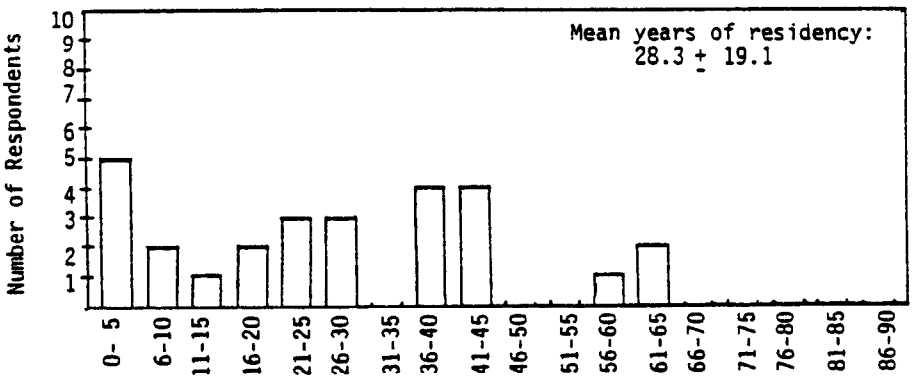


FIGURE 12
YEARS OF RESIDENCY IN KLAWOCK
FOR HEADS OF HOUSEHOLDS (1981)

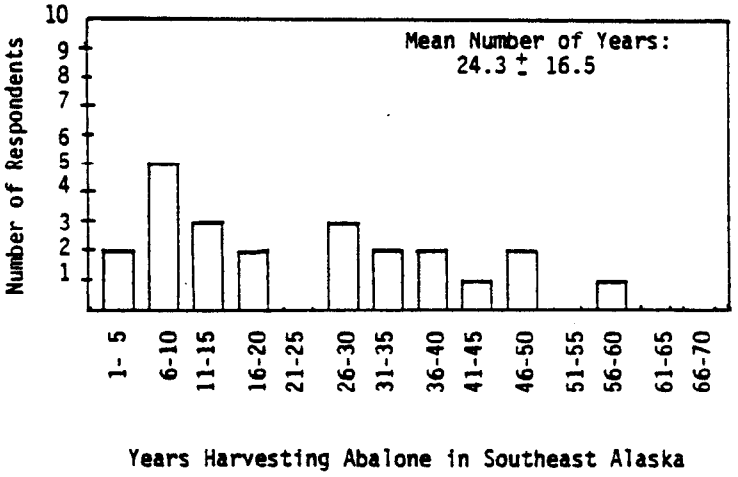


FIGURE 13
NUMBER OF YEARS OF ABALONE HARVESTING
EXPERIENCE IN SOUTHEAST ALASKA AMONG
HEADS OF HOUSEHOLDS IN KLAWOCK (1981)

(Years of harvesting experience may exceed years of residency in Klawock for individuals who have resided in other Southeastern communities).

evenly distributed is evident. It is notable that a relatively small percentage of households who had been residents of Klawock less than 5 years were active harvesters. Many newcomers to the area were busy with full-time employment or had not yet had the opportunity to pick abalone.

As in Hydaburg, commercial fishing was an important source of employment in Klawock. Part-time or seasonal work was most common. Frequently seasonal commercial fishing and full-time jobs during summer months were combined with other seasonal work that took place in or near the community during other months. This combination was classified as full-time employment in Figure 14. Many of the households were able to combine work in this manner; however, a larger group depended solely on seasonal or part-time work for their cash income. A few full-time jobs existed with local and state government, the timber industry, and commercial services in town. The median reported income range for households interviewed was $15-20,000. The distribution of incomes is shown in Figure 15.

The Harvest

Of the active abalone users interviewed in Klawock (i.e. households that have harvested regularly in the past few years), techniques used in picking abalone were very similar to the shorepicking and pole and gaff methods described by Hydaburg residents. One exception was a household which combined shorepicking and snorkel techniques (Table 13).

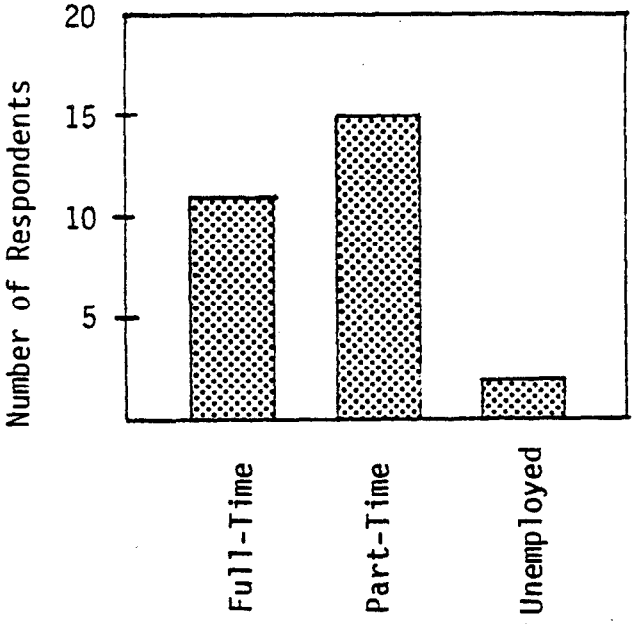


FIGURE 14
EMPLOYMENT STATUS OF HEADS OF HOUSEHOLDS
IN KLAWOCK (1981)

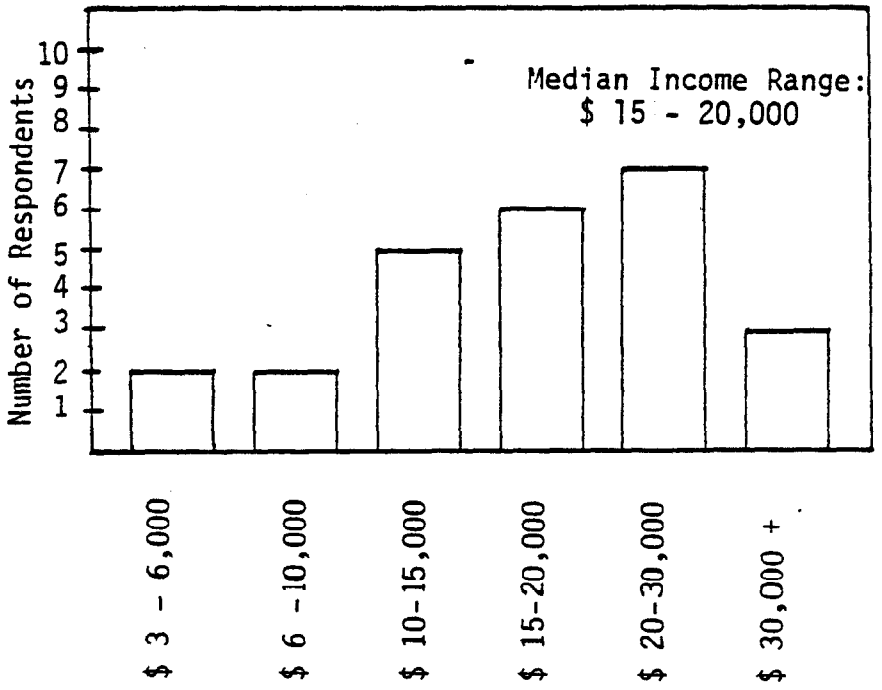


FIGURE 15
ANNUAL INCOME RANGES FOR HOUSEHOLDS
IN KLAWOCK (1981)

TABLE 13
HARVEST METHODS USED FOR PICKING ABALONE
BY KLAWOCK HARVESTERS (1981)
(n=23*)

Technique	Number of Households	Percent of Sample
Shorepick only	17	74
Shorepick/pole and gaff	5	22
Shorepick/snorkel	1	4

* Eight Households do not harvest.

The household that combined snorkel picking and shorepicking techniques usually relied on harvesting from the shore at low tide, but occasionally ventured into the water to pick while standing on the bottom or by performing shallow dives during the low tide. It is interesting to note that the snorkeler's catch per effort was close to the mean for that of shorepickers. However, the greater number of efforts that were made per year boosted his annual catch much higher than the annual mean for shorepickers. The snorkel picker was also able to (and preferred to) go out earlier in the season than most of the shorepickers. This was in part related to the snorkelers' ability to harvest successfully during minus tides that were not as extreme as those suitable for shorepicking.

SCUBA gear was reportedly used by two individuals from nearby logging camps. These individuals were not selected for interviews during the random household survey and were unavailable for conversations at the time of the study.

As in the case of Hydaburg, it was necessary to travel out into the islands west of Klawock to reach abalone sites. Table 14 describes distribution of means of transportation that were used to reach desired abalone harvesting sites.

TABLE 14
MEANS OF TRANSPORTATION TO KLAWOCK ABALONE HARVESTING SITES
(1981)
(n=23*)

	Means of Transportation		
	Fishing Boat	Skiff	Boat or Skiff
Number of Respondents	3	16	4
Percentage of Respondents	13	70	17

* Eight households gave no response.

Patterns of use and natural limitations imposed on the shore pickers in Klawock were found to be the same as described in the Hydaburg section. Tides are of nearly identical magnitude and timing as those found in Hydaburg (Sitka District of the 1981 Tide Book).

Keeping in mind the limitations considered in the Hydaburg section, Figure 16 depicts the availability of daylight minus 2 and minus 3 foot tides for each month of 1981, compared to the seasonality of abalone harvesting. The range of responses to the question of how low of a tide was needed to pick abalone was minus 1 to minus 3 feet with an average of minus 1.73 feet and a median of minus 2.0 feet (Table 15). Only five to

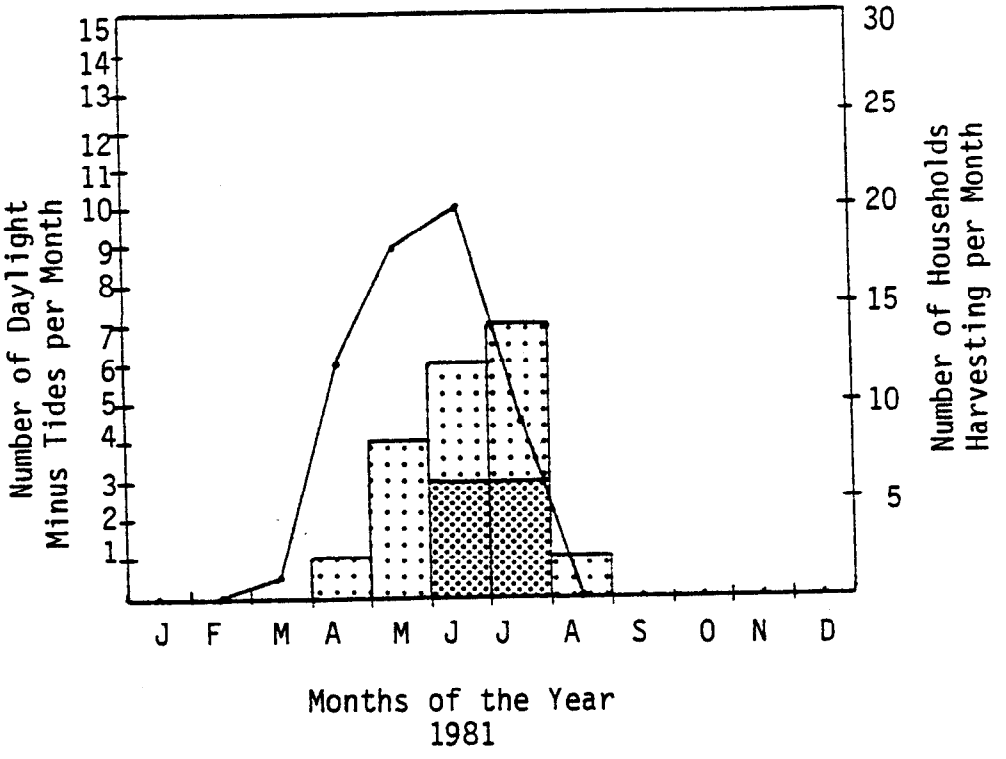


FIGURE 16
NUMBER OF HOUSEHOLDS IN KLAWOCK HARVESTING ABALONES PER MONTH IN 1981, COMPARED WITH THE NUMBER OF MINUS 2 (LIGHTLY SHADED) AND MINUS 3 (HEAVY SHADING) DAYLIGHT TIDES PER MONTH OF 1981.

TABLE 15
DEGREE OF MINUS TIDE PERCEIVED NECESSARY FOR HARVESTING BY KLAWOCK ABALONE PICKERS (1981)

Number of Respondents:	22*
Range of Minus Tide:	-1 to -3'
Mean Minus Tide:	-1.73'
Standard Deviation:	0.57

*Nine households gave no response.

eight minus 3 foot tides per year were found to occur during daylight hours in 1980, 1981, and 1982.

Figure 16 shows the harvester's preference for picking abalones early in the season of available minus tides (May and June). In 1981 use peaked in June, decreased rapidly through July and August, and became non-existent in September. Scheduling conflicts with other activities similar to those mentioned in Hydaburg were said to be the reason for this decrease in harvesting effort. By the end of June many people in Klawock were busy preparing for summer commercial fishing season and the late June early July subsistence sockeye season. Both resources are important to the community and nearly everyone participates in subsistence sockeye fishing.

One to two hours were spent per effort working the low tide by Klawock shorepickers. Snorkel pickers were able to extend this time somewhat; Klawock snorkel pickers usually spent two hours working in combination with shorepicking techniques.

The number of efforts per year has remained nearly constant over the past ten years (Table 16 and Figure 17). Slightly fewer efforts occurred in 1981 partially due to decreased catch rate over the year and partially due to other activities occurring in the area. Long-term residents accustomed to harvesting abalone at higher levels common five and ten years ago expressed frustration at declining catch per effort and questioned the value of attempting to harvest at all. Although time

TABLE 16
DESCRIPTION OF KLAWOCK ABALONE HARVEST CHARACTERISTICS
1981, 1980, 1977 and 1972

Harvest Year	Number of Respondents	Mean	Standard Deviation	Median	Range
		Number of abalone harvested per year			
1981	18	110.9	132.8	50.0	7 - 500
1980	11	127.7	163.0	75.0	30 - 500
1977	15	306.5	248.6	150.0	48 - 800
1972	15	396.5	260.3	350.0	48 - 800
		Number of harvest efforts* per year			
1981	19	1.8	0.7	2.0	1 - 3
1980	12	2.1	1.5	2.0	1 - 6
1977	16	2.0	1.2	2.0	1 - 6
1972	16	1.9	1.2	2.0	1 - 6
		Number of abalone picked per effort*			
1981	18	58.1	64.1	47.5	3 - 200
1980	11	72.9	76.7	50.0	20 - 250
1977	15	161.5	126.0	150.0	34 - 400
1972	15	217.6	129.4	200.0	48 - 400

* Mean hours per effort for 20 respondents equalled 1.8 ± 1.0 hours.

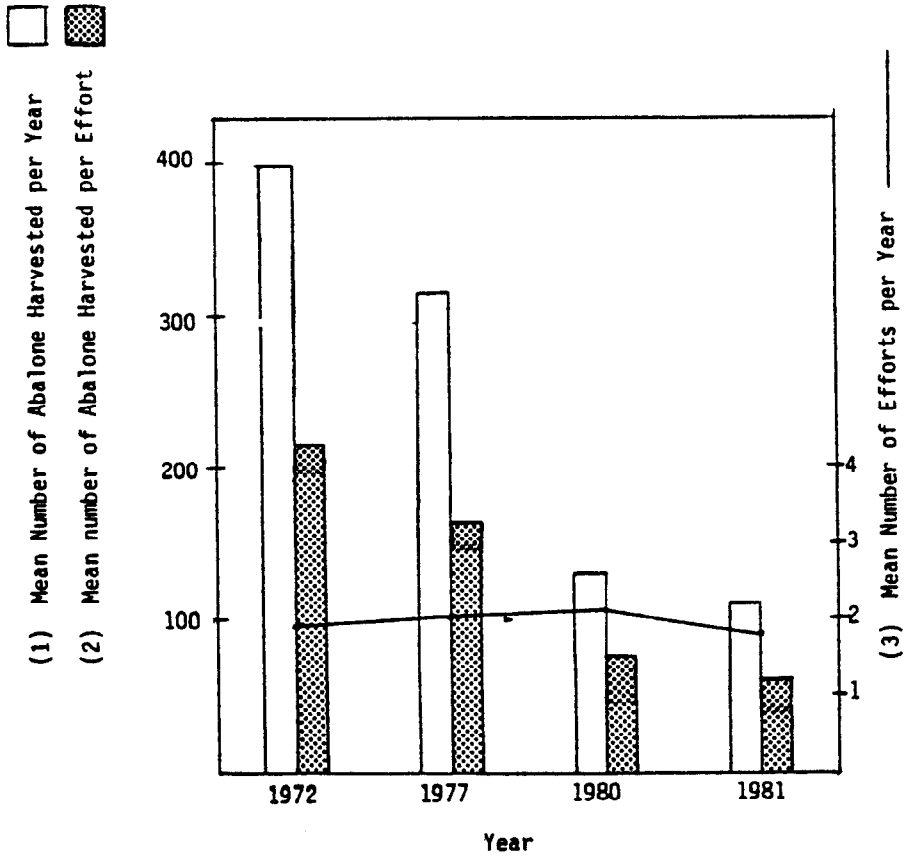


FIGURE 17
COMPARISON OF (1) MEAN NUMBER OF ABALONE HARVESTED PER YEAR, (2) MEAN NUMBER OF ABALONE HARVESTED PER EFFORT, AND (3) MEAN NUMBER OF EFFORTS PER YEAR FOR KLAWOCK ABALONE PICKERS DURING THE YEARS 1972, 1977, 1980 AND 1981.

(Number of hours per effort averaged 1.6 ± 1.0; n=20).

invested in an abalone picking trip is not great, the cost of fuel expended can be substantial.

The trends over time of declining total annual catch and catch per effort are depicted in Figure 17 and Table 16. Annual harvest totals in 1972 and 1977 averaged between 300 to 400 abalones per household; by 1980 and 1981 that average was between 100 and 130 per household (Table 16). The catch per effort statistics show a similar decline from about 217 and 160 in 1972 and 1977 respectively down to 72 and 58 in 1980 and 1981 respectively (Table 16). The number of households providing information for those years remained relatively constant as did the numbers of efforts, except for a slight decrease in 1981. Several of long-term residents who were still very active abalone pickers felt that the population of available abalone improved in 1981 compared to 1980. However, both men had abandoned traditional areas three years ago and have been using new locations the past two years. The catch success of 1981 compared to 1980 does not reflect an increase in available abalone. Even though it was generally felt that the population or locations of available abalone fluctuated slightly year to year, everyone active in harvesting abalone over the past 10 years felt that the population had declined drastically.

The relative size of available abalone was a topic of much discussion in Klawock. Most people felt the relative size had decreased over the past 10 years. Favorite abalone sites were said to be void of

the larger abalone with smaller ones being more common. As in Hydaburg, measuring the abalone was not a common practice; most households picked the largest abalone they could find and left the small ones even if it meant coming home empty-handed. Only one household reported they preferred the smaller 3 inch abalone because of its tenderness.

From 1972 to 1981 over 20 different areas of use were identified and mapped, ranging from 6 to 25 miles from Klawock (Figure 18). As found in Hydaburg, desired locations typically existed away from the protected waters of Klawock and near the open bays and inlets that were subject to open ocean currents and swells. Inlets such as Bucarelli Bay, Port Real Marina, St. Nicholas Channel, and the Maurelle Islands were mentioned as key places. Two households stated that they took abalone from the southern portion of Sea Otter Sound.

The solid line drawn through Figure 18 depicts the regulatory boundary for commercial abalone fishing. Areas east of the solid line are closed to commercial harvesting. The dashed line indicates the boundary of Area 3 and Area 4 for commercial salmon fishing. As the map indicates approximately 30 percent of the areas are located to the west of this boundary line in commercial areas. Areas used on the inside waters south of Craig in the vicinity of San Juan Bautista Island and Irocadero Bay are considered marginal habitat and only small numbers of abalone are presently found in these areas.

Places that were mentioned as areas where abalone were once

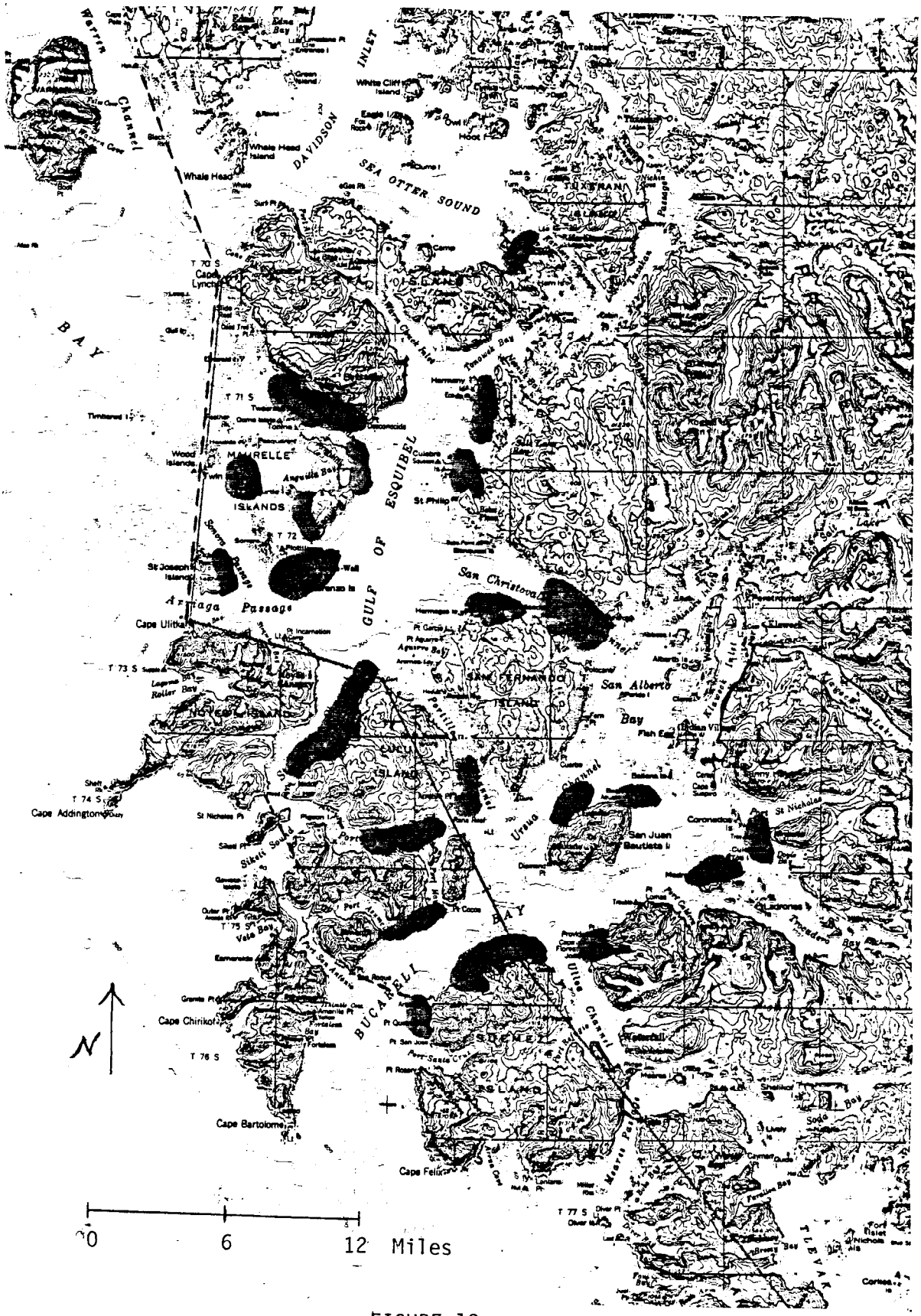


FIGURE 18
ABALONE HARVEST SITES, KLAWOCK (1972 to 1981)

(Harvest sites are identified by shaded areas. Areas east of the solid line are closed to commercial harvest).

plentiful, but were found to be scarce in 1981 included Pt. Cangrejo, Trocadero Bay Islands, the shores of San Juan Bautista Island, St. Nicholas channel, San Christoval channel, the Hole in the Wall area of San Lorenzo Island, and Bocas de Finas.

Preparation, Storage, and Distribution

As in Hydaburg, abalone was prepared for consumption in a variety of ways, with pan frying and deep frying being the most common.

Number of abalones served per person per meal and the number of abalone meals served per year in Klawock followed closely the pattern and quantities that were found in Hydaburg (Table 17).

TABLE 17
ABALONE MEALS IN KLAWOCK
1981

Number of Abalone per Person per Meal (n=27*)		Number of Meals per Year (n=17*)	
Range	2-12	Range	1-24
Mean	5.0	Mean	5.9
SD	2.2	SD	5.9
Median	4.5	Median	5.0

* Four households gave no response

* Thirteen households gave no response

When comparing seasons of meals served versus the seasons of harvesting abalone (Figure 19), one can see a similar correlation that existed with the shorepickers from Hydaburg. Because a smaller quantity

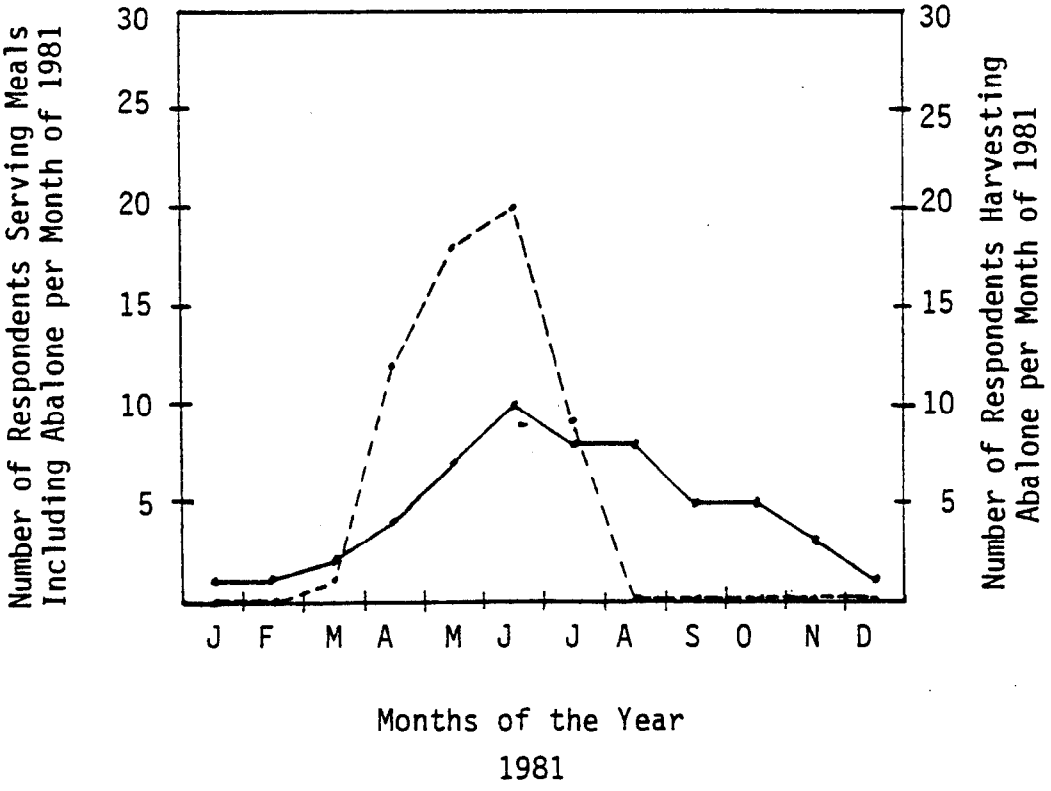


FIGURE 19
COMPARISON OF THE NUMBER OF RESPONDENTS FROM KLAWOCK SERVING MEALS INCLUDING ABALONE FOR EACH MONTH OF 1981 (SOLID LINE) WITH THE NUMBER OF RESPONDENTS HARVESTING DURING EACH OF THESE MONTHS.

of abalone is harvested annually per household, the number of Klawock households serving abalone meals per month is lower than in Hydaburg; however, Klawock households spread their meals out through the fall months in a similar fashion as was depicted for Hydaburg. This of course was dependent on whether enough was collected to store any abalone after fresh meals were served. In 1981 households in Klawock generally served a fresh meal immediately after picking and froze the balance if enough were harvested to preserve. Table 18 describes the modes of preserving abalone used by households interviewed in Klawock in 1981.

TABLE 18
MODE OF USE AND STORAGE FOR HARVESTED ABALONE
IN KLAWOCK (1981)
(Values Indicate Percentage of Households Utilizing Abalone in the Specified Manner)

	"All" (100%)	"Most" (75%)	"Half" (50%)	"Some" (25%)	"None" (0%)
Fresh	35	4	9	48	4
Frozen	4	43	9	4	39
Smoked	0	0	0	0	100
Canned	0	4	0	0	96
Pickled	0	0	0	0	100

Information in Table 18 is interpreted as follows: of all the people that used abalone, 35 percent used "all" their abalone fresh, 4 percent used "most" of it fresh, 9 percent used "half" of it fresh, 48 percent used "some" of it fresh, and 4 percent used "none" of it fresh. Of all the people using abalone, 4 percent froze "all" of it, 43 percent froze "most" of it, 9 percent froze "half" of it, 4 percent froze "some" of it and 39 percent froze "none" of it.

Most households ate some abalone fresh during the harvest season, then preserved the balance by freezing. A greater proportion of Klawock households consumed their entire annual harvest fresh than did Hydaburg harvesters. One household, however, preferred not to eat the abalone fresh but froze it first, even if just for a few hours. Reportedly, this made cleaning easier and helped tenderize the meat.

Canning was not a common means of preservation among households interviewed in Klawock, and smoking and pickling did not occur. Canning was said to have been more popular in days of larger abalone catches. In the past, households reportedly canned enough abalone to last through the winter as occasional meals at special gatherings.

Thirteen percent of the households interviewed used abalone but did not harvest themselves. As in Hydaburg, abalone use by these households was greatly affected by decreasing numbers of abalone harvested by the rest of the community. Abalone is still shared with those people unable to harvest for themselves (Table 19), but the frequencies and quantities shared are said to have decreased in recent years. Active harvesters in Klawock shared abalone with an average of 2.7 family-member households and 3.4 non-family households within the community. Responses regarding sharing outside of the community of Klawock were too few to statistically analyze.

TABLE 19
MEAN NUMBER OF HOUSEHOLDS RECEIVING ABALONE
FROM ACTIVE HARVESTERS IN KLAWOCK (1981)
(Recipients include family and non-family households within the community)

Recipient Household	In Klawock
Family	2.7
Non-Family	3.4

Similar trading patterns existed in Klawock as were explained for the community of Hydaburg. Friends and relatives from Ketchikan were often given abalone in exchange for favors or purchase of commodities that were unavailable in Klawock. Eulachon oil was a highly desired item and was frequently exchanged for abalone.

Klawock also had craftsmen who used abalone in wood carving, although the larger California abalone shells were usually used. Local shells had been used in one household by a young resident who had crafted a wood carving at the local school.

Craig

History and Area Description

Prior to 1900 the site on which Craig is now located was used by both Tlingit and Haida Indians for temporary fishing camps. The area was

well known for its salmon runs and especially the herring spawn which provided a predictable resource each March. The site was one of the few places where leaders of the Haida and Tlingit met together in peace during times of strife to discuss their conflicts. It was first known in English as "Fish Egg" after a nearby island and the massive herring spawn that occurred in the area. In 1912 the area was renamed Craig after the superintendent of a salmon packing operation that constructed permanent facilities at the site. Craig was built around this salmon packing operation and continued to grow as the fishing industry expanded through the 1930s. Between 1929 and 1939 the population of Craig grew from 231 to 505 (Table 20), partially due to Alaska Natives migrating to the area from Hydaburg and Klawock for employment. Salmon fishing and processing remained the focus of the cash economy until the 1950s and 1960s when the salmon runs crashed (Alaska Department of Community and Regional Affairs, 1981; Pacific Rim Planners, Inc., 1977; and Roppel, 1978).

TABLE 20
POPULATION TRENDS IN CRAIG, 1929-1980

Year:	1929	1939	1950	1960	1970	1975	1980
Population:	231	505	374	273	273	484	587

Source: Alaska Department of Community and Regional Affairs, 1981.

In 1981 Craig's population was over 600 and continued growth in the area is expected. The 1980 United States census reported 30 percent of Craig's residents were Alaska Natives. Many of the 70 percent non-native population or their ancestors have resided in Craig since its establishment. Craig also has seen a recent influx of population from

outside of Prince of Wales Island.

Recent development of timber resources and processing, seafood processing, government services, and commercial services have notably increased the opportunities for wage employment. Still considered a fishing community, Craig derives 40 percent of its employment from commercial fishing (Alaska Department of Community and Regional Affairs, 1981).

Craig is located on Prince of Wales Island, 7.5 road miles south of Klawock on the east shore of San Alberto Bay (refer back to Figure 1). Most of the previously mentioned services available to Klawock are available to Craig in terms of access. In addition, Craig has a commercial district which provides fuel, groceries, restaurants, bars, a hardware store, library, bank, post office, laundramat, and additional services.

The Household

Of the 175 individual households identified in Craig, interviews were conducted with 36 randomly selected households representing 21 percent of the community. Eighty-six percent of the households contacted used abalone regularly in their households (Table 21).

TABLE 21
USE OF ABALONE BY 36 HOUSEHOLDS IN CRAIG (1981)

	Active Harvesters	Use, but do not harvest	Do not use
Percent of Respondents	72	14	14

All households in Craig that used abalone but were not active harvesters were found to be older residents who no longer went out to abalone picking areas. The remaining 14 percent that did not use abalone were either new to the area or were households that did not eat abalone.

Total household size ranged from 1 to 11 persons averaging 3.8 persons per household (Table 22). Sixty percent of the households interviewed were composed of individuals between the ages of 18 to 55 years (Figure 20).

Craig was found to be composed of individuals from a great variety of previous places of residence. Most long-term residents, both non-native and native, and their families trace roots in the origin of the community and some have lived in Craig most of its seventy-five years. Recently, because of employment opportunities and the attractiveness of the country, Craig has drawn new residents from various parts of Alaska, other states, and foreign countries. The mean number of years of residency of households interviewed was 19.5 years; distribution of years of residency is found in Figure 21.

TABLE 22
NUMBER OF PERSONS PER HOUSEHOLD
INTERVIEWED IN CRAIG (1981)

Number of Households:	32*
Range of Household Size:	1 - 11
Mean Number of Persons per Household:	3.8
Standard Deviation:	2.3

*Four households gave no response.

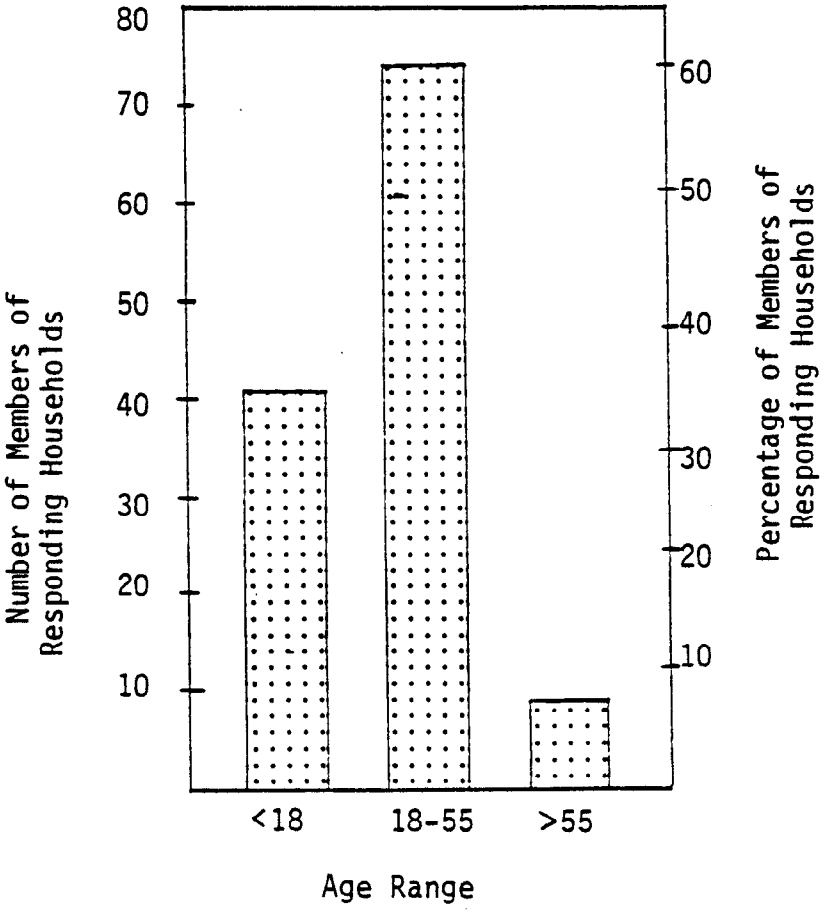


FIGURE 20
DISTRIBUTION OF HOUSEHOLD MEMBERS BY AGE RANGE
IN CRAIG (1981)

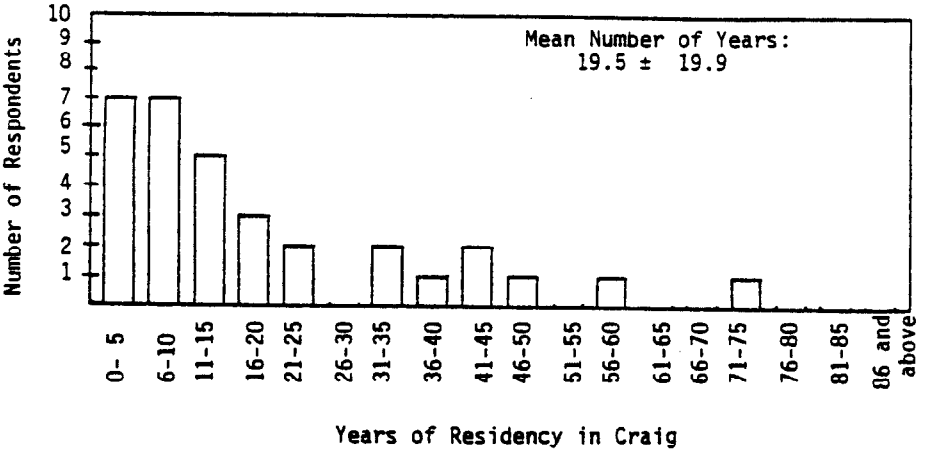


FIGURE 21
YEARS OF RESIDENCY IN CRAIG
FOR HEADS OF HOUSEHOLDS (1981)

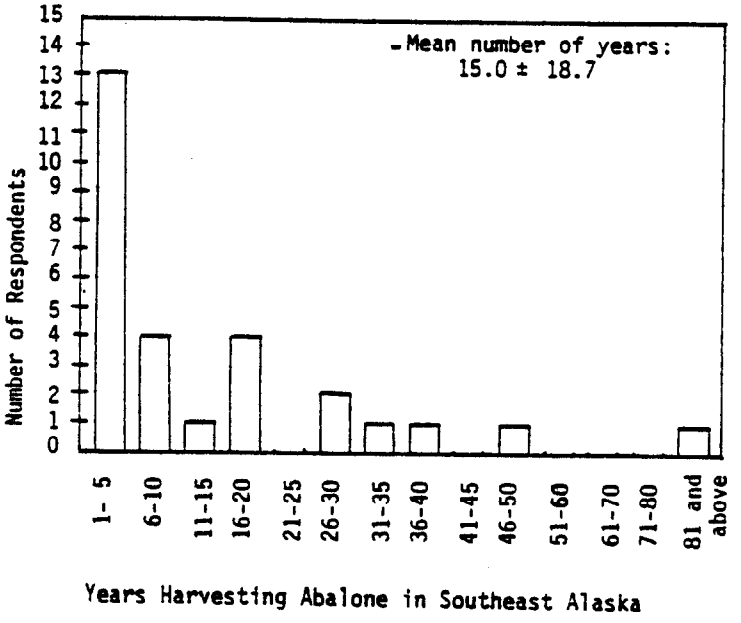


FIGURE 22
NUMBER OF YEARS OF ABALONE HARVESTING
EXPERIENCE IN SOUTHEAST ALASKA AMONG
HEADS OF HOUSEHOLDS IN CRAIG (1981)

(Years of harvesting experience may exceed years of residency in Craig for individuals who have resided in other Southeastern communities).

The average number of years harvesting abalone in Southeast Alaska by Craig respondents was 18.7 years. The substantial number of households who reported less than ten years abalone harvesting experience probably reflect the recent population increase that has occurred in the area (Figure 22). There was also a range of households that had picked abalone for many years; one centenarian resident of the area had been an active picker for over eighty years.

Full-time employment in Craig households was found to be the most common occurrence (Figure 23). Many households were able to combine several forms of seasonal, part-time employment to create full-time, year-round work. Seasonal or part-time work was also an important part of the wage employment. The median income range for Craig correspondingly was $15-20,000 (Figure 24), reflecting the higher proportion of full-time employment compared to Hydaburg.

The Harvest

A variety of methods were used to procure abalone by active harvesting households in Craig (Table 23).

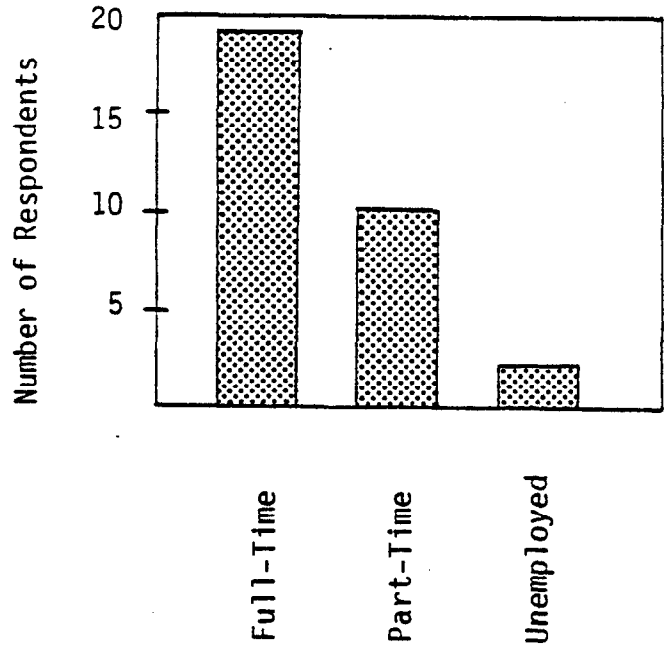


FIGURE 23
EMPLOYMENT STATUS OF HEADS OF HOUSEHOLDS
IN CRAIG (1981)

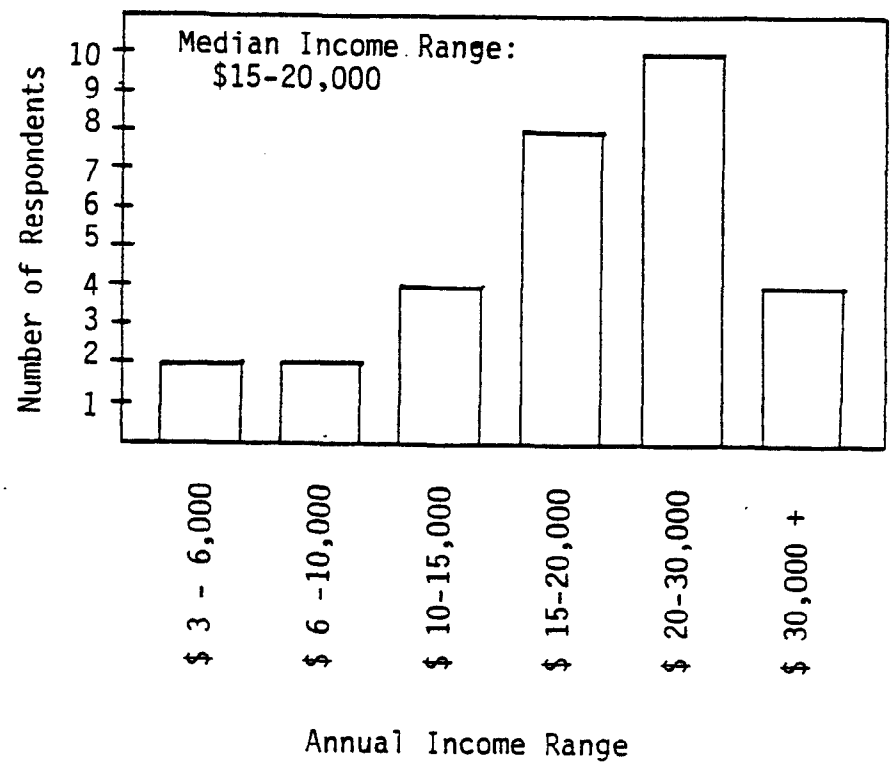


FIGURE 24
ANNUAL INCOME RANGES FOR HOUSEHOLDS
IN CRAIG (1981)

TABLE 23
HARVEST METHODS USED FOR PICKING ABALONE IN CRAIG (1981)
(n=30*)

Technique	Number of Households	Percent of Sample
Shorepick	20	67
Shorepick/Pole and gaff	5	17
Shorepick/Snorkel	2	6
Snorkel	3	10

* Six households do not harvest

Eighty-four percent of the households obtained abalone by shorepicking techniques that followed the same pattern described for Hydaburg shorepickers. The primary difference between Craig and the other two communities studied was the increased use of snorkeling techniques. Sixteen percent of the Craig sample combined this technique with shorepicking or used snorkel techniques only.

Means of transportation to abalone sites varied, but most often a small skiff was used (Table 24).

TABLE 24
MEANS OF TRANSPORTATION TO CRAIG ABALONE HARVESTING SITES (1981)
(n=30*)

	Pleasure Boat	Skiff	Fishing Boat or Skiff
Number of Respondents	1	23	6
Percentage of Respondents	3	77	20

* Six households do not harvest.

Months in which abalone were harvested by Craig shorepickers followed the seasonal pattern depicted in Hydaburg and Klawock; shorepicking peaked in May, June, and July in response to the availability of extreme minus tides and did not occur during the fall and winter months (Figure 25).

Snorkel pickers were also most active during the late spring and summer months. It was found the snorkel group was also active during the fall and winter months, although at a much reduced effort. Most snorkelers started picking abalone earlier in the year (ie. such as in March and April) than did shorepickers and one individual continued to harvest on a year-round basis (Figure 25). Thus, in addition to their access to a greater range of abalone habitat, snorkelers were able to exploit a longer season of harvest. The degree of minus tide perceived to be necessary by Craig harvesters averaged minus 1.73 feet (Table 25).

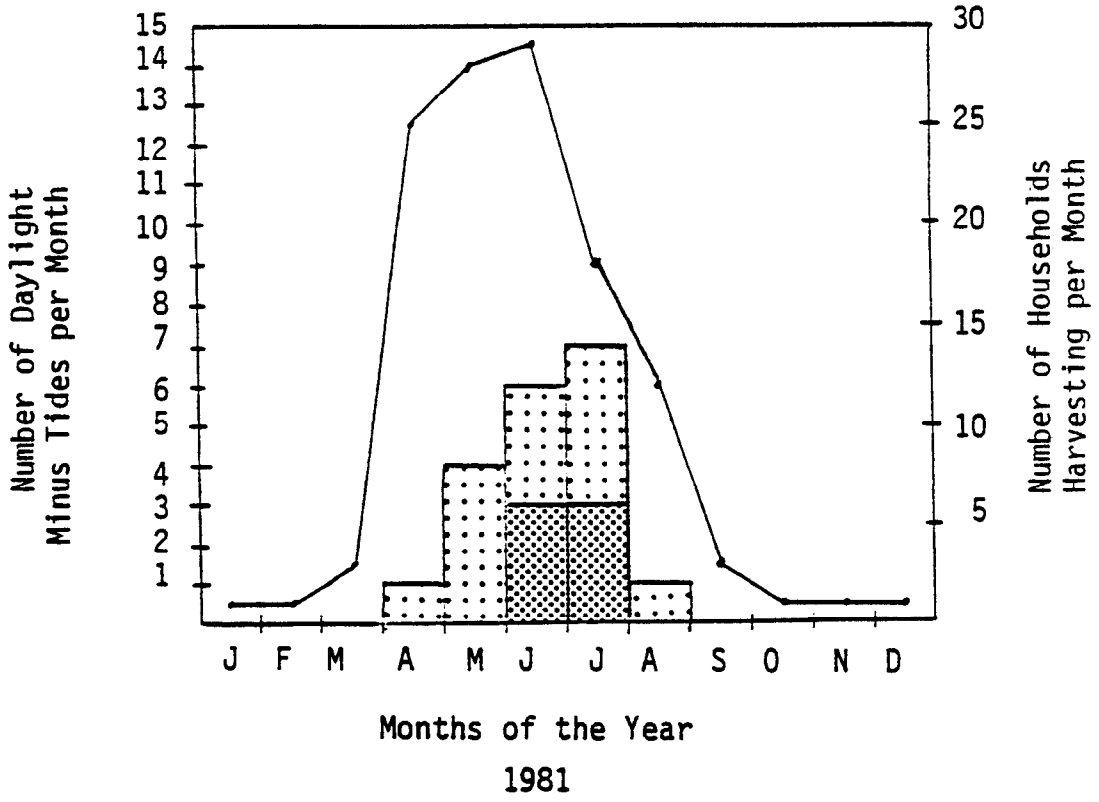


FIGURE 25
NUMBER OF HOUSEHOLDS IN CRAIG HARVESTING ABALONE PER MONTH IN 1981, COMPARED WITH THE NUMBER OF MINUS 2 (LIGHTLY SHADED) AND MINUS 3 HEAVY SHADING) DAYLIGHT TIDES PER MONTH OF 1981.

TABLE 25
DEGREE OF MINUS TIDE PERCEIVED NECESSARY FOR HARVESTING BY CRAIG ABALONE PICKERS (1981)

Number of Respondents:	29*
Range of Minus Tides:	0 to -3'
Mean Minus Tide:	-1.73'
Standard Deviation:	0.57

*Seven households gave no response.

A decline of harvesting activities during July and August existed in Craig which paralleled the patterns found in Klawock and Hydaburg caused by time conflicts with other activities, such as subsistence sockeye salmon fishing and commercial fishing seasons.

None all the random households surveyed reported using SCUBA gear to procure abalone for non-commercial purposes. However, there were a few Craig residents who used SCUBA gear to pick abalone commercially. Attempts to contact resident commercial abalone fishermen were unsuccessful. It was reported that the few commercial fishermen operated on a small, local scale. Compressed air to fill diving cylinders was obtained from Ketchikan or by the purchase of an individually owned compressor.

In Craig the mean number of abalone procured per year by active harvesters declined from 350 in 1972 to 67.8 in 1981 (Table 26; Figure 26). This represents an 81 percent decrease in mean annual harvest levels over the past ten years.

During this ten-year interval, the mean number of harvesting efforts per year fluctuated as follows: 3.9 (1972), 2.7 (1977), 3.3 (1980), and 2.5 (1981) (Table 26; Figure 26). Long-term residents voiced concerns and frustrations about decreased catch success per effort. This may relate to the slight decrease in mean number of efforts observed since 1972.

TABLE 26
DESCRIPTION OF CRAIG ABALONE HARVEST CHARACTERISTICS
1981, 1980, 1977, and 1972

Harvest Year	Number of Respondents	Mean	Standard Deviation	Range
		Number of abalone harvested per year.		
1981	23	67.8	54.6	0 - 200
1980	24	125.0	110.3	0 - 450
1977	9	283.3	242.4	100 - 800
1972	6	350.0	137.8	200 - 500
		Number of harvest efforts* per year.		
1981	23	2.5	1.8	1 - 6.5
1980	23	3.3	2.2	1 - 8.5
1977	7	2.7	2.0	1 - 6
1972	7	3.9	3.0	1 - 10
		Number of abalone picked per effort*		
1981	23	34.3	23.7	0 - 100
1980	24	42.5	26.1	0 - 100
1977	7	172.9	132.5	20 - 400
1972	6	143.3	88.0	20 - 200

* Mean hours per effort for 25 respondents equalled 2.5 ± 1.8 hours.

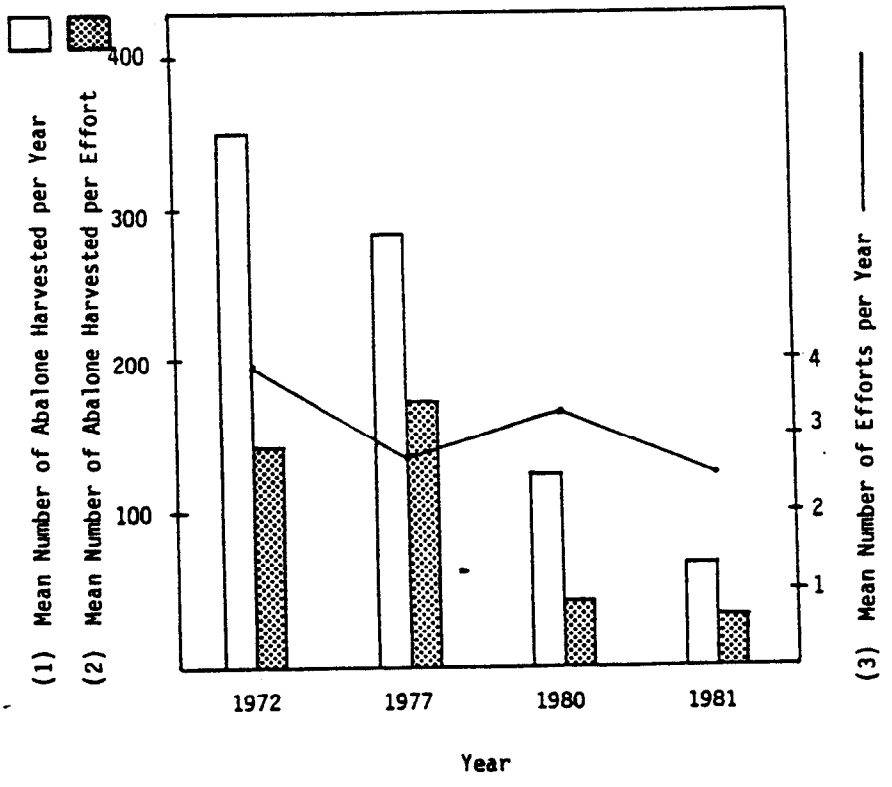


FIGURE 26
COMPARISON OF (1) MEAN NUMBER OF ABALONE HARVESTED PER YEAR, (2) MEAN NUMBER OF ABALONE HARVESTED PER EFFORT, AND (3) MEAN NUMBER OF EFFORTS PER YEAR FOR CRAIG ABALONE PICKERS DURING THE YEARS 1972, 1977, 1980 AND 1981.

(Number of hours per effort averaged 2.1 ± 1.2; n=25)

The pattern of decreasing annual household catch success as documented in Hydaburg and Klawock was also found to have occurred in Craig during the last ten years (Table 26). Mean catch per effort levels declined from 143.3 in 1972 to 34.3 in 1981, representing a 76 percent decrease in returns per harvest effort.

Comments on the lack of available abalone were primarily made by households that were strictly shorepickers. Many of the snorkel pickers had not lived in the area long enough to give a relative comparison of abalone availability through time. Generally, the annual harvest of the snorkel picker was slightly greater than shorepickers; but snorkelers also had a greater number of efforts.

Craig residents commented more frequently on the decreasing size of available abalone than on the absence of abalone from their favorite harvest sites. This contrasts with Hydaburg where residents complained that many traditional harvest areas were now void of abalones. All of the households interviewed in Craig preferred the larger abalone (i.e. 4 inches) and many stated they preferred not to pick the smaller individuals. However, long-time Craig residents did emphasize that some areas they had used for years were now nearly void of abalone.

From 1972 to 1981, 26 harvest areas were used and mapped from the interviews in Craig (Figure 27). Craig harvesters generally used the same harvest sites as Klawock harvesters (Figure 18). Two areas south of Waterfall were used by Craig and Hydaburg residents only; these two areas were the only sites that overlapped with Hydaburg's use pattern

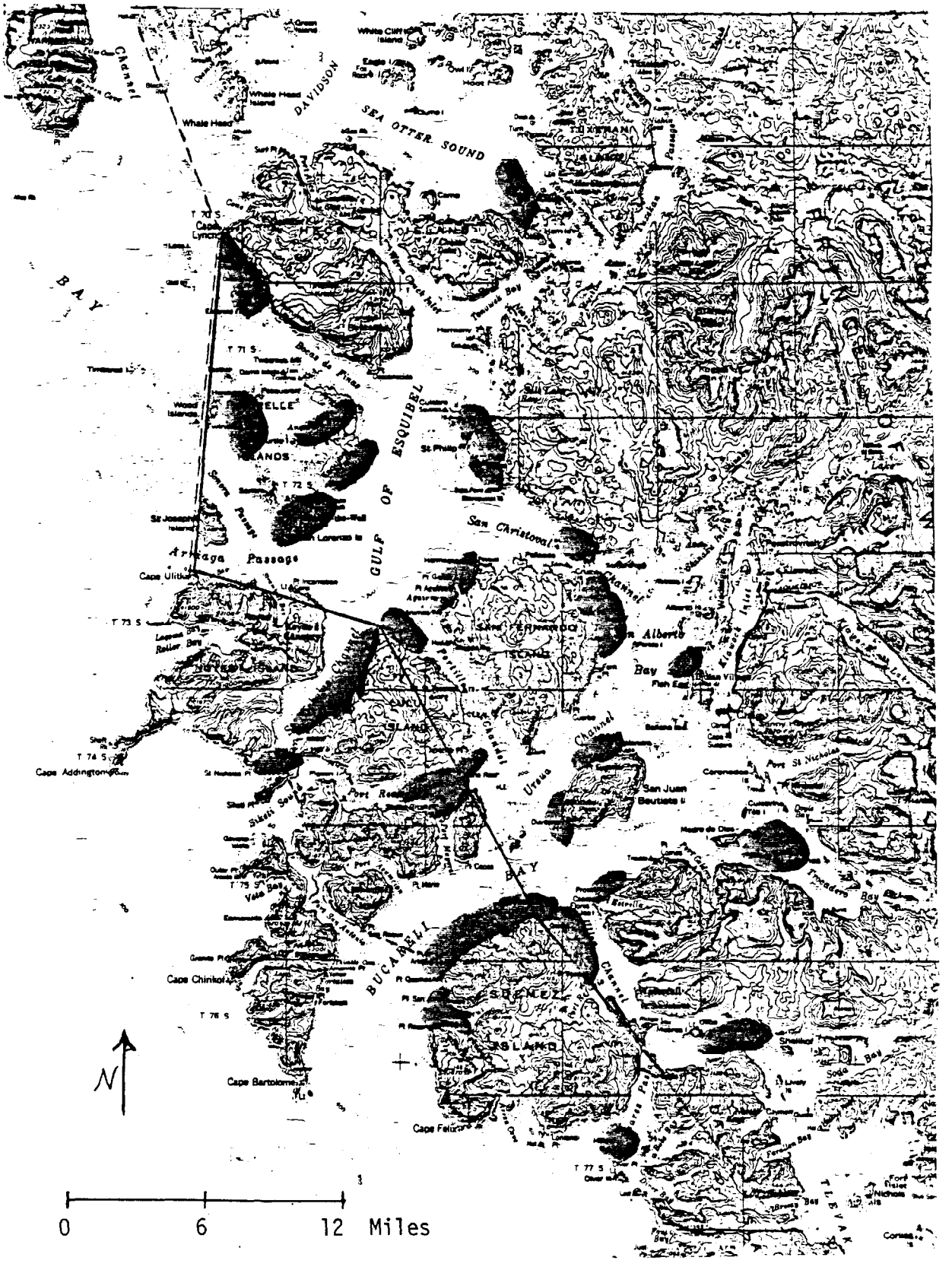


FIGURE 27
ABALONE HARVEST SITES, CRAIG (1972 to 1981)

(Harvest sites are identified by shaded areas. Areas east of the solid line are closed to commercial harvest).

(Figure 9). As in other communities studied, most households felt it was necessary to travel away from the Craig area to find prime habitat for abalone picking. Households reportedly utilized traditional areas that were passed down to them from their parents. In recent years households have been trying new harvest areas in search of greater densities of abalone.

The solid line drawn in Figure 27 denotes the regulatory limit for the commercial abalone fishing area. Areas north and east of this line are closed to commercial harvesting. Approximately one-third of the locations identified as non-commercial harvest sites were found to be near the boundary line or within the area open to commercial harvesting. Many of the reported prime areas (i.e. St. Nicholas channel, Port Real Maring, eastern Bucareli Bay and southern Sea Otter Sound) lie within the commercial harvest area. Reports that some of these areas were no longer very productive were common.

Preparation, Storage, and Distribution

Abalones were reportedly prepared in meals in the multitude of ways described in the Hydaburg section. Abalone meals were said to be fewer in 1981 than past years because of decreased catch per effort. Contemporary practices (1981) were recorded and are presented in Table 27.

TABLE 27
ABALONE MEALS IN CRAIG
1981

Number of Abalone per Person per Meal (n=27*)		Number of meals per Year (n=27*)	
Range	2 - 10	Range	1 - 36
Mean	5.26	Mean	9.21
SD	1.23	SD	9.86
Median	5.0	Median	6.0

* Nine households gave no response

* Nine households gave no response

Figure 28 compares seasons of harvest with seasons abalone were served in meals in 1981. The fact that abalone were served in meals in fall and winter (i.e. low harvest seasons) indicates abalone were being stored for later use, even with declining annual harvest levels. The solid line (representing meal seasons) is low compared to the dotted line (representing harvest seasons) because of the low response on the topic of meals served (n=16) compared to the topic of harvest attempts (n=29).

According to the households interviewed, storage methods have fluctuated through time. In 1981 much of the abalone taken by Craig households was eaten fresh, some of it was frozen, and small portions of it were smoked, canned, and pickled (Table 28). Information on Table 28 is interpreted as follows: of all households using abalone, 20 percent use "all" of it fresh, 33 percent use "most" of it fresh, 23 percent use "half" of it fresh, 20 percent use "some" of it fresh, and 3 percent use "none" of it fresh.

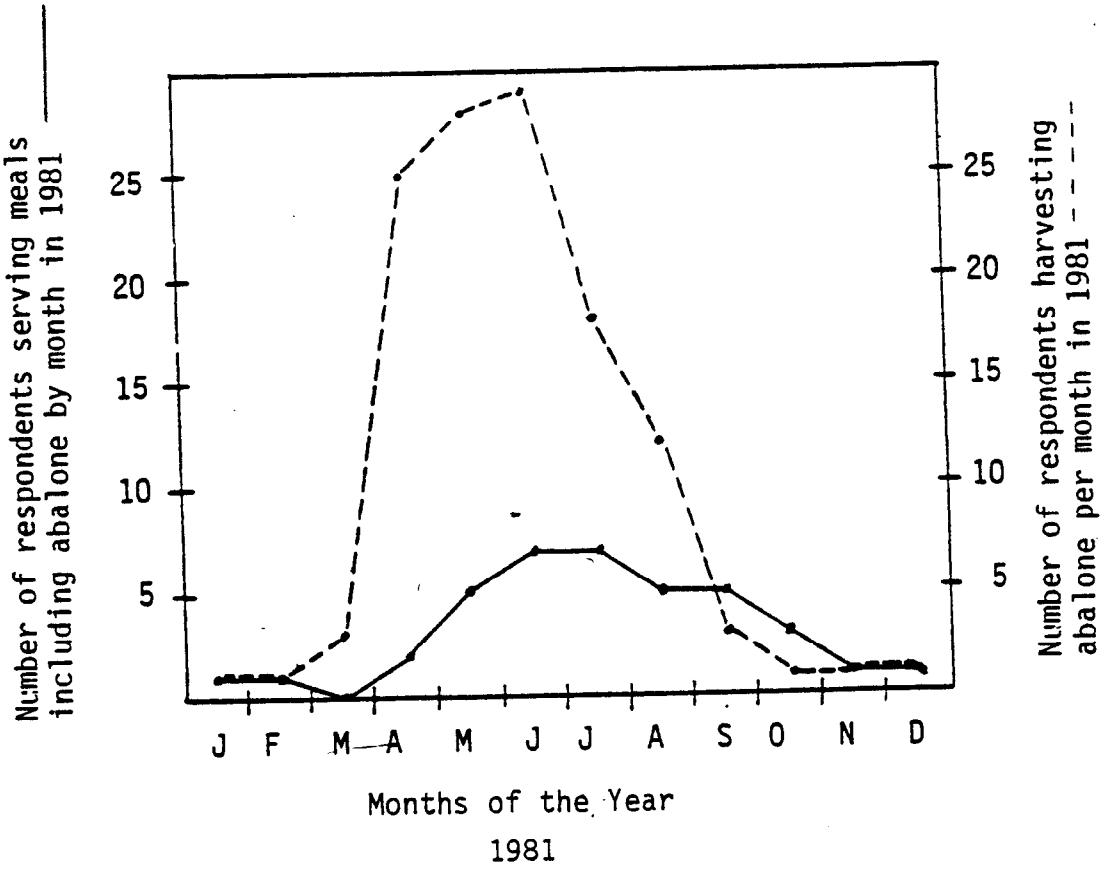


FIGURE 28
COMPARISON OF THE NUMBER OF RESPONDENTS FROM CRAIG SERVING MEALS INCLUDING ABALONE FOR EACH MONTH OF 1981 (SOLID LINE) WITH THE NUMBER OF RESPONDENTS HARVESTING DURING EACH OF THESE MONTHS (DOTTED LINE).

TABLE 28
MODES OF PREPARATION FOR HARVESTED ABALONE IN CRAIG (1981)
(Values Indicate the Percentage of Households Utilizing Abalone in the Specified Manner)

	"All" (100%)	"Most" (75%)	"Half" (50%)	"Some" (25%)	"None" (0%)
Fresh	20	33	23	20	3
Frozen	3	10	23	33	30
Smoked	0	0	7	7	87
Canned	0	3	0	3	93
Pickled	0	0	0	3	97

Fourteen percent of the households in Craig traded, purchased, or received abalone from other community members since they used it regularly but did not harvest themselves. Abalone was available during the fall of 1981 in retail grocery stores and from commercial fishermen in Craig for $4 to $6 per pound unshucked. Most people did not purchase abalone because of the expense and the fact that they did not want to pay for a food item they used to easily harvest for themselves. Sharing of abalone in Craig existed among family members and close friends but not at levels remembered 5 to 10 years ago (Table 29).

TABLE 29
MEAN NUMBER OF HOUSEHOLDS RECEVING ABALONE FROM ACTIVE HARVESTERS IN CRAIG (1981)
(Recipients include family and non-family households within the community)

Recipient Household	In Craig
Family	3.0
Non-family	1.4

Active harvesters in Craig shared abalone with an average of 3.0 family-member households and 1.4 non-family households within the community. Responses regarding sharing outside of the community of Craig were too few to statistically analyze.

Discussion: Part I

This section summarizes the findings of research conducted in Hydaburg, Klawock, and Craig and discusses these findings in terms of customary and traditional use guidelines as defined by the Boards of Fisheries and Game. Important patterns of use that were found to exist for all three communities will be discussed in terms of present regulatory practices. Additionally the researcher's perceptions of community concerns and issues will be presented. The study communities will be discussed collectively when patterns are thought to be similar enough to do so; otherwise, the individual community which may be the exception will be mentioned.

Abalone and the Round of Resource Use

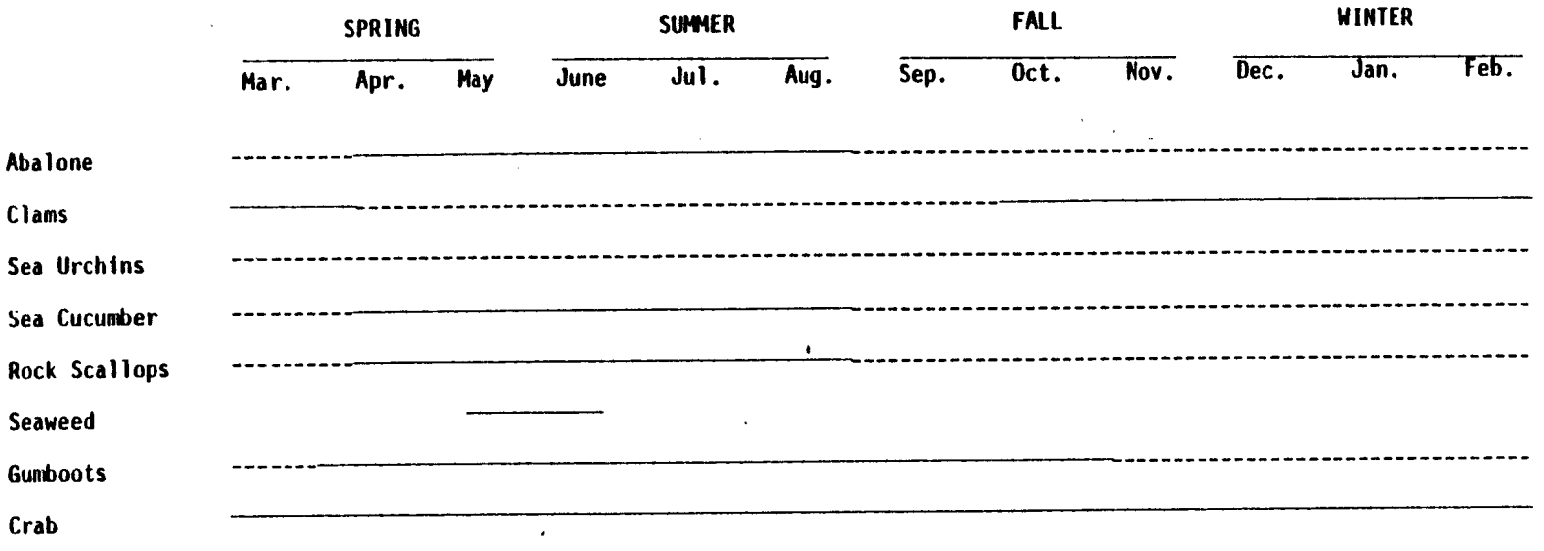
Non-commercial procurement and use of abalone by southern Prince of Wales Island communities have been part of the annual round of resource use since pre-European contact. Although this research has focused on

contemporary practices (1981) with an attempt to denote patterns of use within the past ten years, the collective past experience of local informants formed a picture of abalone use which dated back to the turn of this century. The consistency of these historical practices with contemporary harvest and use patterns was noted throughout the study.

A sketch of the seasonal round of some resources used in the communities of Hydaburg, Craig, and Klawock was composed during the interview process (Figure 29). The procurement of abalone often occurs as part of a larger practice of gathering invertebrates and plant resources from the sea. The intertidal gathering season begins during April and May as low (spring) tides begin to expose large portions of the intertidal zone during daylight hours. The intertidal gathering season continues through August. Shorepicking is most productive during the minus 2 and minus 3 foot tides which usually occur in June, July and early August.

Shorepickers concurrently seek out abalones and sparsely distributed rock scallops during extreme low tides. In addition, black seaweed, gumboots, sea cucumbers, and occasionally sea urchins are picked also with abalone at less extreme minus tides. When harvesting abalone and other shoreline foods, it is common for households to make 2 to 3 trips per year via boat or skiff to passages that receive the open ocean swell. Fluctuation of annual efforts was noted with changes in availability of abalone. In recent years when abalone catches began to decline, the number of efforts with some of the households, increased slightly in an

FIGURE 29
SEASONAL ROUND OF GATHERING FOR SELECTED SHELLFISH
AND LISTS OF SOME OF THE OTHER SPECIES USED
Prince of Wales Island Area, 1980-1981
(——— Usual Period of Harvest Effort; ------- Occasional Period of Harvest Effort)



Others
Goeducks
Octopus
Shrimp
Herring Spawn (on Kelp)

Birds/Hunted
Mallards
Common Merganser (Sawbill)
Canada Geese
Ptarmigan
Spruce Hens
Pintail
Teal (Green Wing)
Golden Eye

Fishing
King Salmon
Silver Salmon (Coho)
Red Salmon (Sockeye)
Chum Salmon (Dog)
Pink Salmon (Humpy)
Herring
Halibut
Steelhead Trout
Rainbow Trout
Cutthroat Trout
Cod
Dolly Varden
Red Snapper
Hooligan (Eulachon)
Salmon Eggs

Gathered from the Land
Rosehips
Strawberry
Cranberry
Blueberry
Raspberry
Cloudberry
Thimbleberry
Huckleberry
Smilingberry
Salmonberry
Elderberry
Gray Currants
Wild Rhubarb
Wild Celery
Goosetongue
Mushrooms
Beach Asparagus
Swamp Tea
Seagull Eggs
Fireweed
Crab Apple

Mammals Hunted
Deer
Black Bear
Harbor Seal

Mammals Trapped
Mink
Otter
Wolf
Marten

attempt to obtain previous years harvest levels. When this was found to be unsuccessful many households returned to previous effort levels and a few stopped harvesting all together.

Often the family or individuals will camp near harvest areas or overnight on their boat in order to take advantage of suitable tide and weather conditions. Younger family members accompany the party and learn the areas that are productive as well as harvest techniques. Many of the abalone harvest sites were found to be considered a family possession and the knowledge of their whereabouts were passed through generations by the father or occasionally a maternal uncle, to younger family members as they learned from their elders. Other shorter trips made specifically to harvest abalones are also made and may require just a morning or days time.

By mid-June preparations for upcoming subsistence sockeye and commercial fishing seasons diminish abalone harvesting activities. The specific scheduling of low tide trips is less practical at this time. Occasionally commercial fishermen and their families may break from fishing to shorepick abalone, but much of July, August, and September are devoted to harvesting salmon.

This pattern of abalone harvesting was found to exist during 1981 with the large majority of households. Even new residents to the area quickly adopt this pattern of use. Other new residents have brought with them new methods (snorkeling) and have modified older methods by

combining both activities. Occasionally these newer methods are also adopted by long-term residents. Although at present a small minority of households use snorkel gear, this may change in years to come.

With the exception of a small recent influx of new residents, all three communities exhibited a long-term consistent pattern of abalone use by the majority of residents interviewed. Average years involved picking abalone in these communities by the heads of households ranged from 15 to 33 years.

The shorepick methods are tied to a shorter practical harvest season in comparison with snorkel or SCUBA picking. The wider habitat ranges, longer seasonal range, and longer harvest times available to a SCUBA picker make for a longer annual harvest period. The shorepicker's technology, on the other hand, is less expensive in terms of time and money in comparison with snorkel or SCUBA picking. Depending on the season, the shorepickers knowledge of the area, and the abalone population, he can harvest abalone with the lesser amount of time, money, and effort. If seasons are planned adequately to take advantage of low tides, and social and environmental limitations do not interfere, the shorepicker can obtain abalone efficiently.

Snorkel picking as well can become an efficient means of picking, but additional investments in equipment and time (learning the skills of snorkeling) are needed. SCUBA picking is most effective in terms of producing year-round harvests, but is restrictive in terms of time,

energy, and money invested for the people of these communities. The monetary investment combined with the time needed to maintain the equipment and learn the skills of SCUBA diving makes this method impractical for most residents.

Mapping areas used for picking abalone determined that patterns of use occurred in areas generally within a twenty-five mile radius of the communities. The majority of harvest sites were not found in areas occurring close to the communities but in areas farther distant that were considered more productive. These areas generally were away from the communities because better habitat for abalone occur within areas exposed to the open ocean. Other common sites that were used included areas that were being visited for other food procurement purposes, such as gathering sites for seaweed and seagull eggs.

The preparation of abalone retains traditional methods along with many new techniques, added because of exogenous social and cultural influences and changes in technology. Storage techniques have fluctuated depending on available resources and technologies. In 1981, smoking and pickling of abalone were only occasionally used; canning and freezing were the most common means of preservation.

The sharing and distribution of abalone within the community has remained strong even in times of fewer available abalone. Special celebrations are highlighted by the sharing of food; abalone is one of the most appreciated gifts at these occasions. Older residents and

people unable to harvest abalone are often included in the harvest by neighbors and relatives who share their catch. Trading abalone for food items that cannot be obtained locally, such as eulachon oil or staples from the city was found to be a common practice.

Declines in Abalone Harvest Numbers

Estimates of quantities harvested by households indicated a decrease of abalone taken during the past 10 years. The level of effort has remained relatively constant per household through this same period. Information gathered on quantities harvested before the commercial abalone fishery began in this area and after it showed its greatest harvest success, suggests that commercial abalone catches may be a factor in the lower catches recorded by the local communities. Boundaries established to protect areas used by local communitites were found to transect and exclude actual areas used by local communities. The recent decrease in quantities of abalone available to the communities' households have changed methods and frequency by which it has been eaten, stored, and shared.

Seasonal Patterns, Gear Types, and Regulations

The predominant method of use in these communities was found to be shorepicking, with snorkeling used occasionally. These users were found to pick seasonally during the spring and summer months with a few of the snorkelers harvesting year-round. Most households were found to make

only about two trips a year for harvesting abalone. The number of trips was controlled by the availability of low tides, good weather, and time to spend on this activity which did not compete with other food procurement activities. The distance needed to travel and fuel consumed in getting to the harvest sites may have also limited the number of efforts. Active abalone pickers supplied their entire household with abalone and shared their catch with other households within the community that were unable to harvest for themselves. Existing regulations which prohibit the possession of more than 50 abalones may place a burden on individuals attempting to harvest abalone under the constraints mentioned above.

Concerns and Issues Identified by the Communities

Time spent by the researcher in these three communities involved talking to many households and individuals throughout the community. Just mentioning the word "abalone" usually resulted in a response of personal feelings about the perceived increasing scarcity of abalone or questions and interests about the biology and life cycles of this animal. Even though abalone was not considered a high volume food item in terms of quantity consumed, it was highly valued and considered an important part of nearly everyone's diet. The following is a summary of major concerns expressed while visiting the communities.

1) Concern was expressed about the overall population health of abalone populations in the general area of southern Prince of Wales Island in light of recent large commercial catches of

abalone followed by decreases in commercial catches and local non-commercial catches. It was generally felt that decreases in the population of abalones in commercial areas may affect protected areas because of the "broadcast spawning" reproductive cycle of abalones.

2) Concern was expressed over the past histories of other commercial abalone fisheries that have nearly depleted the abalone stocks of California and British Columbia: would the Alaskan commercial harvest have similar effects on Alaska abalone populations? Many people were not against commercial fishing per se; many of them were commercial fishermen of other ocean resources. Objections were expressed regarding the lack of knowledge that exists on pinto abalone populations, distributions, life cycles, and migrations, especially between the vertical subtidal and intertidal areas. By and large people believed that until populations of existing abalone were determined, there should not be commercial exploitation of abalone. Abalone was considered by many to be a fragile, slow-growing creature that could not stand commercial pressure in most areas. Quotas that were percieved as arbitrarily set, that is, not based on data were felt to be poor method of management.

3) Enforcement was considered a key problem. There were many complaints about commercial abalone fishermen working in closed areas and picking undersized abalone. Enforcement problems were not blamed on the local enforcement officer who was

responsible for all three areas (i.e. the west coast of Prince of Wales Island) but rather on the lack of additional support for this one man. However, many residents believed commercial boundary lines were farther west (offshore) than they actually are.

4) Most households felt the commercial boundaries were improperly defined. Many of their important use areas were not included in the non-commercial areas. They believed boundaries should be changed to include all "inside waters" (District 3).

5) Many believed their catches had declined in the past few years due to commercial harvesting of the same area. Divers were considered very efficient at removing most, if not all, of the abalones from an area.

6) Regulations limiting individuals to a possession limit of 50 abalones were thought to be inappropriate and inefficient in terms of established harvest practices. People felt regulations should just prohibit the waste and commercial sale of abalone taken for subsistence uses, and not set an individual possession limit, especially since thousands of pounds of abalone were being taken for commercial sale in the same waters.

7) Effects on populations of abalone from outside users (especially fly-in SCUBA divers from Ketchikan and commercial salmon fishermen from outside the area) concerned local residents.

8) Finally, many believed that waters near the community that are

used for local gathering of shellfish should not be open to commercial exploitation but should be protected in order to allow continued non-commercial uses.

A high level concern was expressed about present abalone populations and availability by nearly all households interviewed in Hydaburg, Klawock, and Craig. While abalone was not considered a high volume food item it was a highly valued part of most people's diet. The activities involving the procurement and uses of this food were also considered important social and cultural activities.

The Procurement and Use of Abalone
in Southeast Alaska

Part II - Supplement

Sitka and Ketchikan

TABLE OF CONTENTS

(This Supplement is to be added to the Part II - Results and Discussion Sections on Page 112 of The Procurement and Use of Abalone in Southeast Alaska - Report to the Board of Fisheries.)

Results: Part II

Part II presents information gathered from a permit-survey administered by the Alaska Department of Fish and Game, Commercial Fisheries Division, in Sitka and Ketchikan between mid-May and December, 1981. The survey consisted of a questionnaire which was completed while obtaining a permit and a catch calender that was to be returned by non-commercial abalone harvesters by December 31, 1981. Because of a low level of response by Ketchikan permittees, additional surveys were mailed to abalone users and were combined with permit-survey questionnaires during statistical analysis. Permit-survey data in both Sitka and Ketchikan were supplemented by personal interviews to provide further information on user groups and harvest areas.

In evaluating data collected in Part II of this study it is important to consider the limitations of the methodology and understand the preliminary nature of these findings. The permit-survey was initiated during an active abalone harvesting season; individuals that picked abalone between January and May, 1981 were excluded from data collection. This practice not only precluded many of the users, but also prevented the researcher from obtaining information on the seasonal round of abalone use through an entire year. Because of the newness of the permit-survey regulation, many people were unaware of the Department's effort to obtain this information. The sample of individuals surveyed represents an undetermined percentage of the total number of abalone users in the community. Data must be interpreted with the realization

that not all abalone users from Sitka and Ketchikan were contacted. Finally, the limitations of a permit-survey format compared to a personal interview should be restated.

Data collected from Sitka and Ketchikan are organized as follows: 1) description of harvest methods; 2) the household; 3) harvest characteristics; and 4) harvest sites. Data are subdivided into appropriate "user groups" based on the harvest techniques employed. A description of these harvest methods was provided previously on pages 26-31.

Sitka

Of the 262 people who participated in the Sitka permit-survey, eighty-six percent were full-time residents of Sitka and fourteen percent were residents of other Alaskan communities or other states. A brief characterization of resident and non-resident harvesters surveyed in Sitka follows.

The community or state of origin and harvest methods used are presented in Table 30 for non-resident harvesters. Visitors to Sitka from other parts of Alaska were predominantly SCUBA pickers (87 percent) while visitors from outside the State of Alaska who obtained permits were predominantly shorepickers (86 percent). None of the visiting permittees used snorkel techniques to obtain abalone near Sitka and none were found to be commercial abalone fisherman.

TABLE 30
RESIDENCES AND HARVEST METHODS USED
BY NON-SITKA RESIDENTS HARVESTING ABALONE IN SITKA AREA
(1981)
(n=38)

Alaskan Communities	Number of Respondents
Juneau	6
Anchorage	5
Fairbanks	4
Ketchikan	2
Palmer	2
Valdez	2
Homer	1
Kotzebue	1
Soldotna	1
TOTAL	24

Number of Shorepickers:	3	(13%)
Number of SCUBA pickers:	21	(87%)

Other States	Number of Respondents
Washington	9
Arizona	1
California	1
Hawaii	1
Kansas	1
Virginia	1
TOTAL	14

Number of Shorepickers:	12	(86%)
Number of SCUBA pickers:	2	(14%)

Sitka residents used shorepicking, SCUBA, and snorkel techniques, or a combination of two or all of these, to obtain abalone (Table 31). Sixty-five percent of those surveyed used "shorepicking only," 17 percent used "SCUBA picking only," and 2 percent used "snorkel picking only," to obtain abalone. Sixteen percent of the sample used a

combination of these techniques. In the data analysis which follows, trends which were observed for the "snorkel picking only" user group could not be validated or considered significant due to the small sample size (n=5).

TABLE 31
ABALONE HARVEST METHODS USED BY SITKA-RESIDENT PERMITHOLDERS (1981)
(n=224)

Harvest Method		Number of Respondents	Percent of Respondents
Shorepicking		147	65
SCUBA picking		38	17
Snorkel picking		5	2
Combined techniques		34	16
Shorepick/SCUBA:	28		
Shorepick/Snorkel:	4		
Shorepick/SCUBA/Snorkel:	2		

Shorepicking was the most common harvest method utilized by Sitka residents. Eighty-one percent of the respondents used shorepicking solely or in combination with snorkel and/or SCUBA. Thirty-one percent of the sample used SCUBA alone or in combination with other methods. Only five percent used snorkel picking alone or in combination with other methods.

During personal interviews, commercial harvesting of abalone in 1981 by Sitka residents was reported to have declined from levels which were common during the late 1970s. Nine individuals (4 percent) from the Sitka residents sampled were commercial abalone fishermen.

A total of 226 Sitka households were contacted by means of the 1981 permit survey; household size for all user groups combined ranged from 1 to 12 persons (Table 32). Mean household size did not vary appreciably between the four user groups, but ranged from 3.0 to 3.5 persons per household. It was notable that only households in the shorepick user group included members over 55 years of age.

TABLE 32
AVERAGE HOUSEHOLD SIZE AND AGE DISTRIBUTION
FOR HOUSEHOLDS SURVEYED IN SITKA (1981)
(n=226)

	Shorepick	SCUBA	Snorkel	Combined Techniques
Number of Respondent	147	38	5*	36
Range of Household Size:	1 - 12	1 - 7	1 - 5	1 - 5
Mean Household Size:	3.1	3.1	3.5	3.0
Mean Number of Persons per Age Range**:				
18 years	0.93	1.21	0.80	1.19
18-55 year	1.84	1.68	2.80	1.69
55 years	0.22	0.0	0.0	0.0

* Small sample size may affect significance of observed trends.

** No response in an age range was interpreted as "zero" persons in that age range.

Years of residency in Sitka for heads of households ranged from less than one year to 68 years (Table 33). The mean number of years residency for the shorepicking group (16.2 years) was nearly twice that of the

SCUBA picker group (8.7 years), and substantially longer than the snorkel picker (10.2 years), and combined techniques (9.3 years) groups. For all user groups the most frequent response was less than 5 years of residency in Sitka. The SCUBA picker user group had the greatest percentage (53 percent) of short-term residents.

TABLE 33
YEARS OF RESIDENCY IN SITKA FOR HEADS OF HOUSEHOLDS (1981)

	Shorepicking	SCUBA	Snorkel	Combined Techniques
Number of Respondents:	143	38	5*	36
Range of Years of Residency:	0 - 68	0 - 24	4 - 15	0 - 34
Mean Number of Years of Residency:	16.2	8.7	10.2	9.3
Standard Deviation:	15.0	7.7	7.1	8.7
Mode:	0 - 5	0 - 5	0 - 5	0 - 5
Percent of Sample Represented by Mode:	34	53	40	42

* Small sample size may affect significance of observed trends.

Years of experience harvesting abalone in Southeast Alaska are reported in Table 34. The shorepicking user group reported the greatest range of years of experience (0 to 60 years) and also the highest mean value of 11.8 years. SCUBA picking was a more recent technique used by Sitka residents with a range of 0 - 15 years and a mean value of 4.5 years. SCUBA gear has been available to the general public for less

than 30 years and is said to have been introduced to Sitka 10 to 15 years ago by scientists and commercial abalone divers. Sixty-six percent of the SCUBA pickers surveyed had 5 or fewer years of experience harvesting abalone in Southeast Alaska.

TABLE 34
NUMBER OF YEARS OF ABALONE HARVESTING EXPERIENCE
IN SOUTHEAST ALASKA AMONG HEADS OF HOUSEHOLDS IN SITKA (1981)

	Shorepicking	SCUBA	Snorkel	Combined Techniques
Number of Respondents:	140	35	5*	35
Range of Years of Experience:	0 - 60	0 -15	0 - 14	0 - 32
Mean Number of Years of Experience:	11.8	4.5	5.8	7.0
Standard Deviation:	12.7	4.3	5.0	7.7
Mode:	0 - 5	0 - 5	0 - 5	0 - 5
Percent of Sample Represented by Mode:	44	66	60	56

* Small sample size may affect significance of observed trends.

Of the Sitka households surveyed, 76 to 83 percent had at least one member working full-time (Table 35). Seasonal employment was also common with over one-third of the households having at least one seasonal or part-time worker. Unemployed or retired adults were found in approximately 20 percent of all groups surveyed.

TABLE 35
EMPLOYMENT STATUS OF HOUSEHOLD MEMBERS
SURVEYED IN SITKA (1981)
(n=226)

	Shorepick	SCUBA	Snorkel	Combined Techniques
Number of Responding Households:	147	38	5*	36
Percent of Households with one or more Full-time Workers:	78	76	80	83
Percent of Households with one or more Part-time Workers:	37	39	80	40
Percent of Households with one or more Unemployed Adults:	22	18	20	17

* Small sample size may affect significance of observed trends.

Annual income ranges for households surveyed in Sitka showed little difference between user groups (Table 36). Shorepicking households had a slightly lower median annual range income ($15-20,000) than did other user groups ($20-30,000). However, the most frequent response was an income exceeding $30,000 for the shorepicking, SCUBA picking, and combined techniques users groups. The anomalous figure presented for snorkel pickers is likely related to the extremely small sample size.

TABLE 36
ANNUAL INCOME RANGES FOR HOUSEHOLDS SURVEYED IN SITKA (1981)

	Shorepicking	SCUBA	Snorkel	Combined Techniques
Number of Households Surveyed:	131	33	4*	30
Median Income Range:	$15-20,000	$20-30,000	-------	$20-30,000
Mode:	over $30,000	over $30,000	$3-6,000	over $30,000
Percent of Sample Represented by Mode:	46	42	50	47

* Small sample size may affect significance of observed trends. For this sample, median income could not be calculated.

Household information for the non-Sitka residents who picked abalone in the Sitka area is summarized in Table 37. Most were employed full-time and the median range income level was $20-30,000 per year.

TABLE 37
SUMMARY OF HOUSEHOLD DATA FOR NON-SITKA RESIDENTS (1981)
(Alaskan [non-Sitka] and out-of-state pickers combined.)
(n=38)

Household Data	Shorepickers (n=15)	SCUBA pickers (n=23)
Median Income Range:	$20-30,000	$20-30,000
Percent of Individuals with Full-time Employment:	94	83
Mean Number of Persons per Household:	2.6	3.0

Quantities of abalone used annually by a household and quantities distributed each year to other households were estimated by respondents on the permit-survey questionnaire (Appendix C). Respondents were asked to pick a quantity range (in increments of 25) which best represented their use level. Table 38 summarizes these responses by user group and also presents the estimated number of harvest efforts per year for each group. It is important to note that harvest quantities and effort levels presented in Table 38 did not depict actual harvest levels and efforts for 1981, but were estimates of "usual" values based on previous years experiences. Existing regulations prohibiting the possession of more than 50 abalone may have affected the permittees' responses to these questions.

The mean ranges of estimated number of abalone used per year by the SCUBA, snorkel, and combined techniques user groups were 101-125 abalone per year; the shorepicking user group averaged slightly lower at 76-100 abalones per year. The combined techniques user group had the greatest percentage of harvesters who reported using over 175 abalones per year (37 percent). Thirty percent of the SCUBA pickers and 15 percent of the shorepickers also reported using over 175 abalones per year.

The shorepicking group shared slightly fewer abalones on the average than the other groups, with the exception of the small sample of

TABLE 38
SITKA ABALONE HARVEST CHARACTERISTICS
LISTED BY HARVEST METHOD
(Based on tabulations of 1981 permit survey questionnaire.)

Harvest Method	Number of Respondents	Mean	Range	Mode	Percent of Sample Represented By Mode
	Range of quantities of abalone used by household per year				
Shorepick	127	76-100	0-over 175	175	15
SCUBA	37	101-125	1-over 175	175	30
Snorkel	5*	101-125	1-over 175	175	40
Combined Techniques	35	101-125	1-over 175	175	37
	Range of quantities of abalone distributed to other households				
Shorepick	123	1-25	0-over 175	1-25	50
SCUBA	34	26-50	0-over 175	1-25	47
Snorkel	5*	0	0-75	0	60
Combined Techniques	31	26-50	0-over 175	1-25	39
	Number of harvest efforts per year				
Shorepick	120	3.7	1-25	2.0	26
SCUBA	33	12.3	1-99	4.0	21
Snorkel	5*	5.2	0-9	5.0	40
Combined Techniques	32	5.5	0-12	6.0	28

* Small sample size may affect significance of observed trends.

sample of snorkelers. Approximately 40 to 50 percent of all groups distributed 1 to 25 abalones to other households each year.

Shorepickers averaged 3.7 harvest efforts per year. Two efforts per year was found to be the most common response. The mean number of efforts per year for the snorkel picker and combined techniques user groups was 5.2 and 5.5 respectively.

SCUBA pickers were the most active group and averaged 12.3 efforts per year. A comparison of mean annual use levels by SCUBA households (101 to 125 abalone) with mean annual efforts (12.3) results in a catch per effort value of approximately 15 abalone per effort. However, personal interviews with SCUBA pickers in Sitka indicated that most were able to obtain their limit of 50 abalone each time they dove. This may indicate that annual use levels estimated by SCUBA pickers on the questionnaire were erroneously low. Catch calendars submitted by SCUBA pickers for 1981 and reported in Table 39, indicated an average catch per effort of 39 abalone, which is more reflective of interview data.

Catch calenders returned by Sitka residents at the end of the 1981 harvest year provided information on the annual harvest per household, number of harvest efforts and number of abalone harvested per effort for the three identified user groups (Table 39). The combination of the three basic harvest methods was not reported on any catch calendars, and was not considered as a user group in this tabulation.

TABLE 39
DESCRIPTION OF 1981 SITKA ABALONE HARVEST
FOR SHORE, SCUBA, AND SNORKEL PICKERS
(Based on tabulation of returned 1981 catch calendars.)

Harvest Method	Sample Size	Mean	Standard Deviation	Range
	Number of abalone harvested per household in 1981			
Shorepick	38	81.6	77.8	15-386
SCUBA	25	66.5	78.8	12-387
Snorkel	5*	188.0	128.2	54-400
	Number of harvest efforts during 1981			
Shorepick	38	1.8	1.1	1- 6
SCUBA	25	2.0	2.3	1-12
Snorkel	5*	3.6	3.2	1- 9
	Number of abalone harvested per effort in 1981			
Shorepick	69	43.7	31.5	0-150
SCUBA	46	38.3	19.8	0-100
Snorkel	20	54.9	32.8	12-150

* Small sample size may affect significance of observed trends.

Quantities of abalone harvested annually and reported on 1981 catch calenders (Table 39) by Sitka residents were lower than harvest estimates reported on the permit-survey questionnaires (Table 38). This is most likely due to a lack of catch calendar information for the period of January to mid-May, 1981. Personal interviews in Sitka and other harvesting communities (Part I) indicated that a portion of the early spring peak harvest period may not have been reported on returned catch calendars.

This limitation is particularly apparent for the SCUBA picking user group. Through interviews and the survey questionnaire; it was determined that the annual catches were generally higher for SCUBA pickers than for shorepickers. The conflicting trend depicted on Table 39 is probably due to the omission of 4 to 5 months of harvest data from the catch calendars.

Although annual harvest levels and annual effort values may be too low due to a lack of recorded catches prior to May, 1981, the catch per effort values are significant for three identified user groups (Table 39). Shorepickers reported harvesting an average 43.7 abalones per effort in 1981. Personal interviews with shorepickers from the Sitka area indicated that this average may be low. Long-time residents exhibited a similar pattern of use as described in the smaller Prince of Wales Island communities (Part I). In the past and presently in many shorepicking households the annual supply of abalone for a household was collected in 2 to 3 trips per year, usually in the spring and early

summer months. Trips were kept to a minimum because of the expense of traveling to areas considered good for abalone picking, Snorkel pickers generally followed the pattern of low tides that shorepickers depended on; however, their catch per effort was greater than the shorepickers due to greater range of area available to them for harvest. SCUBA pickers were generally able to collect the possession limit of 50 abalone during each dive. Because of the fewer environmental constraints on the SCUBA picker, the annual number of efforts was considerably higher.

The returned 1981 catch calendars from Sitka residents also provided partial information on the seasonal practices of the various abalone harvesting groups (Table 40). Since the permit system did not begin until the middle of May, data is lacking for the first four months of 1981.

Information gathered in personal interviews supported and supplemented the seasonal harvest practices described here. Shorepickers began picking in April, were most active in July and ended their season the first part of September. SCUBA pickers were also very active during July, but were able to harvest throughout the entire year. Many divers preferred the fall, winter, and spring months because of superior water clarity and lack of kelp growth during these months. Snorkel pickers generally followed the spring and summer harvest pattern of the shorepickers. The combination technique group used a variety of methods and usually picked abalone year-round.

TABLE 40
REPORTED SEASONS OF ABALONE HARVESTING EFFORTS
BY PERMIT HOLDERS IN SITKA (1981)
(Data collected from returned 1981 catch calendars;
no data avaliable for January to mid-May, 1981.)

Month	Shorepick	SCUBA	Snorkel	Combined Techniques
January	NA	NA	NA	NA
February	NA	NA	NA	NA
March	NA	NA	NA	NA
April	NA	NA	NA	NA
May	4	0	3	0
June	8	1	2	0
July	29	24	7	3
August	25	5	6	3
September	2	5	0	1
October	0	2	0	0
November	0	2	0	0
December	0	0	0	4
TOTAL:	68	39	18	11

NA: Data not available.

Harvest data for abalone harvesters who were not residents of Sitka were not included in previous tabulations and descriptions, but are summarized briefly in Table 41. Non-resident shorepickers had been harvesting abalone in Southeast Alaska for an average of 5.0 years; SCUBA pickers averaged 1.0 year previous Southeast harvesting experience.

Non-resident shorepickers harvested an average of 51 to 75 abalone per year and shared 1 to 25 of these abalone with other households. The mean number of harvest efforts per year was 2.1 for shorepickers.

Non-resident SCUBA pickers harvested an average of 1 to 25 abalone

per year and shared 1 to 25 with other households. The mean number of harvest efforts per year was 1.8 for this group.

TABLE 41
SUMMARY OF HARVEST DATA FOR NON-SITKA RESIDENTS (1981)
(Alaskan [non-Sitka] and out-of-state pickers combined.)

Harvest Data	Shorepickers (n=17)	SCUBA pickers (n=23)
Mean Years Harvesting Experience in Southeast Alaska:	5.0	1.0
Mean Range of Number of Abalone Used by Household per Year:	51-75	1-25
Mean Range of Number of Abalones Shared:	1-25	1-25
Mean Number of Annual Harvest Efforts:	2.1	1.8

Areas used by Sitka residents for harvesting abalone were documented through personal interviews and by means of the catch calendar. It is important to realize that this information was collected from a sample group which may reflect a small percentage of non-commercial abalone harvesters from Sitka. Harvest sites identified during interviews with ten households and summarized from approximately sixty 1981 catch calendars are depicted in Figure 30.

The majority of the non-commercial sites were within the area presently closed to commercial fishing of abalone, with the exception of

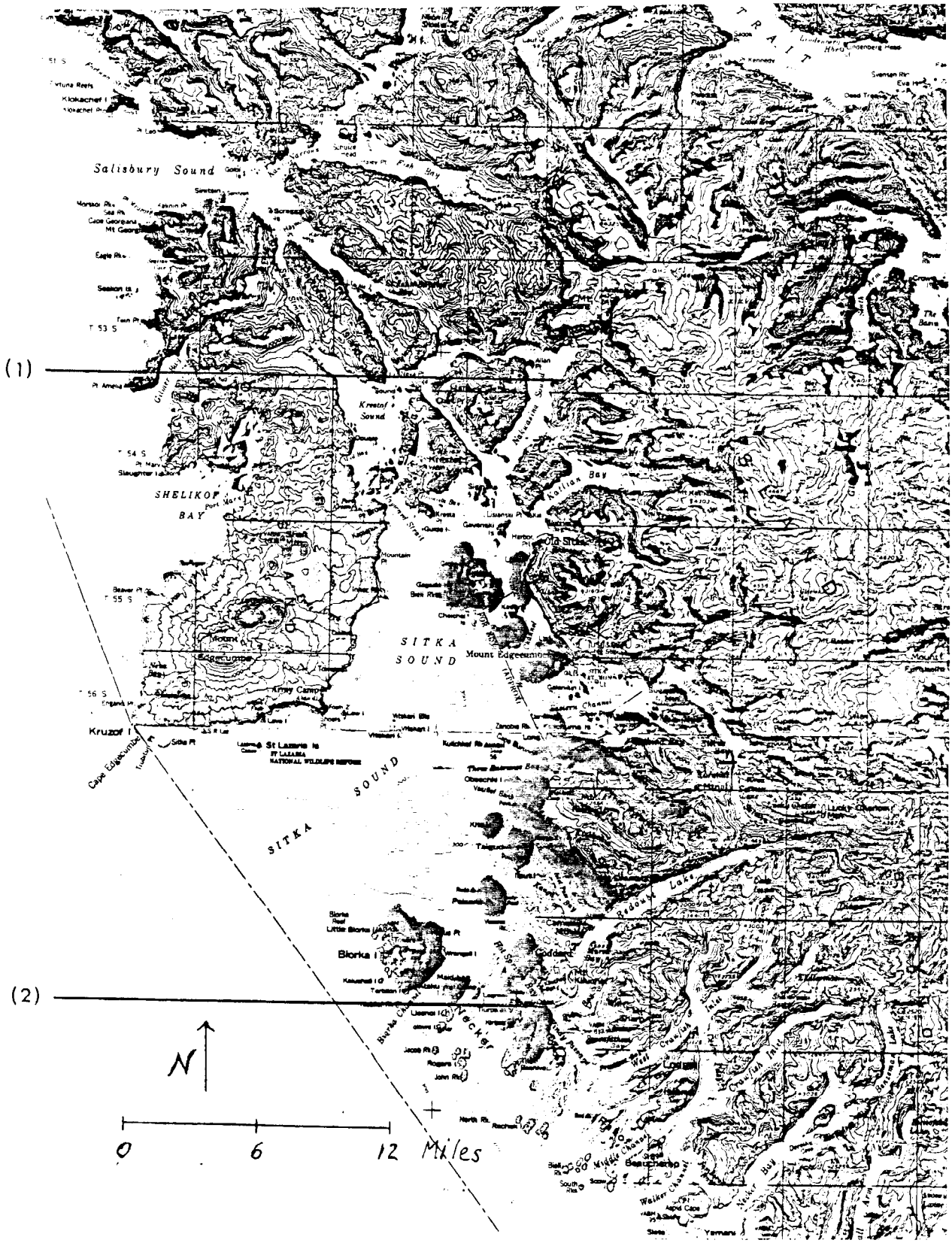


FIGURE 30
ABALONE HARVEST SITES, SITKA (1981)
(Harvest sites are identified by shaded areas. Areas south of line 1 and north of line 2 are closed by regulation to commercial harvesting.)

sites several miles south of Dorothy Narrows (Windy Passage area) and an area on the northern shore of Kruzof Island. Sitka was unique compared to the other four communities studied in that abalone could be found on the shoreline near roadsides and close to town. Generally, these areas were no longer considered good places to get abalone but smaller numbers of abalone are still taken close to town. Most people traveled 5 to 20 miles south and west of the community by skiff or boat to abalone sites.

Ketchikan

The sample of respondents who participated in the Ketchikan permit-survey was limited to forty-five households. Information was obtained from surveys completed at the time of permit application and surveys mailed to permitted households. Additional information was gathered from personal interviews conducted with ten households from various user groups.

Only four surveyed individuals (9 percent of the total sample) were not Ketchikan residents. These included one SCUBA picker from Juneau, two SCUBA pickers from the state of Washington, and one shorepicker from Washington. Due to the extremely low occurrence of non-resident permittees, these individuals are not included in the data presentation and analysis which follows.

Forty-one households (91 percent of the total sample) who were residents of Ketchikan and were found to use shorepicking, SCUBA picking,

snorkel picking, or a combination of these methods to obtain abalone (Table 42). "Shorepicking only" was the most commonly used method with 73 percent of the sample using this technique solely. Shorepicking was used alone or in combination with SCUBA and snorkel techniques by 93 percent of the permitted residents. "SCUBA picking only" was utilized by only 7 percent of the sample. However, data collected during interviews suggested that Ketchikan may have a more active diving community than was indicated by these survey results. Twelve percent of the resident sample was found to combine shorepicking and SCUBA picking. Snorkeling techniques were not used as a sole method of harvest, but 7 percent of the resident permittees combined snorkeling and shorepick methods. The total proportion of households that combined more than one technique to harvest abalone amounted to 20 percent of the sample. There were no commercial abalone fishermen in the groups surveyed.

TABLE 42
ABALONE HARVEST METHODS USED
BY KETCHIKAN-RESIDENT PERMIT HOLDERS (1981)
(n=41)

Harvest Methods		Number of Respondents	Percent of Respondents
Shorepicking		30	73
SCUBA picking		3	7
Snorkel picking		0	0
Combined Techniques		8	20
Shorepick/SCUBA:	5		
Shorepick/Snorkel:	3		

The Household

Household sizes among the three identified user groups averaged

between approximately 3 and 4 members per household. Age distribution within the household was similar for the various user groups, although the shorepicking user group was the only one to have residents over fifty-five years of age (Table 43).

TABLE 43
AVERAGE HOUSEHOLD SIZE AND AGE DISTRIBUTION
FOR HOUSEHOLDS SURVEYED IN KETCHIKAN (1981)
(n=41)

	Shorepick	SCUBA	Combined Techniques
Number of Respondents:	30	3*	8
Range of Household Size:	1-7	2-4	2-9
Mean Household Size:	3.8	2.7	4.4
Mean Number of Persons per Age Range:**			
18 years	1.5	1.0	1.6
18-55 years	1.9	2.0	2.8
55 years	0.4	0.0	0.0

* Small sample size may affect significance of observed trends.

** No response in an age range was interpreted as "zero" persons in that age range.

Members of the shorepicking user group had a longer average tenure of residency in Ketchikan (21.4 years) than did members of the other groups (13 to 14 years). In all user groups, over one-fourth of the members had resided in Ketchikan for less than five years (Table 44).

TABLE 44
YEARS OF RESIDENCY IN KETCHIKAN FOR HEADS OF HOUSEHOLDS (1981)
(n=41)

	Shorepick	SCUBA	Combined Techniques
Number of Respondents:	30	3*	8
Range of Years of Residency:	1-52	5-26	1-35
Mean Number of Years of Residency:	21.4	13.3	13.8
Standard Deviation:	14.7	11.2	12.5
Mode:	0-5	0-5	0-5
Percent of Sample Represented by Mode:	23	33	25

* Small sample size may affect significance of observed trends.

Years of experience harvesting abalone in Southeast Alaska are reported in Table 45. The shorepicking group reported the greatest range of years of experiences (0-50 years) as well as the highest mean value of 12.0 years. The combined techniques group averaged 9.4 years, and the SCUBA group averaged 3.0 years of experience, a value possibly affected by the small sample size. Fifty to seventy-five percent of the shorepickers and combined techniques user group were new to abalone harvesting in the last five years.

TABLE 45
NUMBER OF YEARS OF ABALONE HARVESTING EXPERIENCE
IN SOUTHEAST ALASKA AMONG HEADS OF HOUSEHOLDS IN KETCHIKAN (1981)
(n=40)

	Shorepick	SCUBA	Combined Techniques
Number of Respondents:	30	3*	7
Range of Years of Experience:	0-50	1-6	1-31
Mean Number of Years of Experience:	12.0	3.0	9.4
Standard Deviation:	13.6	---	9.9
Mode:	0-5	---	0-10
Percent of Sample Represented by Mode:	50	---	75

* Small sample size may affect significance of observed trends.

Of the Ketchikan user groups surveyed, 87 to 100 percent had at least one household member employed full-time (Table 46). From one-third to more than one-half of the households in each user group had one or more seasonally employed member. Retired or unemployed household members occurred in approximately one-fourth of the shorepicking and combined techniques households.

TABLE 46
EMPLOYMENT STATUS OF HOUSEHOLD MEMBERS
SURVEYED IN KETCHIKAN (1981)
(n=41)

	Shorepick	SCUBA	Combined Techniques
Number of Reporting Households:	30	3*	8
Percent of Households with one or more Full-time Workers:	87	100	100
Percent of Households with one or more Part-time/Seasonal Workers:	53	33	63
Percent of Households with one or more Unemployed Adults:	27	0	38

* Small sample size may affect significance of observed trends.

The mean annual income range for households surveyed in Ketchikan averaged over $30,000 for both the shorepickers and combined techniques user groups (Table 47). The average income for SCUBA pickers was reported to be slightly lower ($20-30,000 per year), possibly because of the small sample size. Within each group, one-half to three fourths of the members fell into the over $30,000 income category. Income levels reported on the survey questionnaire appear to be high compared to levels documented during personal interviews. However, for each methodology, no significant difference was noted between the income levels of the various user groups.

TABLE 47
ANNUAL INCOME RANGES FOR HOUSEHOLDS SURVEYED IN KETCHIKAN (1981)
(n=41)

	Shorepick	SCUBA	Combined Techniques
Number of Respondents:	30	3*	8
Median Income Range:	over $30,000	$20-30,000	over $30,000
Mode:	over $30,000	$20-30,000	over $30,000
Percent of Sample Represented by Mode:	57	67	88

* Small sample size may affect significance of observed trends.

The Harvest

Quantities of abalone used annually by a household and quantities distributed each year to other households were estimated by respondents on the permit-survey questionnaire (Appendix C). Respondents were asked to pick a quantity range (in increments of 25) which best represented their use level. Table 48 summarizes these responses by user group and also presents the estimated number of harvest efforts per year for each group. Harvest quantities and effort levels in Table 48 do not depict actual levels but were estimates of "usual" values based on previous years experiences.

TABLE 48
KETCHIKAN ABALONE HARVEST CHARACTERISTICS
LISTED BY HARVEST METHOD
(Based on tabulations of 1981 permit survey
and mailout survey questionnaire.)

Harvest Method	Number of Respondents	Mean	Mode	Percent of Sample Represented by Mode
Range of quantities of abalone used by household per year				
Shorepick	30	51-75	26-50	27
SCUBA	3*	51-75	1-25	67
Combined Techniques	8	101-125	126-150	38
Range of quantities of abalone shared per year				
Shorepick	30	1-25	1-25	19
SCUBA	3*	1-25	1-25	67
Combined Techniques	8	26-50	1-25	38
Number of harvest efforts per year				
Shorepick	24	2.8	2.0	37
SCUBA	1*	10.0	10.0	100
Combined Techniques	8	7.9	3.0	25

* Small sample size may affect significance of observed trends.

Users who harvested abalone by utilizing a combination of techniques had the greatest catch success. The average number of efforts per year for this group (7.9 per year) was also higher than the shorepickers, who averaged 2.8 efforts per year. Shorepickers estimated that they took less abalone on the average than did the combined techniques user group, and they also distributed less to other households. SCUBA respondents were too few to give significant patterns of harvest levels compared to the other groups.

Harvest information received for 1981 was very limited; catch calendars were returned by only eight shorepickers and one snorkel picker. The average number of abalone reported by the shorepicker group from the catch calendar was lower than the estimated information obtained from the survey questionnaire (Table 49). It is difficult to detect other trends or patterns from the catch calendar information because of the low sample size.

Ten personal interviews were conducted with households of known abalone users in Ketchikan to provide information regarding user techniques and patterns of harvesting. Shorepickers were found to harvest 2 to 3 times annually, generally during the minus 2 (or lower) tides which occur in the months of April through August. Annual harvests for shorepickers ranged from 75 to 400 abalone per year. Most shorepickers who had been active for the past 5 to 10 years stated that their catch success had declined during the past few years.

TABLE 49
DESCRIPTION OF 1981 KETCHIKAN ABALONE HARVEST
FOR SHOREPICKERS AND COMBINATION PICKERS
(Based on tabulation of returned 1981 catch calendars.)

Harvest Method	Sample Size	Mean	Standard Deviation	Range
Number of abalone harvested per household in 1981				
Shorepick	8	72.3	88.6	0-222
Combined Technique	1*	50.0	---	---
Number of harvest efforts during 1981				
Shorepick	8	1.5	0.8	1-3
Combined Technique	1*	1.0	---	---
Number of abalone harvested per effort				
Shorepick	12	48.2	45.6	0-145
Combined Technique	1*	50.0	---	---

* Single individual responded in this category; reported catch was taken with snorkeling harvest technique.

SCUBA pickers reportedly dove for abalone year-round depending on the weather and available time; the degree of minus tide was not a factor in the timing of dives. Efforts per year ranged from 5 to 7 and annual catches averaged approximately 400 abalones. SCUBA pickers have not experienced decreased catch success over the past few years but a few individuals mentioned that abalone were more difficult to find in recent years.

Snorkel pickers harvested 4 to 5 times per year, generally during April through September. While a low tide was preferred by the snorkel pickers, they would often pick at any level of tide. Annual harvest

levels were estimated at 300 to 400 for the snorkel pickers interviewed.

Areas used by Ketchikan residents for harvesting abalone were documented through personal interviews with 10 households. This sample group may reflect a small percentage of non-commercial abalone harvesters from Ketchikan. Therefore, areas identified by these users should not be considered to represent all the sites currently used by Ketchikan abalone harvesters.

Most of the sites identified were west and southwest of Ketchikan at locations which are influenced by wave action from Dixon Entrance and Clarence Strait (Figure 31). The majority of the sites were within the area presently closed to the commercial fishing of abalone, with the exception of the Percy Islands and Duke Islands. The southern boundary of the closed area also transects a site used by non-commercial pickers on the southern portion of Annette Island. Most people traveled 15 to 30 miles southwest of Ketchikan to find rocky habitat that supported abalone populations. One household mentioned that they harvested at a site north of Ketchikan. Information on areas used by residents of Metlakatla was not avaliable to the researcher at the time of this report.

Discussion: Part II

This section summarizes the findings of research conducted in Sitka and Ketchikan and compares household data, harvest characteristics, and

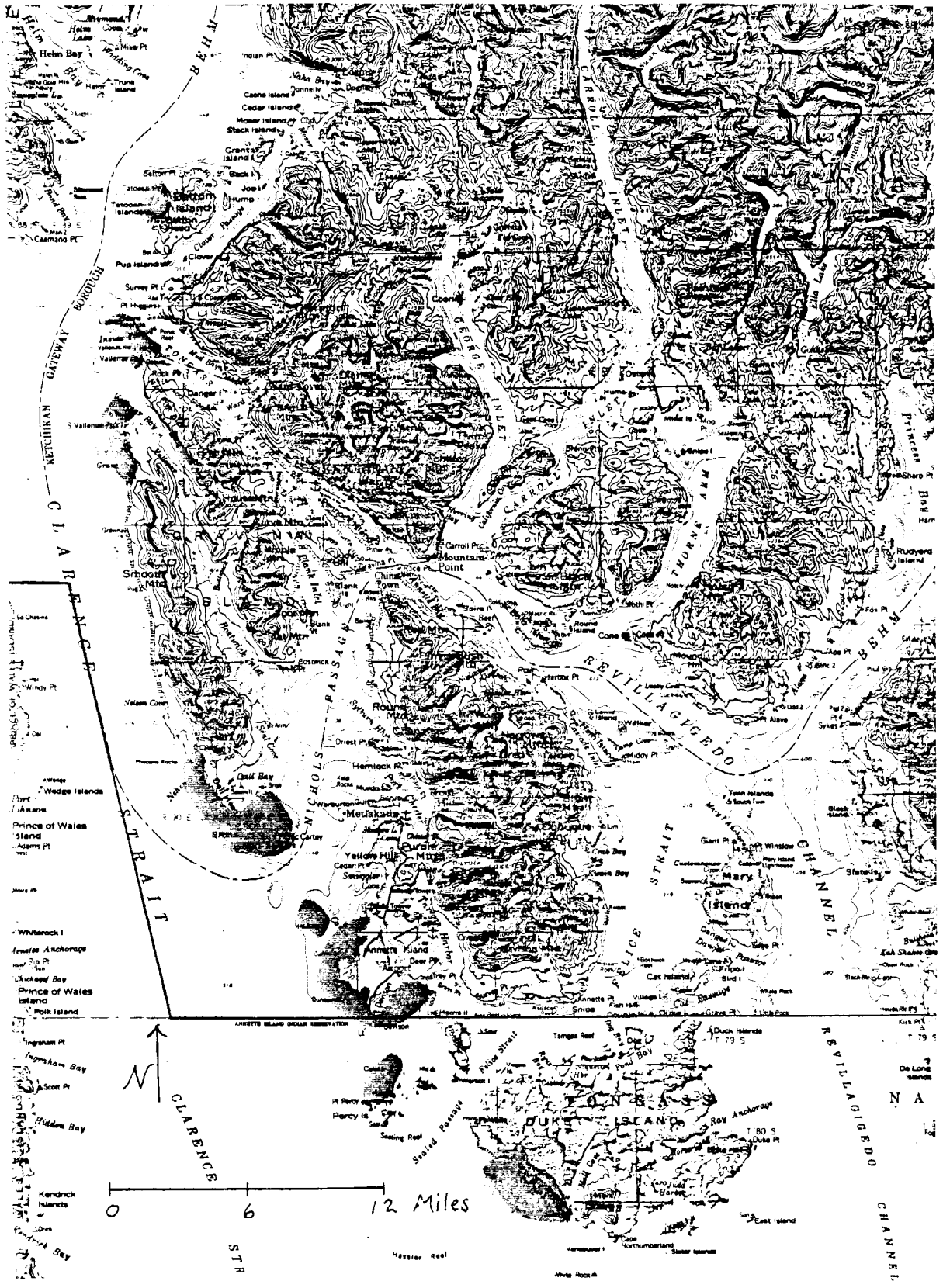


FIGURE 31
ABALONE HARVEST SITES, KETCHIKAN (1981)
(Harvest areas are identified by shaded areas. Areas north and east of the solid line are closed by regulation to commercial harvesting.)

harvest sites among the various user groups. Similarities, as well as differences in procurement and use patterns between communities and between user groups in each community will be described. Additionally, the researcher's perceptions of community concerns and issues will be presented.

Abalone User Groups

The permit-survey determined that a small percentage of the permit-holders in both communities were not residents of the area. Many of these non-residents were from other parts of Alaska and traveled to Sitka and Ketchikan to take advantage of the excellent SCUBA diving opportunities that existed near these communities and picked abalone while diving. Most of the out-of-state harvesters gathered from the shoreline during low tides.

The study focused on the survey respondents who were residents of the communities of Sitka and Ketchikan. Information was collected to compare household and harvest characteristics between the user groups of these local residents. As a result of surveys and interviews, the primary user groups were defined as 1) shorepickers; 2) SCUBA pickers; 3) snorkel pickers; and 4) individuals who combined two or all of these practices. Shorepicking was the dominant historical and contemporary method for abalone harvesting in both communities, although the advent of SCUBA techniques during recent years was also evident in responses by the

sample group. Snorkel gear was used less frequently, but was effectively combined with shorepicking techniques by some individuals.

Household Characteristics

The data show that the various user groups cannot be meaningfully distinguished on the basis of the household data collected during the survey process. Total household size and age distributions were not significantly different among the groups, although it is notable that in both communities individuals over the age of 55 years were only found in shorepicking households.

The fact that long-time community members were usually shorepickers relates to the fact that the length of local residency and years of harvesting experience had bearing on the harvest method used. The shorepicking group, on the average, had greater years of residency and harvesting experience than the other user groups. Although individuals with less than 5 years of residency and harvesting experience were represented in all user groups, they occurred in greatest proportion in the SCUBA picking group.

Employment status and annual income do not distinguish the user groups from one another. Annual household income levels generally exceeded $30,000, and did not vary in a manner which was related to procurement patterns. Most households surveyed had at least one member with full-time employment status.

The Harvest

Opportunities for abalone harvesting were influenced by the procurement method. Shorepicker efforts were scheduled under the constraints of environmental considerations, including weather and the occurrence of daylight minus tides, and the availability of time during appropriate harvesting conditions. Because of these limitations, shorepickers were found to have fewer harvest efforts per year than the other user groups.

Unlike the shorepickers who were limited to harvesting during the minus tides occurring in the spring and summer months, SCUBA pickers were able to harvest abalone year-round regardless of the tides if the weather permitted diving in an area. SCUBA pickers averaged more efforts per year than shore and snorkel pickers. The number of efforts of the snorkel picking and combined techniques user groups fell between those of shorepickers and SCUBA divers.

Abalone pickers utilizing SCUBA, snorkel, and combined techniques generally harvested more abalone per year than did shorepickers, possible because of the longer practical season of harvest for these methods. The SCUBA and snorkel diver can harvest from a wider area over a longer season than the shorepicker. Quantities of abalone distributed to other households by the SCUBA and snorkel pickers were generally larger because of the larger annual catches by these groups.

Many long-term active harvesters from all user groups observed and commented on a decline of available abalone in recent years. In 1981 many shorepickers stated that they found it difficult to find abalone from the shoreline and expressed a concern over the health of abalone populations. Most SCUBA pickers were able to find abalone and did not feel that availability was limiting their catch. Several individuals who used to shorepick stated they now ask their SCUBA diving friends to collect abalone for them because of recent, unsuccessful attempts to find abalone along the shoreline.

Harvest areas used by the various user groups were found to overlap. The majority of the areas identified as harvest sites by Sitka and Ketchikan harvesters were included in the areas closed by regulation to commercial abalone fishing. However, the boundary lines of the closed areas transected and excluded several areas identified by residents (Figures 30 and 31). Generally, most abalone harvesting took place within 30 miles of each community.

Concerns and Issues Identified by the Communities

The following is a summary of the major concerns expressed by Sitka and Ketchikan abalone harvesters.

1) Shorepickers were concerned about the population of abalone in the area and the increasing difficulty they experienced in

harvesting abalone along the shoreline. Many felt the recent commercial harvesting was the main cause of their decreasing catch success. SCUBA pickers generally commented on a decrease of abundance of abalone but did not express a concern over the population health as did the shorepickers.

2) Many residents felt that regulation and enforcement of the commercial abalone fishery were inadequate. Numerous incidences of commercial abalone harvesting in closed areas were reported by these residents. Most people felt that area closures were difficult to enforce unless adequate "buffer zones" were established to separate commercial use areas from non-commercial harvest areas.

3) Within the small sample of residents contacted, most abalone pickers in all user groups felt the closed areas were sufficient in size and location but saw the need for greater separation from the commercial users, citing observed violations of the closed areas by commercial divers.

4) The regulated possession limit of 50 abalones was thought to be inappropriate and inefficient by long-term shorepickers who harvested only two to three times per year and often shared their catch with a large family group.

5) Concern was expressed over increasing sightings of sea otter

herds to the north and south of Sitka Sound and the effects they may have on the availability of abalone for commercial and non-commercial use.

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APPENDICES

Interviewer:_____ Community:_____
Date:_____ Interview #:_____

INTERVIEW DATA SHEET

HARVEST

1. Harvest Method: Shorepick SCUBA Snorkel

2. Seasons: J F M A M J J A S O N D

3. Tides: Present 0 -1 -2 -3
   Past 0 -1 -2 -3

4. Means: Fishing boat Skiff Hike Car Canoe/kayak

5. Size (inches): Present 3 3.5 4 4.5 5 5.5
   Past 3 3.5 4 4.5 5 5.5

	1981	1980	(5 yr) 1977	(10 yr) 1972
6. Number abalone Harvest/year				
7. Number of efforts/year				
8. Number hours/ effort				
9. Number abalone harvested/effort				

10. Number of years in S.E. Alaska harvesting abalone: _____

USES

11. Sharing - number family members not in household: Com. /Outside

12. Sharing - number individuals (non-family) outside household: Com. /Out.

13. Non-food uses? (Indicate past and present uses)

14. Number or percent of abalone used in the following ways:

Fresh _____ Frozen _____ Smoked _____

Canned _____ Pickled _____ Other _____

15. Means of preparation: Main course Chowder Fried Rice

Other _____

Number abalone eaten per person per meal? _____

Number of meals including abalone per year? _____

Months abalone are served in meals: J F M A M J J A S O N D

HOUSEHOLD

16. Number of years lived in this community: _____

17. Other communities in S.E. Alaska and number of years in each:

_____ _____ _____

_____ _____ _____

18. Members of household in each age group:

< 18 _____ 18 - 55 _____ > 55 _____

Total in household: _____

19. Employment: Full-time (including self-employed)

Part-time/Seasonal

Unemployed

20. Annual income: $3,000-6,000 $15,000-20,000

$6,000-10,000 $20,000-30,000

$10,000-15,000 $30,000-

21. When did you start abalone picking?

How did you learn?

Have you introduced other people to abalone harvesting? Who?

Do your children go abalone harvesting with you?

In applying a subsistence priority the Boards will provide for onservation and development of Alaska's fish and game resources pursuant o the following procedures:

(a) Each Board will assess the biological status of fish or game esources and determine whether a surplus may be harvested during a egulatory year consistent with the conservation and development of the esources on the sustained yield principle and compatible with the ublic interest;

(b) Each Board will identify subsistence uses of fish or game esources, recognizing that subsistence uses are customary and traditional ses by Alaska residents for food, shelter, fuel, clothing, tools, ransportation, making handicrafts, customary trade, barter, and sharing, in rural communities and bush areas where such uses have been made in the past. This policy recognizes customary and traditional uses for subsistence purposes are generally identified as characteristics of rural ways of life, but that all users meeting the customary and traditional use criteria must be considered.

Customary and traditional uses by Alaska residents shall be identified by reference to the following criteria:

(1) a long-term, consistent pattern of use (excluding interruption by circumstances beyond the users' control such as regulatory prohibitions);

(2) a use pattern recurring in specific seasons of each year;

(3) a use pattern consisting of methods and means of harvest which are characterized by efficiency and economy of effort and cost, and conditioned by local circumstances;

(4) the consistent harvest and use of fish or game which is near or reasonably accessible from the user's residence;

(5) the means of handling, preparing, preserving, and storing fish or game which has been traditionally used by past generations (but not excluding recent technological advances where appropriate);

(6) a use pattern which includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation;

(7) a use pattern in which the hunting or fishing effort or the products of that effort are distributed or shared among others within a definable "community" of persons, including customary trade, barter, sharing, and gift-giving. Customary trade may include limited exchanges for cash, but does not include significant commercial enterprises. A "community" for purposes of subsistence uses may include specific villages or towns, with a historical preponderance of subsistence users and in addition encompasses individuals, families, or groups who in fact meet the criteria described in this policy;

(8) a use pattern which includes reliance for subsistence purposes upon a wide diversity of the fish and game resources of an area, and in which that pattern of subsistence use provides substantial economic, cultural, social, and nutritional elements of the subsistence user's life.

After identifying subsistence uses based upon these criteria, each Board will determine the approximate amount of fish or game necessary to provide fully for opportunities to engage in these customary and traditional uses.

(c) Each Board will adopt regulations that provide an opportunity for the subsistence taking of fish or game resources in amounts sufficient to provide for the customary and traditional uses identified in paragraph (b) and consistent with sound conservation and management practices. In no instance may such taking jeopardize or interfere with the maintenance, on a sustained yield basis, of a specific fish stock or game population.

(d) These regulations may also provide an opportunity for non-subsistence uses of the resource, to the extent that such uses do not jeopardize or interfere with the conservation and development of fish or game resources, on a sustained yield basis, or with the opportunity for taking these resources for customary and traditional subsistence uses as provided in (c) above.

(e) When circumstances such as increased numbers of users, weather, predation, or loss of habitat may jeopardize the sustained yield of a fish stock or game population, each Board will exercise all practical options for restricting non-subsistence harvest before subsistence uses are restricted. If all available restrictions for non-subsistence uses have been implemented and further restrictions are needed, each Board will reduce the take for subsistence uses in a series of graduated steps, by giving maximum protection to subsistence users who (1) live closest to the resource, (2) have the fewest available alternative resources, and (3) have the greatest customary and direct dependence upon the resource. In no event, however, will a Board allow uses which will jeopardize or interfere with the conservation and management of fish stocks or game populations on a sustained yield basis.

Dear Abalone Fisherman:

Your cooperation in answering these questions will be appreciated. The information will be used by ADF&G in managing the abalone fishery and in maintaining healthy abalone populations.

Please complete the survey and drop it in the box provided.

Thank you !

(Please do not sign this form)

1. What town or community do you live in? _____
2. How long have you lived there? _____
3. What other towns or communities have you lived in and how long did you live in those communities?

Alaskan community or other state Town or Community	Years lived there
_____	_____
_____	_____
_____	_____

4. Including yourself, how many members are in your household? _____
5. How many family members not living in your household share in the use of your abalone harvest? _____
6. How many non-family members not living in your household share in the use of your abalone harvest? _____
7. Including yourself, how many members of your household are: (enter number of each)

   Less than 18 years old? _____
   18 years to 55 years old? _____
   More than 55 years old? _____

8. How many members of your household are: (enter number of each)
   Employed full time (including self-employed) _____
   Employed part-time or seasonally (including self-employed) _____
   Retired or unemployed _____

9. Estimate your household gross annual income: (Check one)
   A. [ ] $0-3,000
   B. [ ] $3,001-6,000
   C. [ ] $6,001-10,000
   D. [ ] $10,001-15,000
   E. [ ] $15,001-20,000
   F. [ ] $20,001-30,000
   G. [ ] $30,000 or above

10. What method do you use to pick abalone? (Check one)
    A. [ ] Hand picking
    B. [ ] Scuba/Diving
    C. [ ] Other (Describe) _____

11. How many years have you harvested abalone in Southeast Alaska? _____
12. How many abalone does your household use each year? (Check one)

    A. [ ] 1-25
    B. [ ] 26-50
    C. [ ] 51-75
    D. [ ] 76-100
    E. [ ] 101-125
    F. [ ] 126-150
    G. [ ] 151-175
    H. [ ] More than 175

OVER

A. [ ] 1-25 C. [ ] 51-75 E. 101-125 G. 151-175
B. [ ] 25-50 D. [ ] 76-100 F. 126-150 H. More than 175

14. What other fish do you catch in Southeast Alaska for subsistence uses? (Check those that apply)
[ ] None
[ ] King (Chinook) Salmon
[ ] Red (Sockeye) Salmon
[ ] Coho (Silver) Salmon
[ ] Pink (Humpy) Salmon
[ ] Chum (Dog) Salmon
[ ] Hooligan (Eulackon)
[ ] Bottom fish (List types):_____

[ ] Freshwater fish (List types):_____

[ ] Shellfish (List types):_____

[ ] Other (List types):_____

15. What other subsistence activities do you participate in? (Check those that apply).
[ ] None
[ ] Gather beach greens
[ ] Gather berries
[ ] Hunt moose
[ ] Hunt deer
[ ] Hunt marine mammals (List)_____

[ ] Hunt birds (List)_____

[ ] Hunt other animals (List)_____

[ ] Other subsistence activities (Describe)_____

16. Do you have a commercial abalone permit? (Check one) [ ] Yes [ ] No

17. Other than you does anyone in your household have a commercial abalone permit? (Check one) [ ] Yes [ ] No

18. If you harvest abalone commercially, and keep abalone from your commercial harvest for subsistence use, about how many do you keep each year?
A. [ ] 0-25 C. [ ] 51-75 E. [ ] 101-125 G. [ ] 151-175
B. [ ] 26-50 D. [ ] 76-100 F. [ ] 126-150 H. More than 175

19. Estimate number of pounds harvested by you commercially_____, sold in southeast? Shipped out of state?_____

20. How many times do you subsistence pick each year?_____

ALASKA DEPARTMENT OF FISH AND GAME
Subsistence Fishery Permit Survey

1. What method do you use to pick abalone? (Check one)
   A. [ ] Shorepicking
   B. [ ] Scuba Diving
   C. [ ] Snorkel
   D. [ ] Other (Describe)_____

2. How many years have you harvested abalone in Southeast Alaska?_____

3. How many times do you pick ablone per year?_____

4. How many abalone does your household use each year? (Check one)

A.[ ] 0-50	C.[ ] 100-150	E.[ ] 200-250	G.[ ] 300-350
B.[ ] 50-100	D.[ ] 150-200	F.[ ] 250-300	H.[ ] 350+

5. How many abalone do you distribute each year to people not in your household? (Check one)

A. [ ] 1-50	C. [ ] 100-150	E. 250-300	G. 350-400
B. [ ] 50-100	D. [ ] 150-200	F. 300-350	H. More than 400

6. When do you harvest Abalone? [ ] Winter [ ] Spring [ ] Summer [ ] Fall

7. List general areas where you gather abalone. _____

_____

8. What means of transportation do you use to get to Abalone Areas?

   [ ] Skiff [ ] Fishing Boat [ ] Car [ ] Hike [ ] Canoe/Kayak [ ] Other_____

9. What town or community do you live in? _____

10. How long have you lived there? _____

11. What other towns or communities have you lived in and how long did you live in those communities?

Alaskan community or other state Town or Community	Years lived there
_____	_____
_____	_____
_____	_____

12. Including yourself, how many members of your household are: (enter number of each)

    Less than 18 years old? _____
    18 years to 55 years old? _____
    More than 55 years old? _____

13. Including yourself, how many members are in your household?_____

14. How many family members not living in your household share in the use of your abalone harvest? _____

15. How many non-family members not living with you share in the use

16. How many members of your household are: (enter number of each)
Employed full time (including self-employed)_____
Employed part-time or seasonally (including self-employed)_____
Retired or unemployed _____

17. Estimate your household gross annual income: (Check one)
A. [ ] $0-3,000
B. [ ] $3,001-6,000
C. [ ] $6,001-10,000
D. [ ] $10,001-15,000
E. [ ] $15,001-20,000
F. [ ] $20,001-30,000
G. [ ] $30,000 or above

COMMERCIAL ABALONE FISHING

18. Do you have a commercial abalone permit? (Check one) [ ] Yes [ ] No

19. Other than you does anyone in your household have a commercial abalone permit? [ ] Yes [ ] No

20. If you harvest abalone commercially, and keep abalone from your commercial harvest for sobsistence use, about how many do you keep each year?
A.[ ] 0-50
B.[ ] 50-100
C.[ ] 100-150
D.[ ] 150-200
E.[ ] 200-250
F.[ ] 250-300
G.[ ] 300-350
H.[ ] 350+

21. Estimate the number of pounds harvested by you commercially_____,
sold in Southeast?_____

THANK YOU FOR YOUR COOPERATION

PLEASE (CHECK) RESOURSES THAT ARE TAKEN FOR HOME USE

GATHERING FROM SEA:	DO YOU GATHER THESE? (CHECK ONES USED)	HAVE YOU EVER GATHERED THESE? (CHECK ONES USED	TOTAL
BUTTER CLAMS			
GOEY DUCKS			
RAZOR CLAMS			
HORSE CLAMS			
COCKLES			
SEA URCHINS			
SEA CUCUMBERS			
SCALLOPS (ROCK)			
SEAWEED:(BLACK OR RIBBON)			
GUMBOOTS			
KING CRAB			
TANNER CRAB			
DUNGENESS CRAB			
OCTOPUS			
SHRIMP			
OTHER:			
HERRING SPAWN ON (KELP)			
FISHING:			
KING SALMON			
SILVER SALMON (COHO)			
RED SALMON (SOCKEYE)			
CHUM SALMON (DOG)			
PINK SALMON (HUMPY)			
HERRING			
HALIBUT			
STEELHEAD TROUT			
CUTTHROUT TROUT			
LINGCOD			
TOM COD			
BLACK COD			
ROCKCOD			
DOLLY VARDEN			
SALMON EGGS			
RED SNAPPER			
HOOLIGAN			
OTHER:			
HUNTING FOR FOOD: DUCKS			
MALLARDS			
RUDDY (BLUEBILLS)			
COMMON MERGANSER (SAWBILL)			
CANADA GEESE			
PTARMIGAN			
SPRUCE HENS (GROUSE)			
PINTAIL			
TEAL (GREEN WING)			
OTHER:			

(TURN PAGE OVER)

TRAPPING:	DO YOU GATHER THESE (CHECK ONES USED)	HAVE YOU GATHERED THESE? (CHECK ONES USED)	TOTAL PER YEAR
MINK			
OTTER			
BEAVER			
WOLF			
MARTEN			
WEASEL			
OTHER:			
GATHERING FROM LAND:			
ROSEHIPS			
STRAWBERRY			
CRANBERRY			
BLUEBERRY			
RASPBERRY			
CLOUDBERRY			
THIMBLEBERRY			
HUCKLEBERRY			
SMILINGBERRY			
SALMON BERRY			
ELDERBERRY			
GRAY CURRANTS			
WILD RHUBARB			
WILD CELERY			
GOOSETONGUE			
MUSHROOMS			
BEACH ASPARAGUS			
SWAMP TEA			
SEA GULL EGGS			
FIREWEED			
CRAB APPLE			
OTHER:			
ANIMALS:			
DEER			
BROWN BEAR			
BLACK BEAR			
HARBOR SEAL			
OTHER:			