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BROWN BEAR/HUMAN ENCOUNTERS  
IN REMOTE FIELD CAMPS ON THE ALASKA PENINSULA,  
1989-1992, WITH NOTES ON HAZING EFFECTIVENESS



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## ABSTRACT

Seasonal field camps on the Alaska Peninsula in 1989-1992 enabled documentation of 648 human/brown bear interactions, with no hostile encounters. Visual observations of bears comprised 68% of the interactions and required no bear hazing. The remaining 155 interactions required use of hazing techniques including waving/shouting, cracker shells, flares, flare/cracker shell combinations, shots in the air, rubber slugs, loud music, and 4-wheeler noise with 65% overall avoidance effectiveness. Variations in voltage were determined to cause no difference in electric fence effectiveness of deterring brown bears. Sex/age distribution of interactive bears of both those requiring hazing and those not requiring hazing were found to consist mostly of subadults. The effects of bear habituation, habitat type, time of day, and interaction distances were also evaluated relative to hazing need and success. Personal preferences with hazing methods showed that shout/talk/wave and shots fired in the air were used most at ranges of 51-100 yards, flares were used most at ranges of 51-300 yards, and cracker shells and rubber slug/bird shot were used most at ranges of less than 25 yards. All the above methods had high success when used within these ranges.

## INTRODUCTION

In 1980, the Alaska National Interest Lands Conservation Act (Public Law 96-487, 94 Stat. 2371) identified brown bears (*Ursus arctos horribilis*) as one of the primary species requiring management and conservation on the Alaska Peninsula/Becharof National Wildlife Refuge Complex. The Alaska Peninsula has been highlighted to contain perhaps the largest remaining parcel of prime brown bear habitat unaltered by man (Glenn and Miller 1980). However, the Alaska Peninsula bear population is also one subject to intensive hunting pressure under a system of alternate year hunting seasons, increasing demands to provide bear viewing opportunities for the public, and threats of habitat alteration from proposed oil and gas corridors.

The 1989 T/V Exxon Valdez oil spill provided a unique opportunity to study the effects on brown bear behavior from new field camps being in previously undisturbed habitat along the Pacific Coast. Field camps were set up by the U. S. Fish & Wildlife Service (FWS) in June of 1989 along Oil Creek and on the south side of Puale Bay (Fig. 1) to study the effects of the oil spill on seabird populations, but this also provided a chance to incidentally record the resultant brown bear/human interactions. Brown bear densities elsewhere on the Alaska Peninsula (Black Lake) have been estimated to be 2.03 mi<sup>2</sup>/bear (Miller and Sellers 1990) suggesting that the coastal camps would have a high probability of encountering bears during the field season.

The purpose of this study was not to compare all hazing methods on an equal basis but rather to record all field camp hazing and non-hazing encounters and evaluate the relative success or failure of the different hazing methods used and, if possible, establish parameters for their future use to increase hazing success.

The objectives of this study were to:

- 1) examine and quantify brown bear/human encounters created by remote field camps in areas of high brown bear densities;
- 2) compare the effectiveness of various bear hazing methods (noisemakers, flares, rubber slugs, electric fences) and analyze scenarios of escalating the level of force while hazing bears;

- 3) document any observed signs of bear habituation, whether positive or negative;
- 4) examine the effectiveness of preventive measures taken by field camps, including camp layout, site selection, and specialized equipment (bear barrels, barrel incinerator, firearms); and
- 5) provide management recommendations for preventative measures for future field camps in high brown bear density areas and develop guidance for use of bear hazing.

This document was originally drafted in 1992, with revisions in 1993 and 1994. The report then remained idle until November 1996, when priorities shifted to "bring to press" several older documents. Regional FWS bear training and safety guidelines have been revised several times since 1992; however, this report documents the situation at that time.

## STUDY AREA AND METHODS

### Study Area

The Alaska Peninsula is approximately 720 km (450 mi) long and is bordered by the Bristol Bay and the Bering Sea in the north and the Pacific Ocean in the south. The dominant feature of this rugged peninsula is the Aleutian Mountain Range with peaks that surpass 13,000 km (8,000 ft) in elevation, providing excellent denning habitat for brown bears. This volcanically active mountain range lies along the Pacific Ocean side of the peninsula resulting in a rugged coastline that is predominately rocky with sandy beach headlands. The Bristol Bay/Bering Sea coastal plain is interspersed with a myriad of small lakes and meandering streams as well as several large lakes including Naknek, Becharof and Ugashik lakes.

Bristol Bay supports one of the largest and most commercially valuable fisheries in the world centered around sockeye salmon (*Oncorhynchus nerka*). All five species of Pacific salmon spawn in peninsula rivers draining into Bristol Bay, providing food for brown bears in July and August. Along the Pacific Coast, dog (*Oncorhynchus keta*) and pink (*O. gorbuscha*) salmon are the predominate spawning salmon in coastal streams, with a smaller run of coho salmon (*Oncorhynchus kisutch*) in September (McCarthy and Boden 1993).

The Alaska Peninsula/Becharof Refuge Complex is a land of many lakes, numbering in the thousands from pothole size to Becharof Lake - the second largest in Alaska. The study area contains 18 major rivers, several hundred tributary streams and 14 coastal bays. Tundra is the major vegetation type on the Alaska Peninsula with alder (*Alnus spp.*) and willow (*Salix spp.*) thickets choking mountain and hill sides.

Camps contributing to the study were located throughout the northern half of the Alaska Peninsula. The study area was bounded by the southern border of Katmai National Park & Preserve to the north, and the southern shore of Port Heiden/Strogonof Point to the south (Fig. 1). Reporting field camps were subdivided into groups by location: Pacific Coast - Oil Creek and Puale Bay; Bristol Bay Coast - Cinder River and Strogonof Point; and the interior (Gertrude Creek, Becharof Lake, and Ugashik Lakes).

All the field camps involved in the study were located in habitats which usually allowed for excellent visibility. Notable exceptions were riparian corridors and coastal dunes where personnel frequently travelled and worked. Rivers, streams, and lake shores were often heavily vegetated and usually provide low visibility where bears were most likely to be encountered, especially during the salmon runs. Coastal dunes are typically erratic, undulating terrain covered with tall grasses. Bears were often found in this

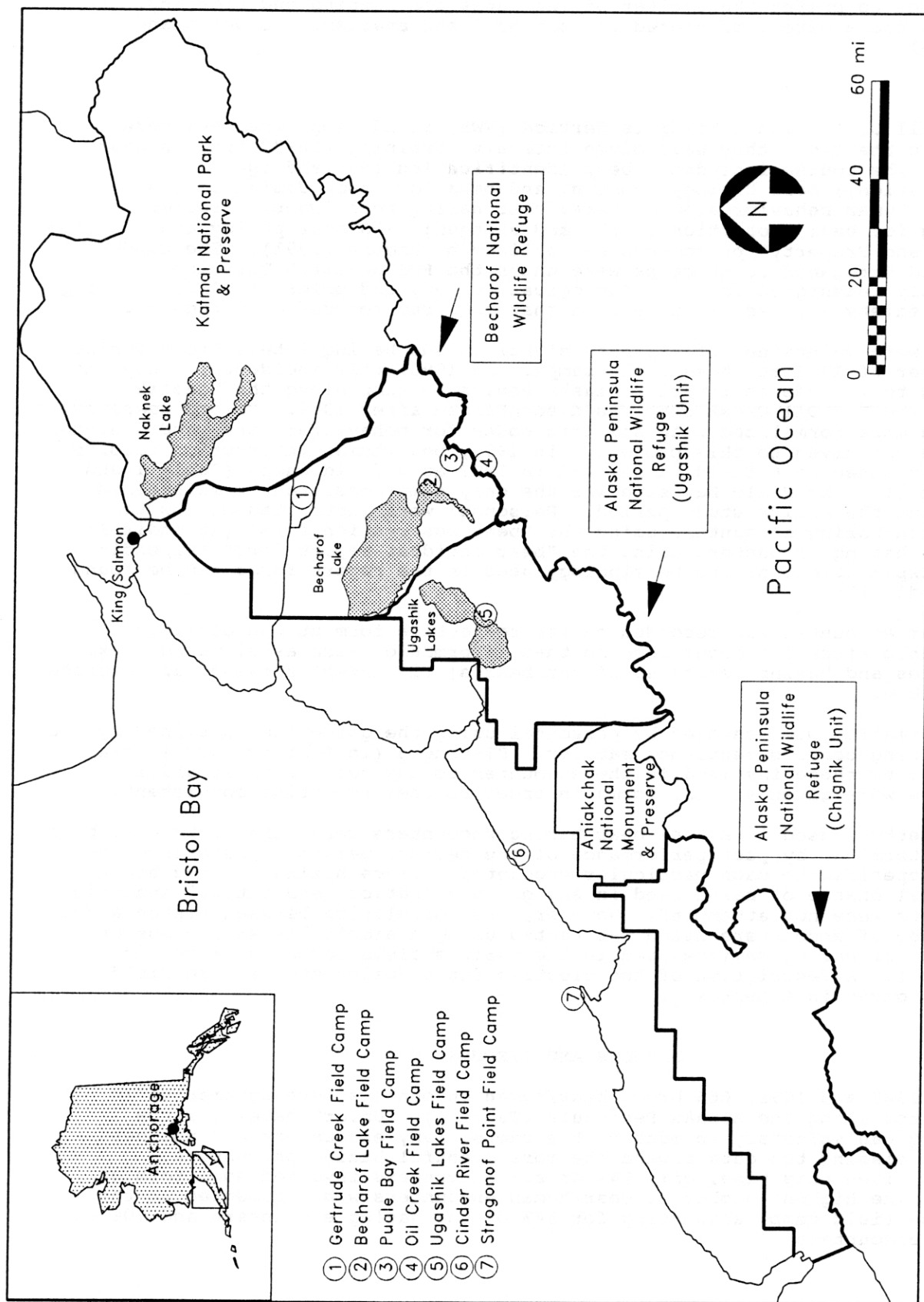


Fig. 1. Locations of field camps involved in brown bear studies, Alaska Peninsula, Alaska, 1989–1992.

habitat because they graze on dune grasses, especially before the salmon run, and seemed to prefer the shelter of the dunes for resting and sleeping. In general, bears were encountered in most habitats available to bears and personnel.

### Methods

Before all U. S. Fish & Wildlife Service (FWS) field camp personnel were placed in the field they were given intensive training (16-32 hrs) on bear safety. The course included: bear identification (sex and age approximation); bear biology, habits, and behavior; camp design in bear country; human behavior around bears; bear hazing techniques; firearms training for bear protection (rifle and shotgun); FWS bear policy and "Defense of Life and Property" procedures as outlined by Rogers (1991). The Cinder River and Stroganof Point camps were under the FWS Research Division (currently reassigned to U. S. Geological Survey) and prior to 1992, training in bear safety was less intense than that required for refuge personnel.

Records were maintained of all bear sightings and hazing interactions during the summer of 1989 at those field camps. In 1990, this incidental study was expanded to include an interior Alaska Peninsula camp along the Ugashik Narrows and the Oil Creek camp was discontinued after 1989. Record keeping was made more formalized with specific codes for behavioral data, and a higher emphasis was given to this project. In 1991, bear/human interaction records were maintained at 6 field camps, and in 1992 at 3 field camps (Table 1 and Appendix I). The Puale Bay site was the only camp consistently maintained throughout the entire study period. Personnel were instructed on how to record non-hazing encounters using the "bear observation form" (Appendix II) and bear hazing encounters using the "bear incident report form" (Appendix III). Explanations of the terminology used in the report forms can be found in Appendix IV.

Each bear encounter was recorded on its respective form at the earliest convenience after its occurrence so that information such as distance, sex, activities and hazing responses of the bear(s) (if hazed) remained as accurate as possible.

All information was assessed by personnel using the guidelines outlined by the FWS training courses mentioned earlier. Distances (in feet or yards) were estimated by those involved in the encounter to the best of their ability. All camps were given similar forms in order to keep reporting consistent.

Hazing methods used in actual bear hazing encounters were subject to user bias often determined by past performance of the device, personal preference, and factors specific to each particular encounter. Since hazing methods did not have equal chance of being used in any given situation, statistical analysis of results were not attempted. However, the correlation between distance and percentage of encounters hazed was tested using a simple linear regression. The types of hazing devices used in the various field camps is listed in Appendix I. A description of the electric fence design used in the field camps is given in Appendix V.

## **RESULTS AND DISCUSSION**

Between 1989 and 1992, 665 brown bear/human encounters were documented in field camps along the Alaska Peninsula (Table 1). Unfortunately, since reporting was voluntary in most of the camps, many encounters did not get recorded biasing the data toward the more eventful hazing encounters. Yet even given this bias, only 24% of all encounters involved some form of hazing. The highest number of bear/human encounters was documented at the Puale Bay field camp, accounting for 54% of the hazing encounters and 70% of overall encounters.



Table 1. Recorded brown bear encounters, hazing and non-hazing, from field camps, Alaska Peninsula, Alaska, 1989-1992.

Camp location	Hazing Encounters	Non-hazing Encounters	Total Encounters
Oil Creek 1989	17	17	34
Puale Bay 1989	15	44	59
Ugashik Narrows 1990	3	9	12
Puale Bay 1990	25	101	126
Puale Bay 1991	10	78	88
Ugashik Narrows 1991	1	31	32
Becharof Lake 1991	12	8	20 <sup>a</sup>
Gertrude Creek 1991	3	50	53
Cinder River 1991	15	1	16
Strogonof Point 1991	18	1	19
Puale Bay 1992	37	153	190
Ugashik Narrows 1992	3	12	15
Becharof Lake 1992	1	0	1 <sup>a</sup>
<b>Total (1989-1992)</b>	<b>160</b>	<b>505</b>	<b>665</b>

<sup>a</sup> Records of non-hazing encounters were not kept.

## Distribution of Bear Encounters Within Habitats

When bear/human encounters were categorized by habitat, parallel trends were apparent between interior and coastal areas for non-hazing encounters (Figs. 2 and 3). Almost half of all non-hazing encounters occurred in riparian habitat. In interior areas, riparian habitats played an even stronger role in hazing encounters, accounting for 80% of these more dangerous type of encounters (Fig. 4). In coastal areas, no relationship between habitat type and frequency of hazing encounter was evident. Hazing encounters on the coast were distributed relatively evenly between riparian, beach, hill/dune, and in camp habitats (Fig. 5). These differences may have been due to the variations in the amount of time spent by personnel in the habitats recorded, that is, the interior fisheries camps spent more time in riparian habitat while the coastal camps spent more time in dunes and hills travelling to bird colonies or travelling to the beach to survey birds. In both cases, habitats with low visibility and heavy vegetation caused a majority of the hazing encounters. Not surprisingly, the percentage of encounters occurring in camp increased 5-10x from non-hazing to hazing situations.

## Seasonal Distribution

Seasonal bear activity on the Alaska Peninsula appeared to proportionate to availability of spawning salmon in area rivers and streams. Generally, as salmon abundance increased and peaked in late July, so did bear encounters (Peter Anselmo, FWS, King Salmon, Alas., pers. commun., McCarthy and Boden 1993) (Fig. 6). The occurrence of hazing encounters also peaked in late July, but demonstrated a second peak in mid-September (Fig. 7). The first peak in July may be attributed to the high concentration of bears along streams during the peak of the salmon run. Because field camps were frequently located on or near salmon streams, and camp personnel often worked on or traveled near these streams, the frequency of bear encounters paralleled salmon availability. The September peak in frequency of hazing encounters was harder to explain. Pacific Coast camps received a late run of coho salmon in September, but this run was significantly smaller than the July run of pink and chum salmon (McCarthy and Boden 1993), and was not a factor in other field camps. More likely, the overall decline in salmon abundance making them a less-consistent food source, which forced bears to seek alternative food sources. At that time, bears seemed to become increasingly bold and approached camps with greater frequency. This was witnessed by several coastal camps which remained in place during the month of September. Not only did the frequency of hazing encounters increase but also the intensity. These late September hazing encounters typically required more hazing responses, required more severe hazing methods, and hazing success was often short lived as these bears usually displayed remarkable persistence by returning repeatedly.

## Diurnal Patterns of Encounters

Bear activity patterns usually showed the greatest concentration of activity during early morning and early evening hours (Fig. 8). Most bear observations were limited to 0700-2300, during the period of greatest human activity and when adequate daylight permitted observation. Bear encounters involving hazing were generally more common in the latter half of the day especially between the hours of 1400 and 2000. In general, only hazing encounters were recorded from midnight to 0600 since none of the research activities in the field camps involved night observations.

## Sex and Age of Bears Encountered

Several interesting trends were evident in the types of bears involved in non-hazing and hazing encounters. More than 50% of all hazing and non-hazing encounters involved subadults (Figs. 9 & 10). Non-hazing encounters had a high number of unknown bear types probably due to greater distances of observations and lower emphasis. Sows with cubs seemed to avoid personnel as soon as they were detected so they made up a higher percentage of non-hazing encounters. Along with subadults, hazing encounters involved a high

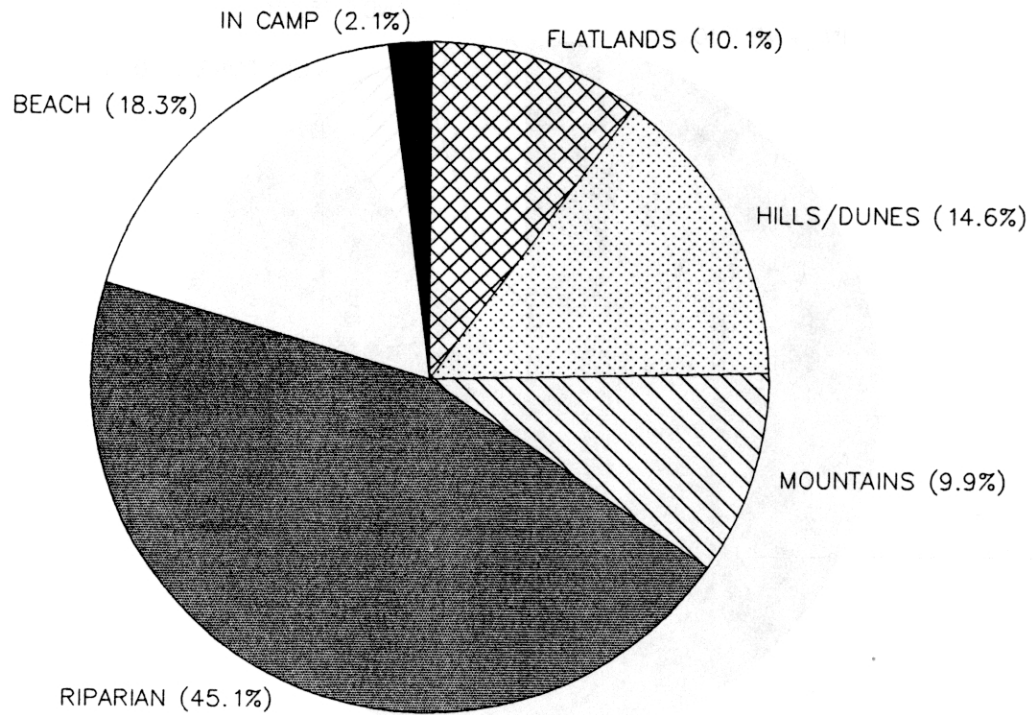


Fig 2. Non-hazing encounters in coastal habitats, Alaska Peninsula, Alaska, 1989-1992.

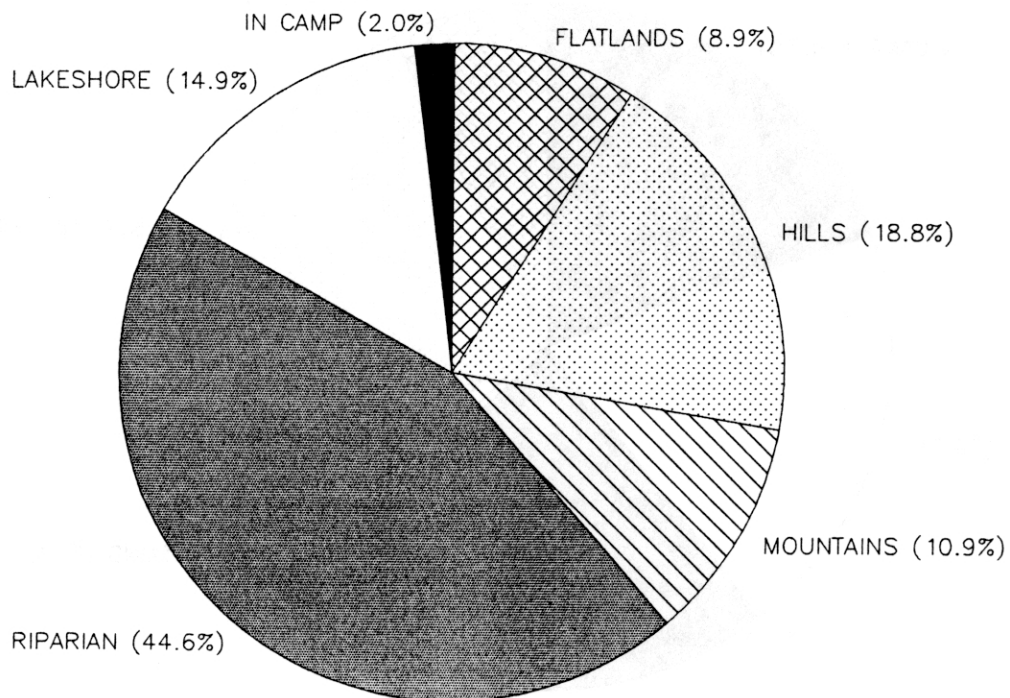


Fig 3. Non-hazing encounters in interior habitats, Alaska Peninsula, Alaska, 1989-1992.

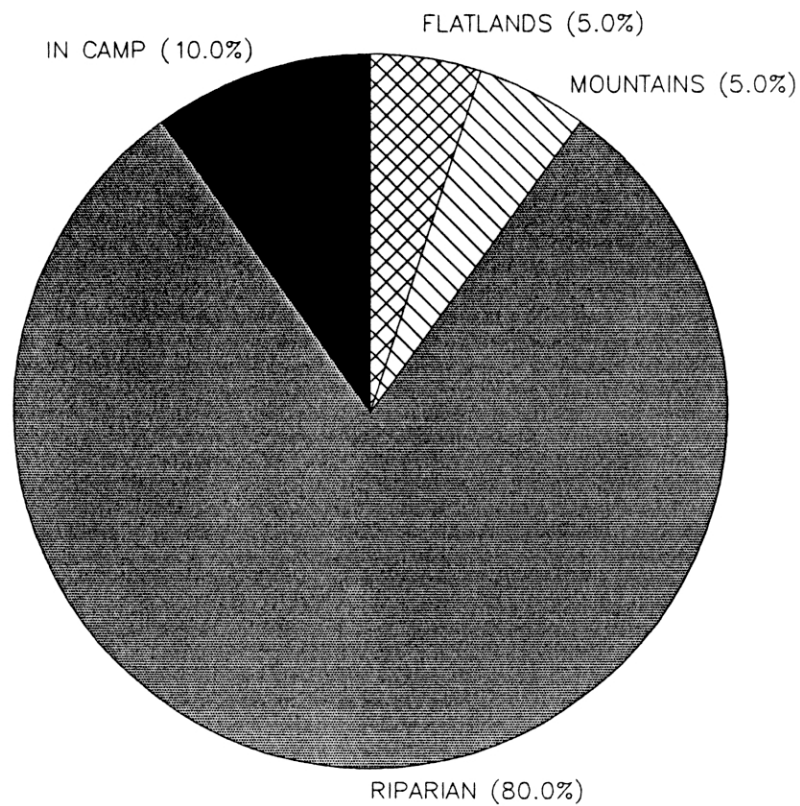


Fig 4. Hazing encounters in interior habitats, Alaska Peninsula, Alaska, 1989-1992.

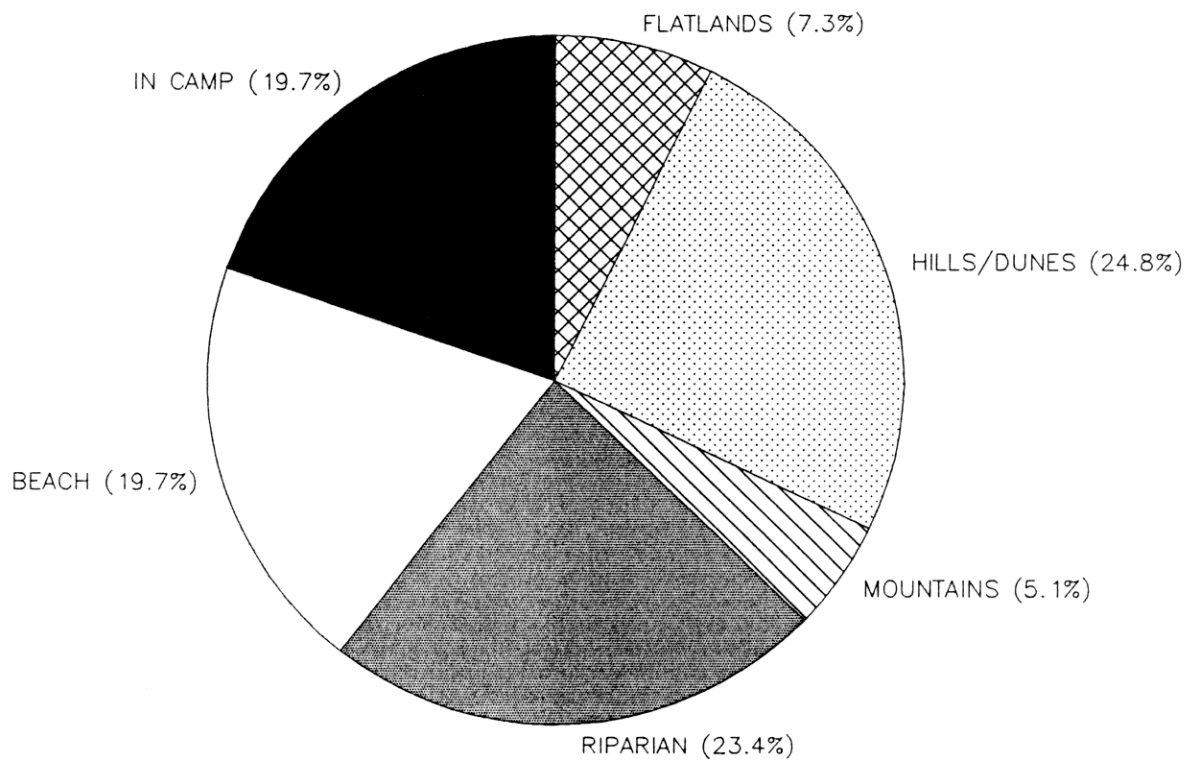


Fig 5. Hazing encounters in coastal habitats, Alaska Peninsula, Alaska, 1989-1992.



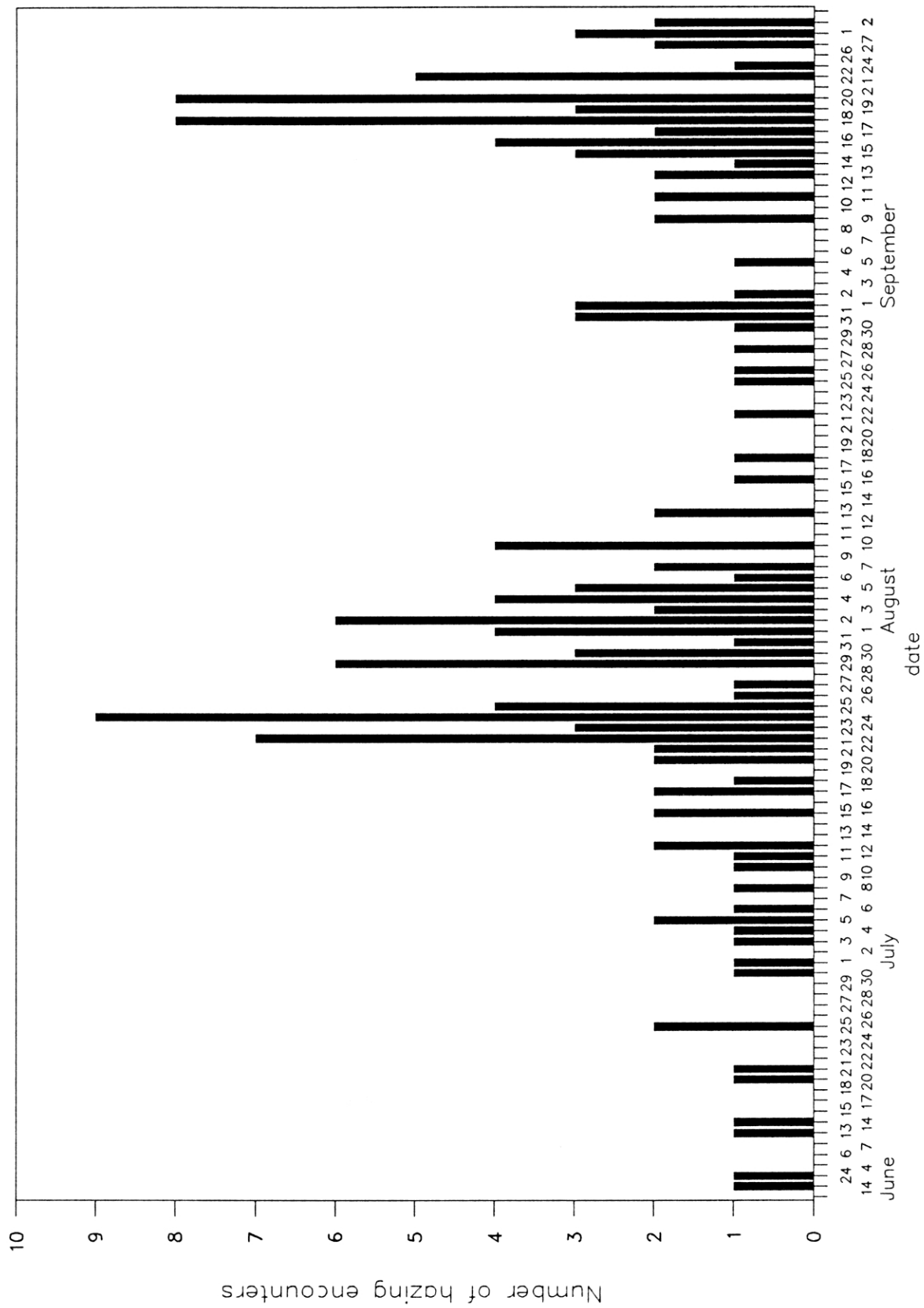


Fig 7. Seasonal distribution of brown bear hazing encounters, Alaska Peninsula, Alaska, 1989-1992.

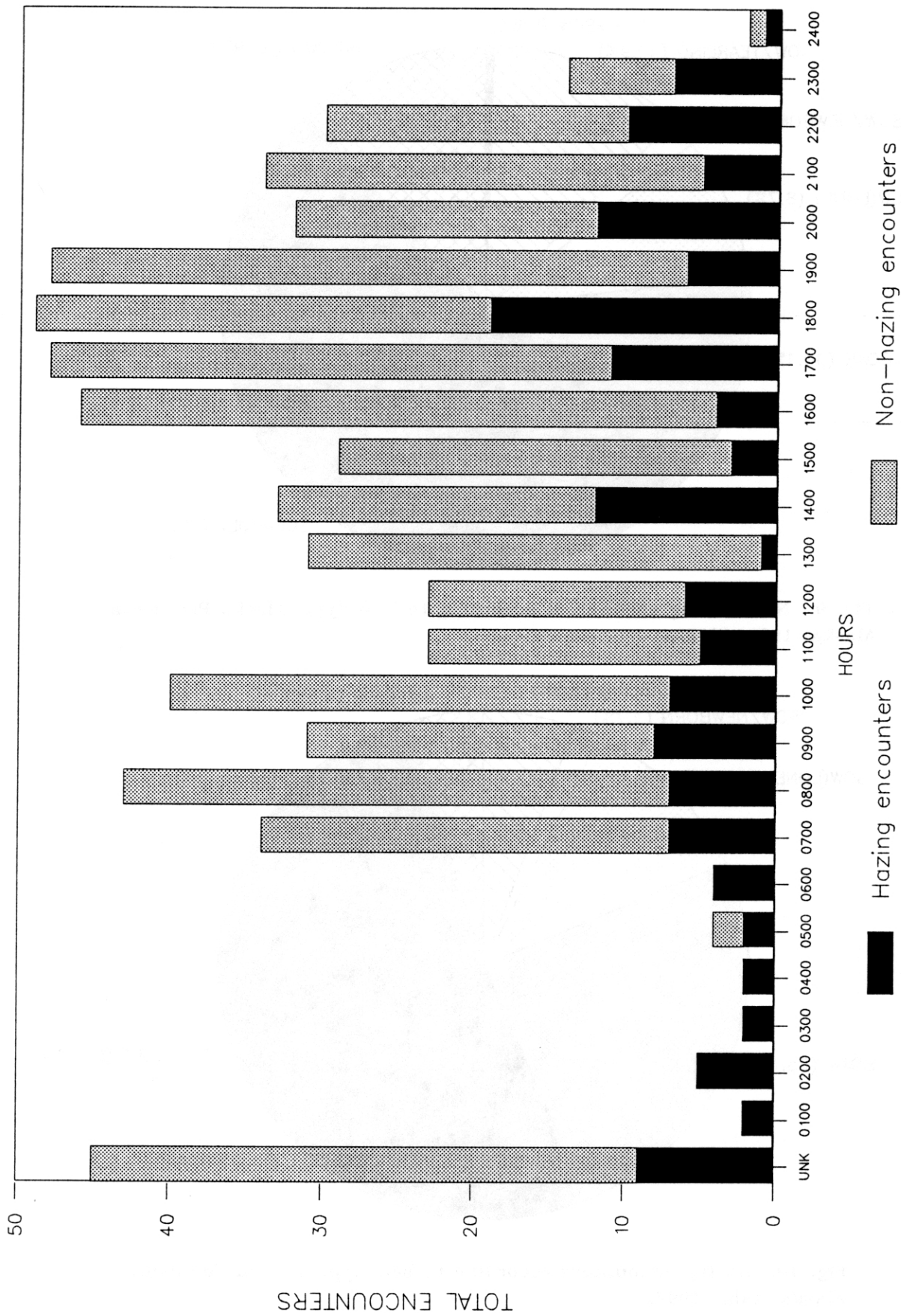


Fig 8. Time of bear encounters (24 hr. clock), Alaska Peninsula, Alaska, 1989-1992.



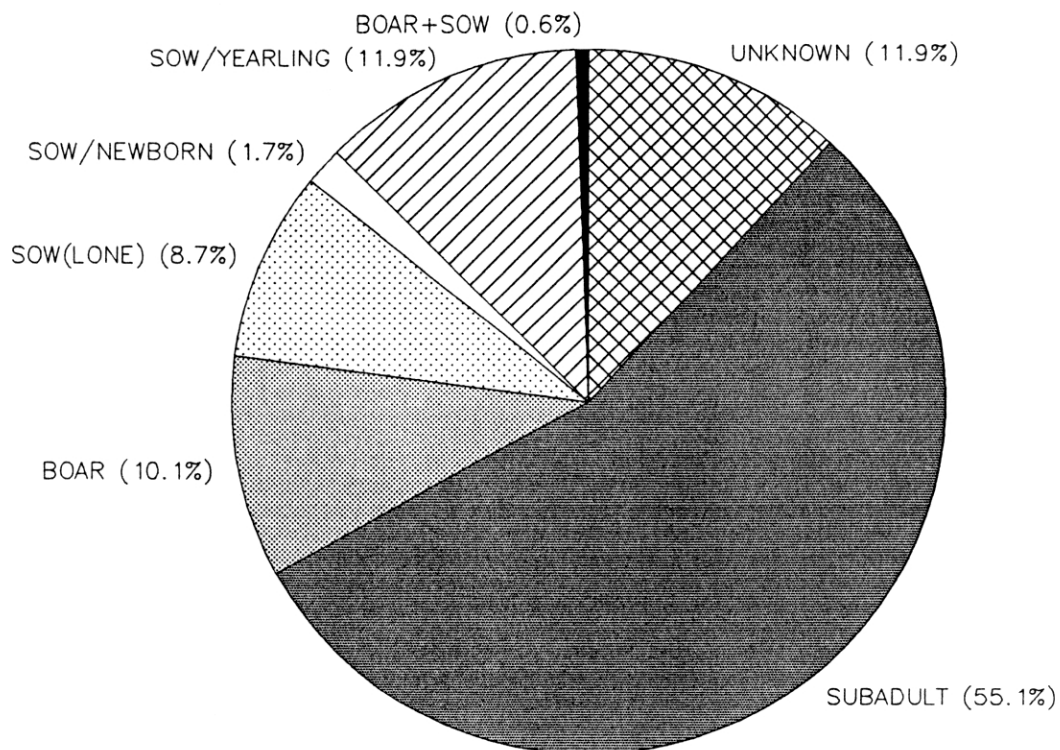


Fig. 9. Non-hazing encounters according to bear type, Alaska Peninsula, Alaska, 1989-1992.

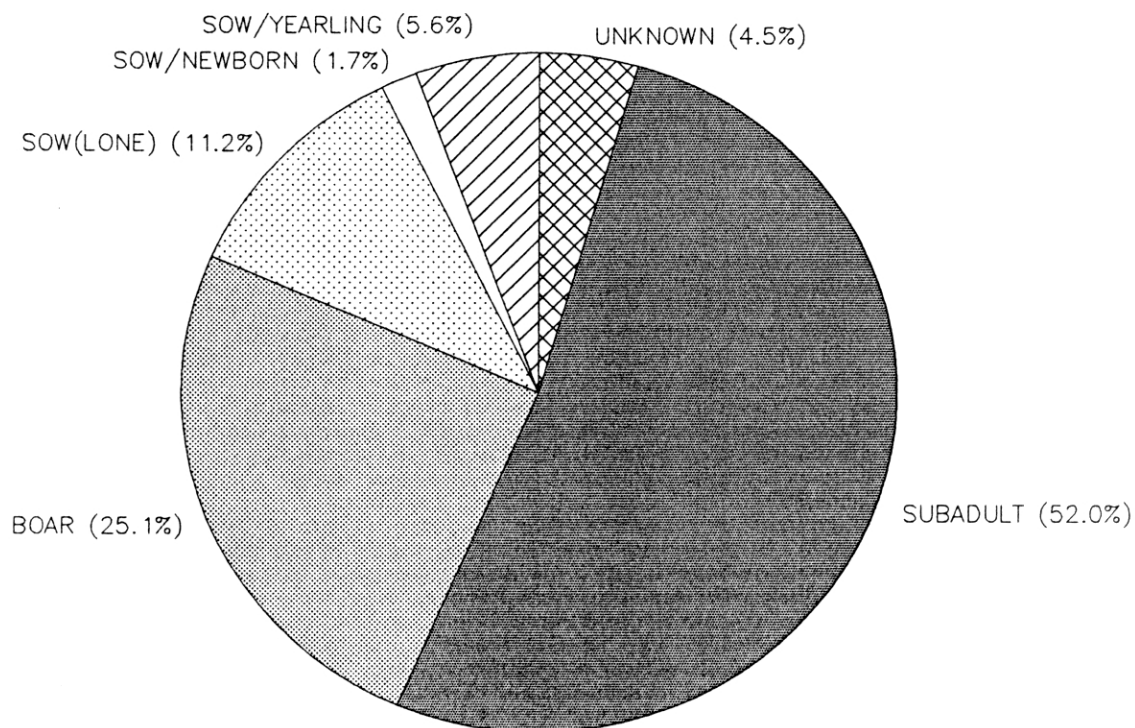


Fig. 10. Hazing encounters according to bear type, Alaska Peninsula, Alaska, 1989-1992.

percentage of boars. Boars may have felt less threatened by humans than other bears and may have approached closer. Personnel may also have been more intimidated by boars and hence would have tended to haze them more readily.

#### Prior Activities of Bears Before Encounters

No trends were apparent for prior activity of bears involved in non-hazing encounters (Fig. 11). Around half of all bear encounters were preceded by some activity associated with feeding (fishing, foraging). Traveling was another bear activity that was high (26-30%) in both non-hazing and hazing encounters, however, it was the bear's behavior while it was travelling that determined whether or not hazing was carried out. Property destruction was a significant activity (24.4%) prompting hazing during bear encounters (Fig. 12); however, use of electric fences in the field camps likely reduced these types of encounters.

#### Behavior of Bears Before Encounters

One of the most common behaviors recorded for both non-hazing and hazing encounters was stationary activity (Figs. 13 and 14). In these cases, the distance the bear was from the observer(s) seemed to be a factor which dictated if hazing was done or not (Fig. 15). As mentioned above, travelling was a common prior activity in both non-hazing and hazing encounters. During non-hazing encounters most of the bears' behavior was recorded as "slow avoidance" which meant that they were travelling at least slightly away from the observer. Hazing encounters recorded most of the travelling bears as "non-aggressive approach" which meant that they were traveling at least slightly toward the observer(s) (Appendix IV). Aggressive approaches were rarely viewed toward camp personnel, although, most aggressive approaches were hazed.

#### Distance of Bear Encounters

The distance between the bear and the observer had a strong influence on whether or not the bear(s) encountered were hazed or not (Fig. 15). Beyond 400 yards no hazing was attempted.

Sixty-eight percent of all encounters <50 yards were hazed while only 15% of all encounters >50 yards had hazing involved. At <100 yards, 54% of the encounters were hazed while only 13% of the encounters >100 yards were hazed. These hazing situations do not necessarily reflect aggression from bears at these distances, but rather the decision of camp personnel to haze. Aggressive behavior was seldom observed during the 4 years of encounters studied, so any conclusions on a distance which could be maintained to avoid an aggressive attack in field camps could not be made. However, it was shown that there was a significant negative correlation between distance and the percentage of encounters at that distance which were hazed ( $p < 0.001$ ) (Fig. 16). Katmai National Park & Preserve has a regulation in its compendium that states that visitors may not intentionally approach or remain within 50 yards of a bear, or within 100 yards of a brown bear sow with young, except on a designated viewing platform (36CFR§2.2(a)(2), National Park Service 1992). The 50/100 yard rule at Brooks Camp may prevent unnecessary stress and habituation of both bears and humans in the presence of bears and aid in avoiding unnecessary encounters.

Figure 17 demonstrates a decrease in the average distance of hazing encounters over the field season, especially encounters >150 yards. Some personnel may have become increasingly relaxed about having bears nearby and allowed bears to get closer to camp and to themselves in the latter part of the season.

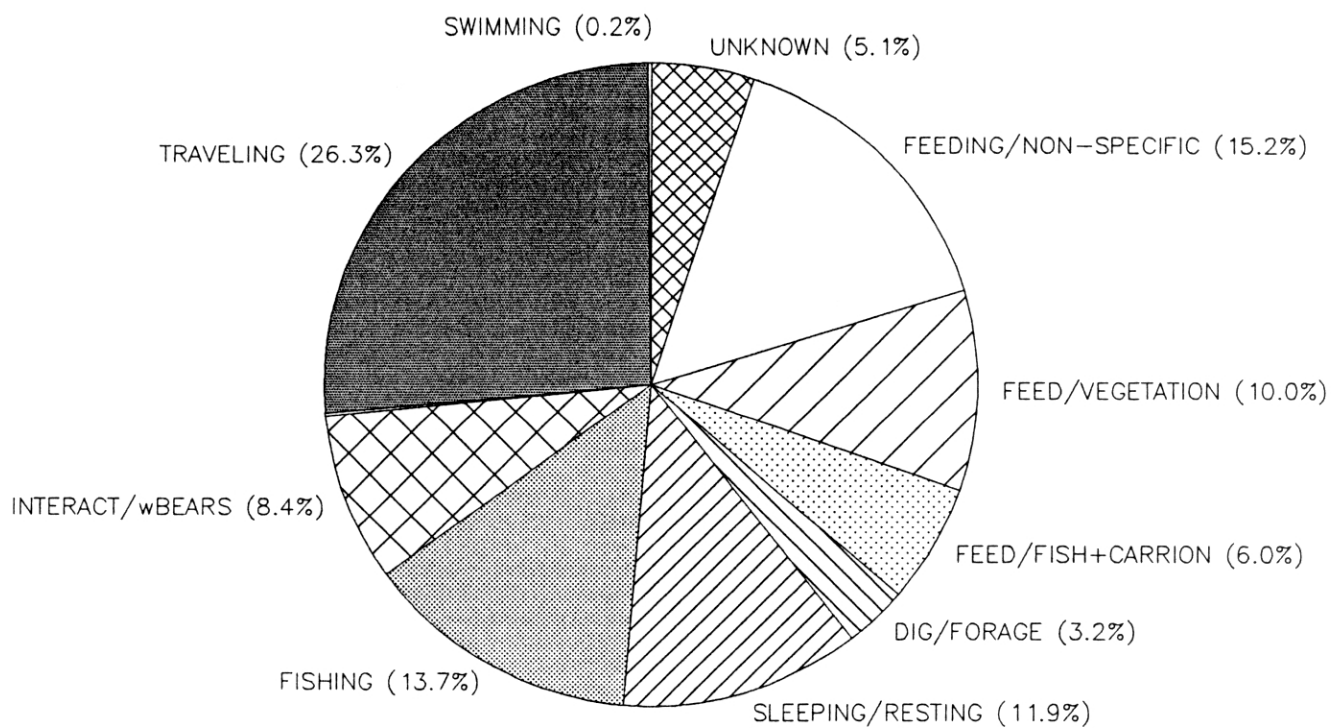


Fig. 11. Prior activity of bears involved in non-hazing encounters, Alaska Peninsula, Alaska, 1989-1992.

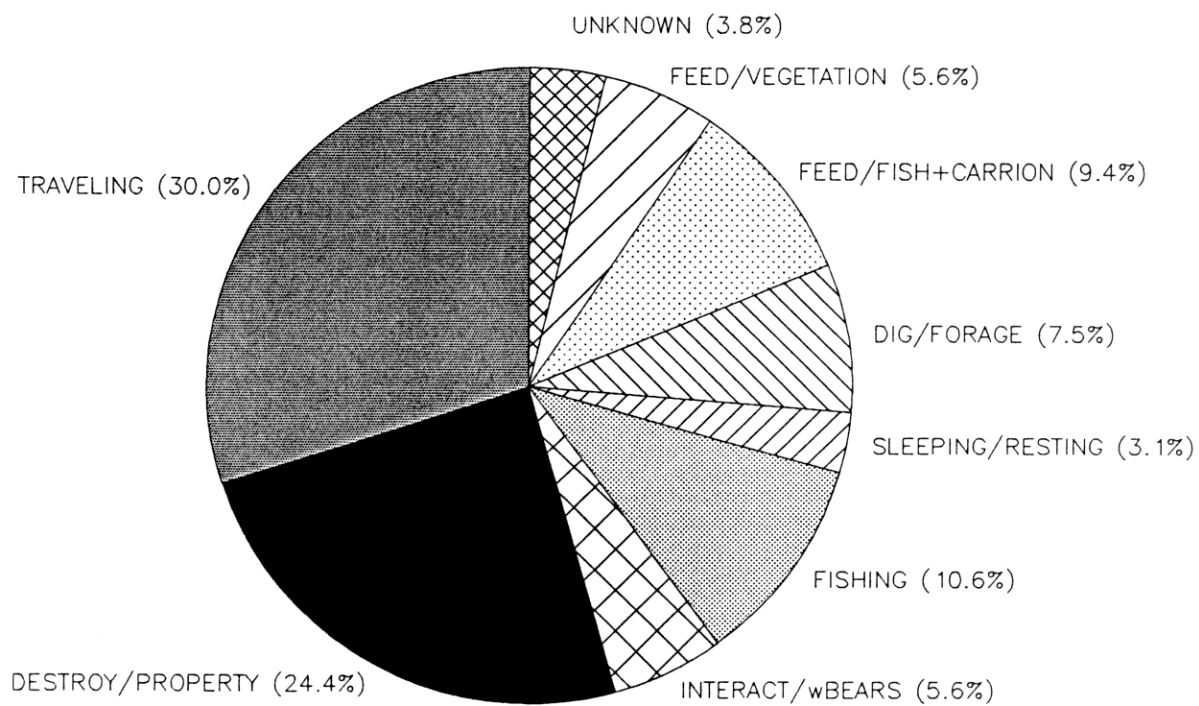


Fig. 12. Prior activity of bears involved in hazing encounters, Alaska Peninsula, Alaska, 1989-1992.

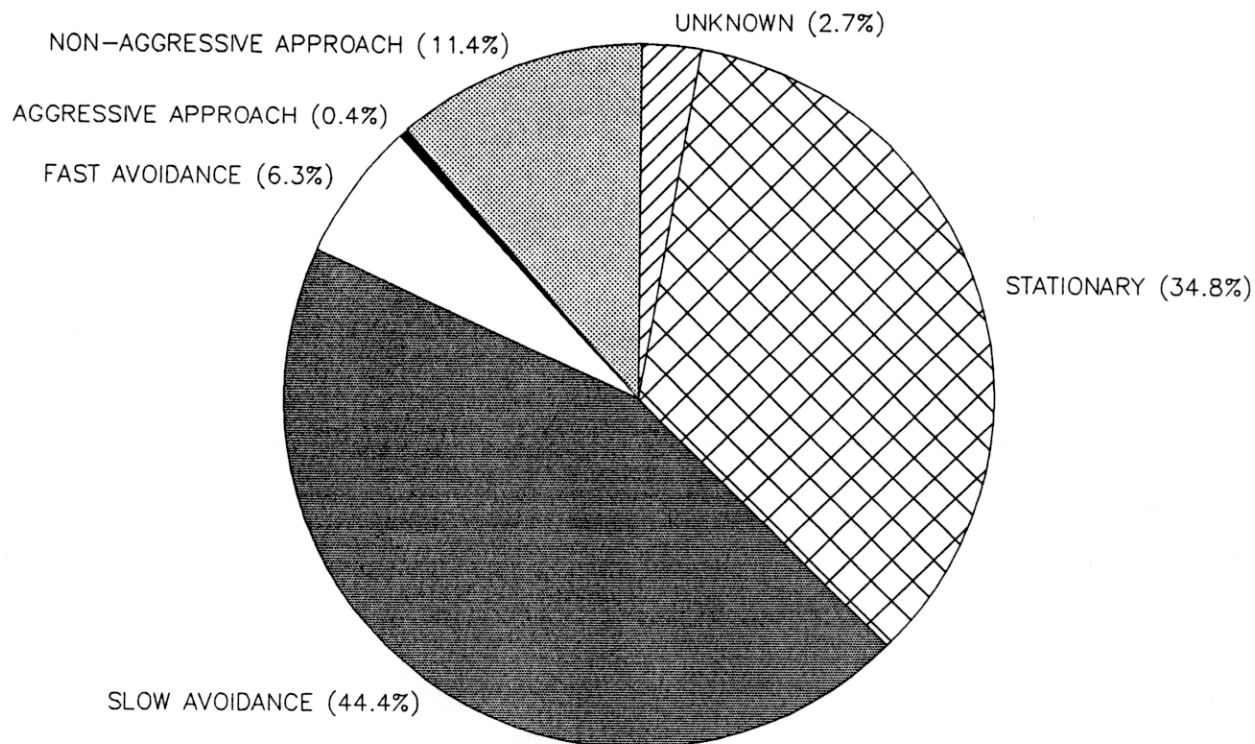


Fig. 13. Prior behavior of bears involved in non-hazing encounters, Alaska Peninsula, Alaska, 1989-1992.

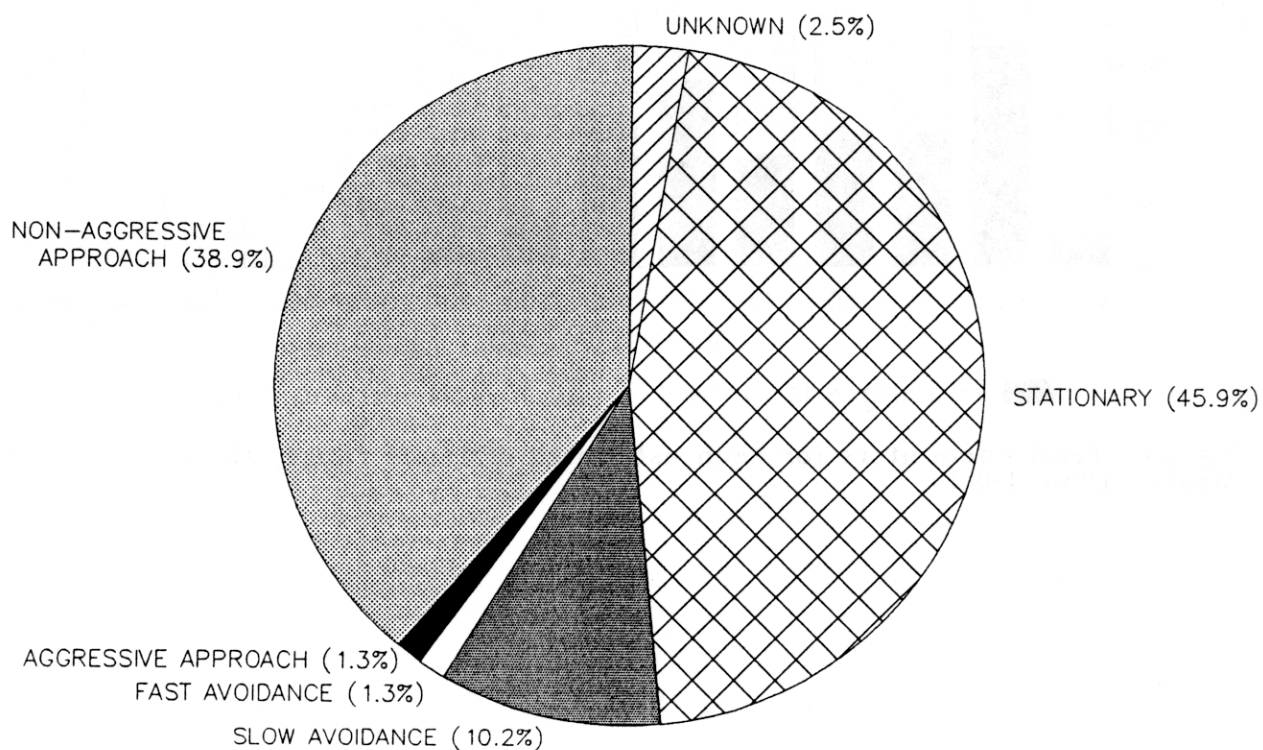


Fig. 14. Prior behaviors of bears involved in hazing encounters, Alaska Peninsula, Alaska, 1989-1992.

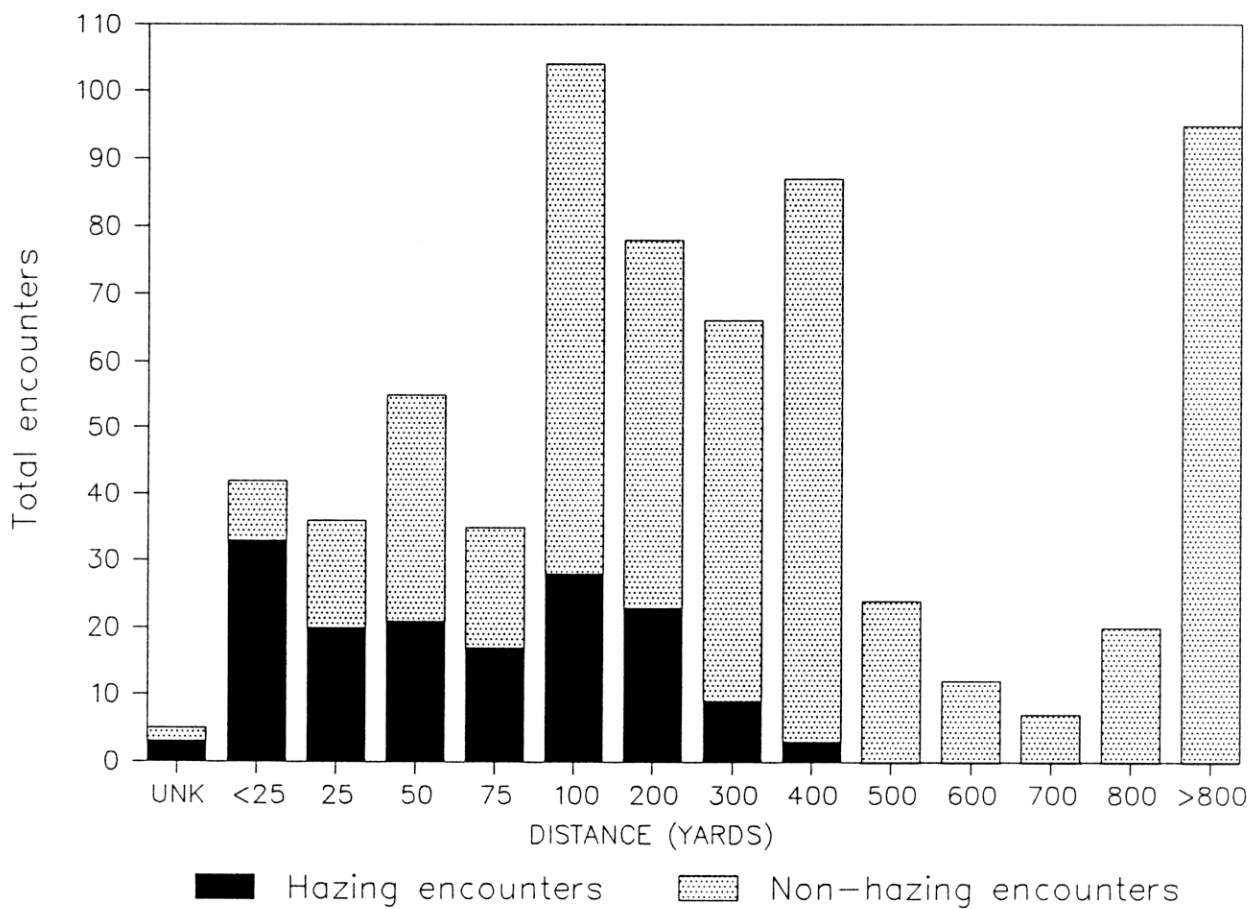


Fig 15. Total encounters for each estimated distance range, Alaska Peninsula, Alaska, 1989-1992.

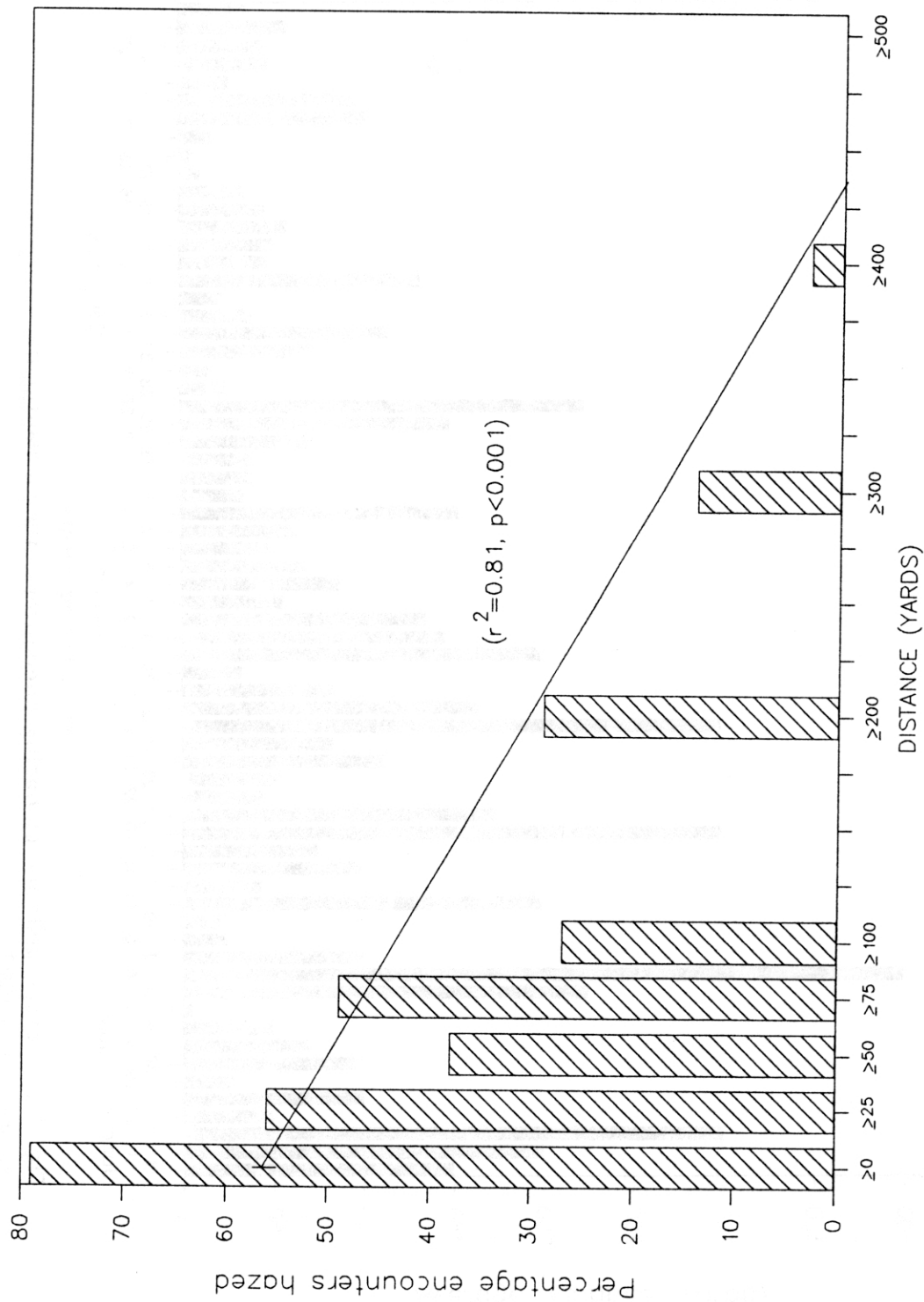


Fig. 16. The relationship between distance and percentage of encounters hazed in bear/human encounters on the Alaska Peninsula, Alaska, 1989–1992. The distances are not inclusive, that is, ≥200 includes 200–299. Beyond 400 yards no hazing encounters were recorded.

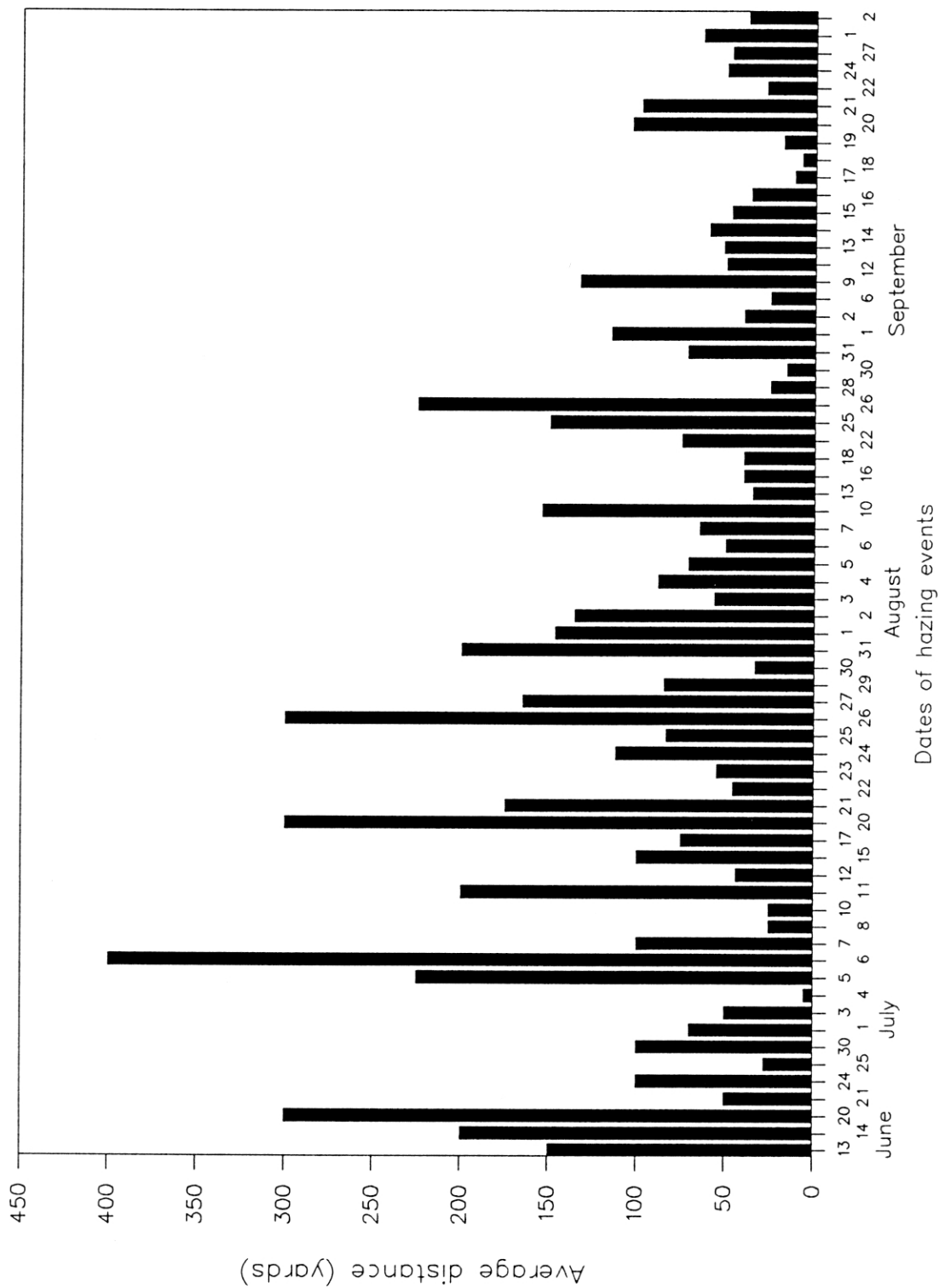


Fig. 17. Average distance of hazing encounters, Alaska Peninsula, Alaska, 1989-1992.



### Comparison of Hazing Effectiveness

Bear hazing methods were not equally available in all camps during the study (Appendix I). Also, camp personnel developed definite preferences for certain hazing methods and, as a result, seldom or never used other hazing methods that were at their disposal. As a result, the frequency of hazing method use did not necessarily reflect its potential effectiveness.

In general, all hazing methods which were used within appropriate ranges had very high success in deterring/repelling bears (Table 2). Trends could be seen in the distance between personnel and the bear(s) and the effectiveness of the various hazing methods used. The bear hazing methods most utilized by the camps were shout/talk/wave, shots fired in the air, cracker shells, flares, and rubber slugs/bird shot (Table 2). These hazing methods are grouped into indirect and direct contact methods below. This was not an order adhered to strictly by all camps nor was it a given order of hazing for the camps to adhere to when hazing was needed. More detailed descriptions of the hazing methods can be found in Bromley (1985).

Indirect Contact Devices -- Shout/talk/wave was the hazing technique mostly commonly used to haze bears. It was the most often between 51-100 yards, but had a high success at all distances <300 yards (Fig. 18). This technique was used beyond 300 yards, but without success. Human whistling was not attempted as hazing due to the possibility of being mistaken for a wounded animal (Herrero and Fleck 1990).

The second indirect contact device was a shot fired into the air. This technique was used most often between 51-100 yards (Fig. 19). It was not used beyond this range but was used in closer encounters. Success with this technique was 100%, the sample size was only 7 times in 4 years. This method generated more noise than shouting or talking, although, when this method was used before shouting and arm waving, the effectiveness of the latter was diminish on returning bears. Some deterrents, especially noise makers, tend to become less effective with repetition (Bromley 1985).

Flares were used at all ranges below 300 yards with good success (Fig. 20). They were used most often between 51-300 yards. Flares were very effective when used at night; not only did they provide a visual deterrent to bears but also helped illuminate the area. Flares were also very effective when used in combination with cracker shells.

Cracker shells are definitely the method of choice for encounters which occurred under 50 yards (Fig. 21). They were used successfully at all ranges up to 300 yards but were not effective over 300 yards. The use of this method over 100 yards more likely shows a safety decision to use cracker shells rather than firing live rounds in the air as a noise maker.

Direct Contact Devices -- Rubber slugs and bird shot were the only direct contact devices used as hazing methods. This technique involved actually hitting the bear with the hazing device (slug or bird shot) in the rump. The slugs caused discomfort to the bear but bounced off, causing only minor localized tissue damage (Dalle-Molle 1989). These were used most at ranges of <25 yards, however, they were used up to ranges of 300 yards (Fig. 22). This technique was very successful when used correctly, but did involve some accuracy in aiming the slug/shot. It was used very few times at the longer distances and its success was probably more attributed to the noise of the discharge rather than the actual slug/shot itself. This method was used frequently by personnel on bears found inside the camp perimeter. This seemed to assist in keeping bears outside the camp perimeter lessening the chance of property damage, personal damage, bear habituation to camps and the possibility of having to kill an aggressive habituated bear. Shooting a bear in the rump with a rubber slug was found to be difficult at times because bears turned to face the shooter. For example at Puale Bay, a subadult male was digging in the sump pit, so the field crew walked toward him with a shotgun loaded with a rubber slug and two rifles with live rounds. Each time

Table 2. All brown bear hazing methods used and brown bear responses, Alaska Peninsula, Alaska, 1989-1992.

Hazing Method	BROWN BEAR RESPONSES <sup>a</sup>					NON-AGGRESSIVE		
	NO RESPONSE	STOP/ALERT	SLOW AVOIDANCE	FAST AVOIDANCE	AGGRESSIVE APPROACH	NON-AGGRESSIVE APPROACH	TOTAL	
Shout/Talk/Wave	27	11	43	26	6	16	129	
Cracker Shell	19	1	23	36			79	
Flare	3	1	6	8			18	
Rubber Slug	1		4	7			12	
Flashlight at Night			6	2			8	
Shot in the Air			2	5			7	
Birdshot			2	2			4	
Cracker Shell/Flare			2	1			3	
Loud Music				2			2	
Electric Fence			2				2	
Air Horn				2			2	
Hazing Grenade				1			1	
Trip-wire Whistle				1			1	
Rock Throwing	1						1	
Clang Pots and Pans	1						1	
ATV Noise	3					1	4	
Helicopter Noise				1			1	
Avoidance	13	3	6	1	3	6	32	
Total responses	68	16	96	95	9	23	307	

<sup>a</sup> See Appendix IV for explanation of brown bear responses.

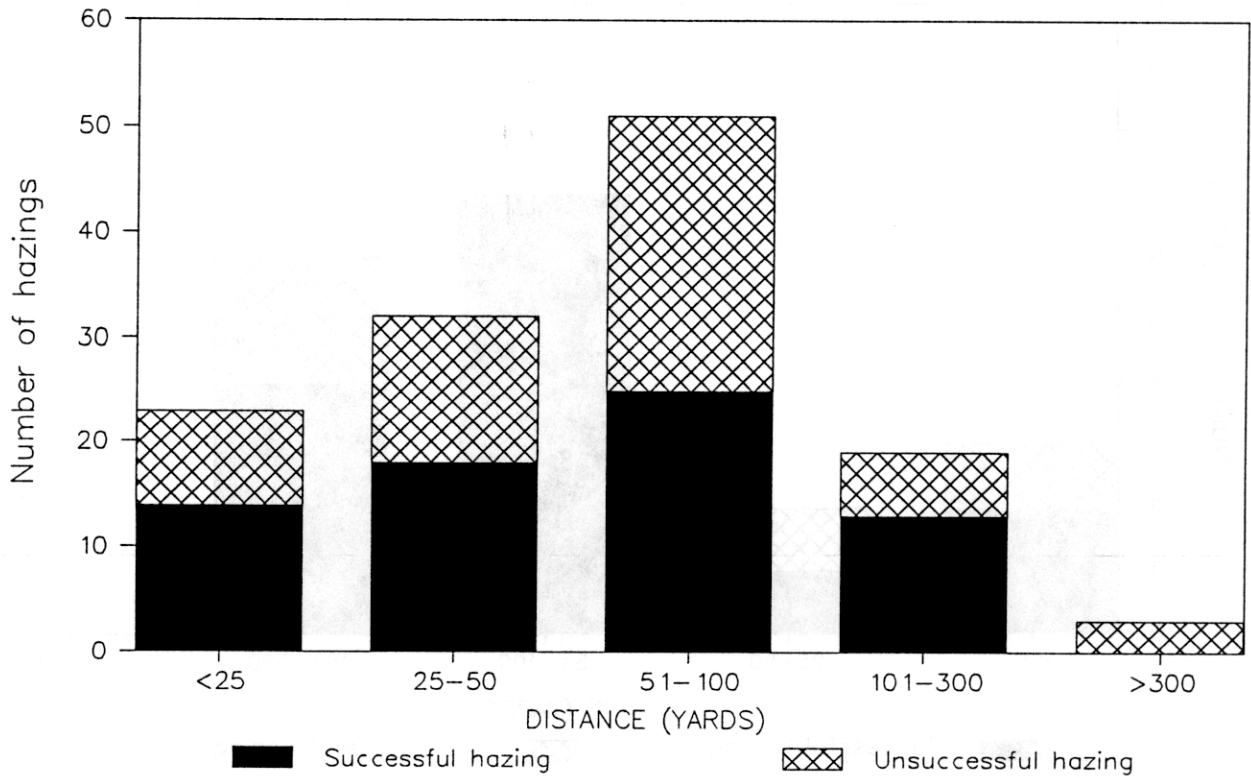


Fig 18. Successful/unsuccessful hazing by Shout/Talk/ Wave, Alaska Peninsula, Alaska, 1989-1992.

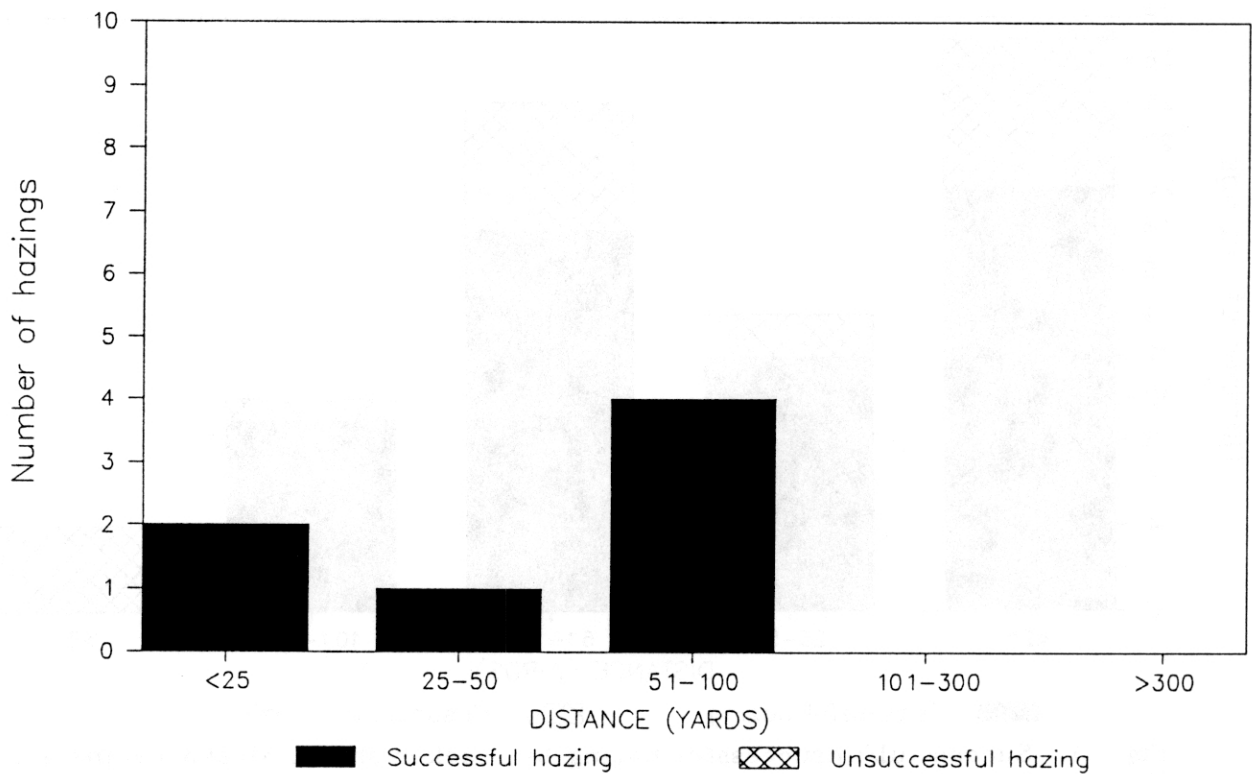


Fig. 19. Successful/Unsuccessful hazing by firing a shot in the air, Alaska Peninsula, Alaska, 1989-1992.

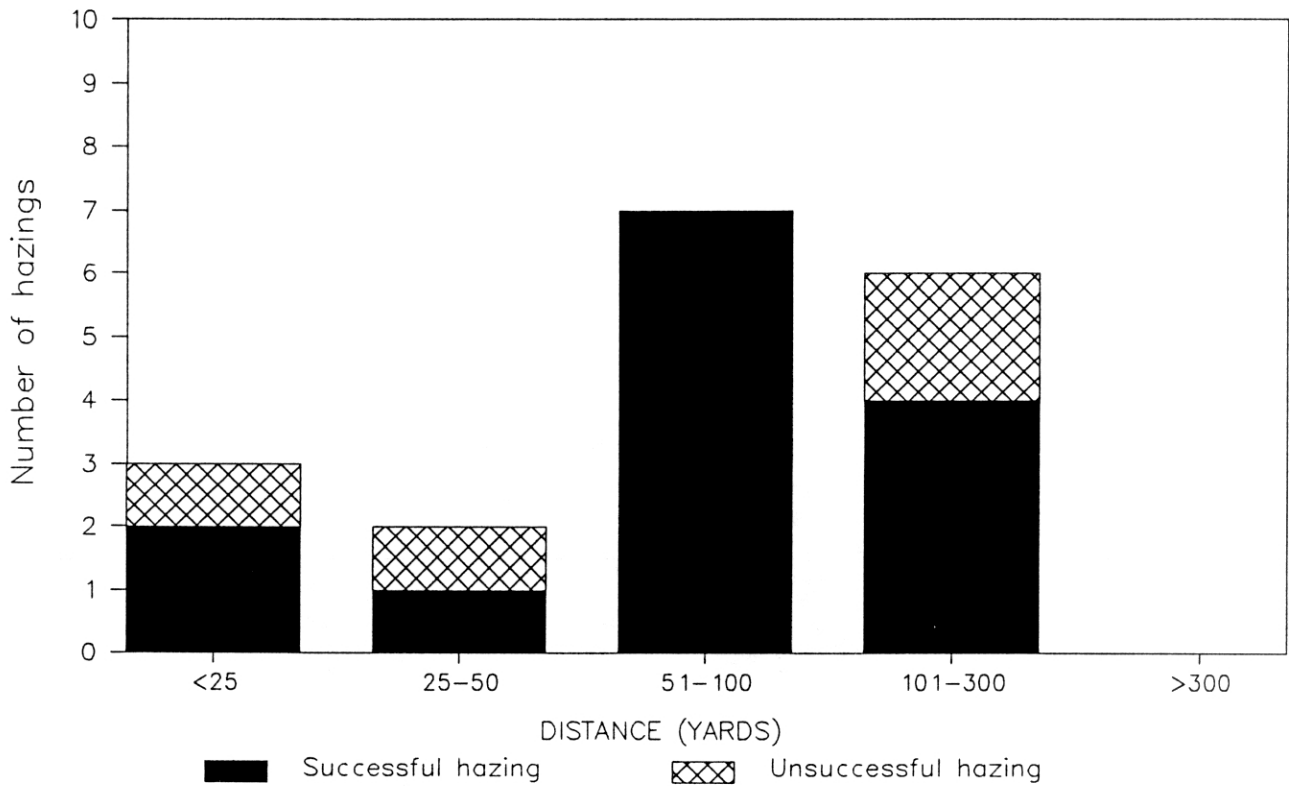


Fig 20. Successful/unsuccessful hazing by flares, Alaska Peninsula, Alaska, 1989-1992.

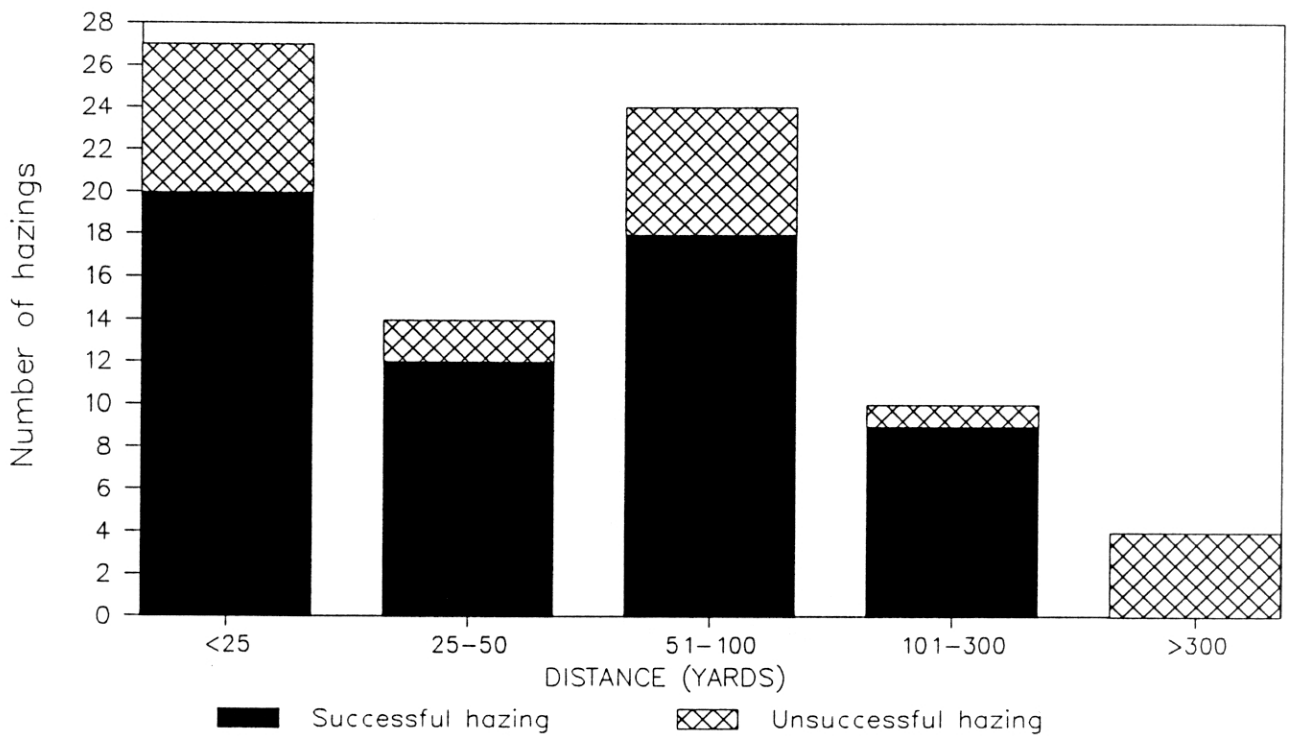
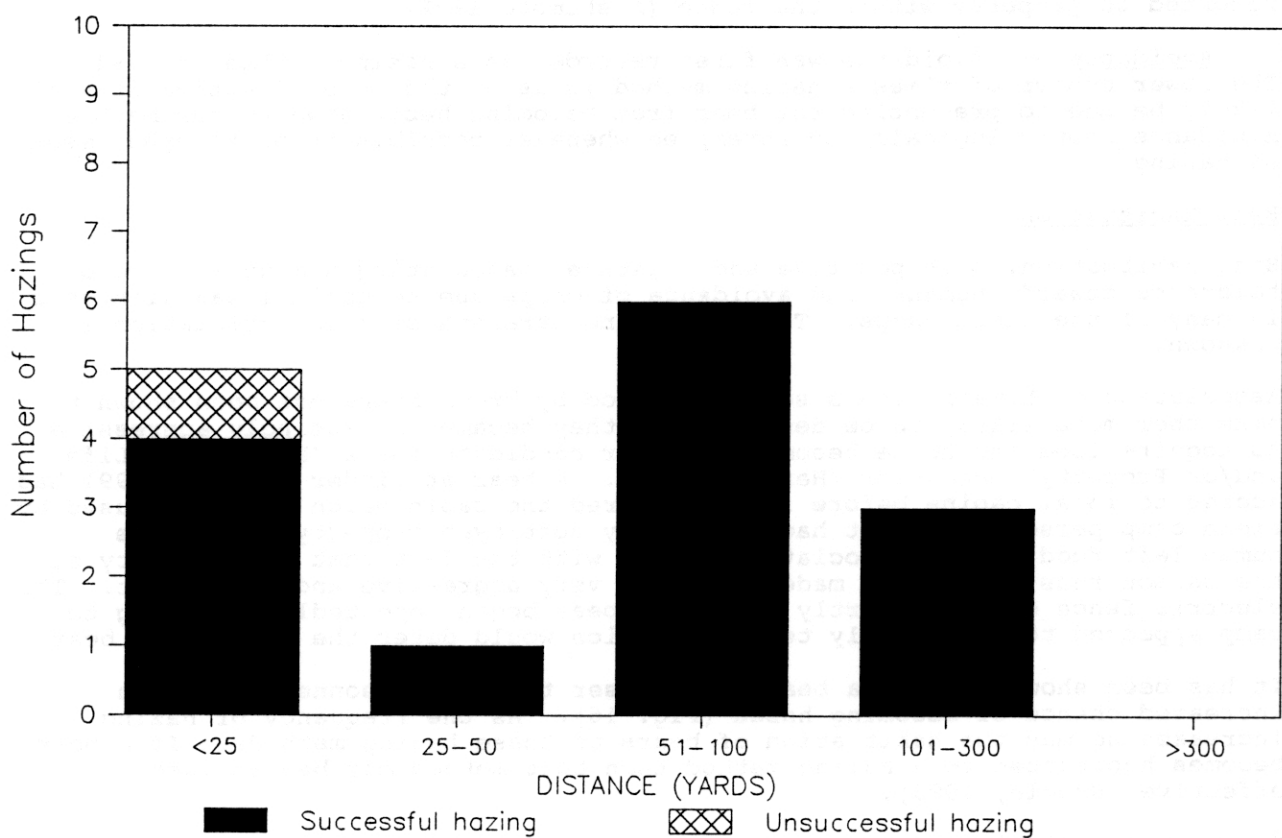


Fig. 21. Successful/unsuccessful hazing by cracker shells, Alaska Peninsula, Alaska, 1989-1992.



**Fig. 22. Successful/unsuccessful hazing by rubber slugs and bird shot, Alaska Peninsula, Alaska, 1989-1992.**

the crew tried to get into position to shoot the bear in the rump, the bear turned to directly face them. Because of this problem, rubber slugs were preferred over bird shot. Bird shot fires a pattern of small lead pellets which would spread more than a single slug. In the above situation, the possibility of hitting the bear in the face with this technique would have been high, potentially injuring the bear and placing the people in a dangerous situation.

Electric Fences.-- Electric fences were used in some of the coastal camps (Puale Bay, Cinder River, Strogonof Point) to protect sections of each camp using the design from Hood (1991). Puale Bay started the use of these fences in 1990 after zodiacs and a 4-wheeler vehicle was damaged in the 1989 season. The fence was put up on the beach so that the zodiacs and 4-wheeler could be kept inside its perimeter. No bear damage occurred to this equipment after the fence was activated. In 1991, fences were also employed at the other coastal camps after bears had successfully obtained food from them. Once the fences were in place, no damage to equipment inside the fence occurred. An electric fence was also employed at Cape Thompson in 1991 with no damage reported to property within the fence (Nishimoto 1992).

Avoidance.-- Avoidance was first recorded as a hazing method in 1991. The fewer number of times a hazing method is used, the more effective it will likely be due to preventing the bear from becoming habituated to the method. Avoidance should logically be attempted whenever possible prior to other means of hazing.

#### Bear Habituation

Bear habituation, both positive and negative (associating humans with food, tolerance towards humans, and avoidance of camps due to hazing) was witnessed in many of the field camps. The extent and strength of this habituation is unknown.

Association of humans with a source of food by brown bears has been shown to make them more likely to be destroyed as they became increasingly aggressive to acquire food and hence become a greater candidate for a "Defense of Life and/or Property" encounter (Herrero 1985). A bear at Cinder River in 1991 had access to local cabins before it encountered the cabin which was being used by field camp personnel and it had previously destroyed property to acquire human-left food. This association, along with the fact that the majority of the salmon runs were over, made this bear very aggressive and persistent. The electric fence erected shortly after the bear began repeatedly returning to camp appeared to be the only technique which would deter the habituated bear.

It has been shown that as a bear gets closer to camp personnel it has an increased chance of becoming hazed (Fig. 16). As the frequency of hazing increases so may the habituation of bears to these hazing methods. If a bear becomes habituated to a hazing method then that method may become less effective (Bromley 1985).

Negative association of bears with field camps could be defined as an form of habituation through the use of negative reinforcement. This association would bring about a non-aggressive retreat of the bear or an aversion of the bear to human presence. Immediate hazing of bears if they entered the field camp perimeter was an example of negative reinforcement methods used. The association of being within the perimeter and a negatively reenforced action such as a cracker shell explosion or being hit in the rump by a rubber slug may keep a bear from entering the camp, especially later in the season when their food is less abundant, when camp personnel may be more relaxed about bear safety, and when bears may be more aggressive to acquire alternate sources of food once the salmon runs diminish. In 1992, Puale Bay had 3 subadults which entered the camp perimeter frequently during the first part of the season. They were hazed each time they entered the camp boundary and as the season progressed, these bears showed less interest in the camp. The bears increased their interest in the camp once again in the fall when the

salmon runs weakened. Berries could be found inside and outside the camp perimeter and the bears could be witnessed just outside the perimeter on many fall days. This decrease in the presence around the camp during the mid-season could also have been attributed to the salmon which were returning to the streams. But bears still entered the compound on occasion to test the burn barrel. Yet this might have been a bigger problem if the season-long association of the camp with negative reinforcement had not occurred.

Attempted association of the Puale Bay field camp with negative reinforcement was carried out with pre-set guidelines. A camp perimeter was established and any bear within that perimeter was hazed immediately, so that the association between the camp and the hazing action could be established. The boundary remained constant throughout the season. The bears were avoided as much as possible outside the camp perimeter and were hazed only if necessary so that the strength of the association between camp and the hazing method would remain high. Rubber slugs were never used outside the camp boundary. Whether this conditioning is remembered from year to year or if these bears would avoid other camps or personnel is unknown. These bears did not, however, retreat from personnel who were outside the camp perimeter at Puale Bay which may mean that the desired association between camp and the hazing action was made and not an association between humans and the hazing action. Bears were always given the right-of-way as much as possible when encountered anywhere outside the camp boundary.

#### Prevention

Perhaps the best method to avoiding dangerous bear encounters was to limit the chances that they will occur. The low number of actual bear hazing encounters could possibly be attributed to the training personnel received and to personnel adhering to the regional bear safety policy when in close proximity to bears.

Camp set-up has been shown to play a major role in preventing dangerous bear encounters (Bromley 1985, Herrero 1985). It encompasses a great number of details such as camp location, layout, food preparation and storage, waste disposal, and availability of hazing methods, which singly, may not seem like much but when all were employed, the overall safety of the camps seemed to be improved toward preventing bear encounters.

Camp locations were usually as far away as possible from known bear habitat such as alder bushes, stream beds and gravel bars. The tents were be set up, usually in a semi-circle rather than tightly put together so that if bears do get into camp they do not feel threatened or trapped by the surrounding tents. Cooking tents, food storage, and burn barrels were kept well away from the sleeping tents.

Cooking was only done in a designated cooking area such as a cook tent or camp-fire type pit. No food was left out where a bear may be able to obtain it. Bear-proof barrels were strongly recommended as they are very effective in reducing problems (Dalle-Molle 1989). Bear hazing methods were nearby while cooking so that an unexpected encounter could be dealt with quickly and properly.

Waste such as food scraps were burned promptly or stored in an air tight container, until they could be properly disposed. A burn barrel seemed to burn waste more completely than a burn pit because the holes in the bottom of the barrel allowed more air to get to the burning garbage and hence give a more complete combustion.

Sump water (discarded water from washing dishes, brushing teeth and general cleaning) was disposed of as soon as possible. Outhouses were treated with lime regularly.



Electric fences (Appendix V), as noted earlier, seemed to be very effective at deterring bears from damaging zodiacs as well as deterring aggressive bears from reentering a camp after food was acquired. However, no bears were actually sighted touching the fence.

No matter what hazing methods were available in the camps, personnel were trained and practiced in all so that they could use them safely and with confidence. All hazing methods as well as firearms were kept in good working order.

#### Comparison Among Field Camps

Describing only the bear encounters without describing the field camps may give the impression that all the camps were equally equipped and set-up in a similar fashion. An explanation of the camps involved in the study can be found in Appendix I.

The camps located on the Bering Sea coast (Cinder River, Stroganof Point) had the most bear-camp related problems. The most likely contributing factor was the food storage technique used in both camps and probable prior habituation of bears to human food and garbage (Appendix I). Cardboard boxes stored in tents at these camps were destroyed and food was acquired by these bears. Once food was acquired, they were very persistent upon returning nightly in order to feed on the camps' food caches. Cinder River staff repeatedly hazed the bear with rubber slugs, bird shot, and once with a hazing grenade (a very loud noise and flash charge), but the bear still returned, some times in less than an hour from the last encounter. Stroganof Point also had their food tent destroyed and their food cache "looted". This bear also returned nightly to feed on their cache. Hazing with bird shot did not deter the bear.

Both of these camps experienced their bear problems during September, when the bears no longer had the heavy salmon runs to feed upon. The Cinder River bear also had access to other cabins in the area which were owned by local fishermen (set-netters) who left food and garbage around the cabins. Evidently this bear was habituated to human food and disturbance before it encountered the Cinder River camp. The Stroganof Point bear did not have any other camps in the immediate area, but may have previously associated humans with a food source before encountering the camp.

Both camps stored food where they slept as well as in the tents which were destroyed. The Cinder River crew had a cabin which offered more protection than the weatherport used at Stroganof Point. Not only was food stored in the sleep areas but cooking was also conducted in the sleeping facilities. This combination, especially at Stroganof Point, may have caused a more serious situation than what actually occurred. The bear did not eat all the food that was stored outside which may have prevented it from trying to enter the sleeping facilities.

Electric fences were constructed around both camps as soon as possible after the bears became a problem. The entire camp was enclosed so that no food could be found outside the fence perimeter. Once the fences were up, all bear problems ceased.

The camp at Becharof Lake stored some of its food outside the cabin in coolers, but the cabin used was isolated on an island at the Island Arm section of the lake. This was not totally protected however, as bears were seen on the island and bear sign was noted around the cabin. The crew usually slept in personal tents and not in the cabin. Despite the temptation of food stored outside the cabin, no bear encounters occurred at this camp.

The camps at Ugashik Narrows were located near a heavily used area where lodges and floatplanes were normal features all summer long. The camp food in 1991 and 1992 was stored in boxes, coolers, and a refrigerator. The camp in 1990 had bear-proof barrels instead of boxes. Although the Narrows does concentrate salmon on their spawning runs, the current is strong and the

channel are deep. The only area fishable by bears was on the west side where the current was weaker and water not as deep (Peter Anselmo, 1992, Fisheries assistance office, King Salmon, pers. commun.). Anselmo also stated that one bear was seen above this west section of the Narrows but no bears were seen near the camp in 1992 nor in 1991 and that the lodge nearby has only had one bear encounter in its last 10 years of operation. The public use camp located at the Narrows in 1990 had 3 occasions where they hazed bears, inside the camp perimeter at night with cracker shells and flares. No property damage was reported.

The camps on the Pacific side (Oil Creek, Puale Bay) of the peninsula had problems in 1989 with bears damaging boating equipment. The boating equipment was kept on the beach away from camp, making it hard to protect it from bears which frequently travelled the beaches. Zodiacs, a 4-wheeler seat, and cans of motor oil were damaged or destroyed by bears. In subsequent years, electric fences were constructed to surround the equipment and provide protection (Hood 1991 and Appendix V). After the use of electric fences at Puale Bay, no damage to boat equipment has occurred.

The Puale Bay camp had several instances of bears being inside the camp perimeter; however, none attempted to get food from the cooking weatherport. Some bears actually walked within 5 yards of the cooking weatherport with no apparent interest. The problem witnessed at Puale Bay was the burn barrel and the sump water pit. These were located together about 40 yards from the camp itself. Bears seemed to be attracted to the sump water pit and evidence of bears pawing through the pit as well as actual bears seen at the pit were documented. Upon viewing the contents of the pit, small bits of food could be seen. The amount of food dumped every day was probably small but it accumulated as time went on and more water was dumped into the shallow pit.

The Gertrude Creek camp was north of Becharof lake on the Gertrude Creek tributary. Some food at this camp was stored in a cooler which was kept 100 yards behind the cooking weatherport in a hole 3 feet deep (John Crye, FWS, King Salmon, Alas., pers. commun.). The cooler was covered in a burlap bag and large rocks. A subadult bear came through the camp at dusk one evening and knocked over the BBQ pit behind the cooking weatherport. This notified the crew that a bear was inside the camp perimeter. By the time the camp supervisor saw the bear, it had already found the cooler and was feeding on a pork roast. The camp supervisor shot 3 shots from a .375 H&H magnum rifle over the bears head and the bear ran approximately 50 yards and then stopped, looking back at the supervisor and the cooler. The same bear came back later that same night to the cooler, but the food had been removed. The bear came back the following morning and cracker shells were used to haze it from the area. After this hazing, the bear failed to return.

## CONCLUSIONS

In both interior and coastal camps, most of hazing encounters occurred in habitat characterized by low visibility, caused by heavy vegetation or rolling hills and sand dunes.

The peak of bear activity on the Alaska Peninsula coincided with the abundance of spawning salmon in peninsula rivers and streams; however, hazing encounters had a second peak in September which could probably be attributed to the decline in salmon abundance forcing bears to seek alternative food sources. At that time, bears seemed to become increasingly bold and approached camps with greater frequency and were more aggressive when encountered. Most problem bears were encountered during the month of September.

Bear encounters occurred at all times throughout the day with encounters being more common between 1600-1900 hours. Most encounters between 2400-0600 were inside camp perimeters where bears were immediately hazed.

More than 50% of all encounters included subadults; however, boars were also prominent in hazing encounters while sows with cubs and unknown bears were more frequent in non-hazing encounters.

All bears found destroying property were hazed immediately. Travelling was a prior behavior seen frequently in both hazing and non-hazing encounters. Bears which were recorded as "non-aggressive approach" were hazed more while those recorded as "slow avoidance" were hazed less.

There was a significant negative correlation found between distance and the percentage of encounters which were hazed ( $p < 0.001$ ). Aggressive encounters were seldom seen in the 4 years of encounters studied, so a recommended distance to maintain to avoid aggressive attacks in field camps could not be made. The average distance of encounters as the season progressed seemed to show that encounters began to decrease in average distance, perhaps due to the more aggressive nature of some bears or due to personnel becoming more "relaxed" about having bears nearby.

Personal preferences with hazing methods from 1989 to 1992 showed that shout/talk/wave and shots fired in the air were used most at ranges of 51-100 yards, flares were used most at ranges of 51-300 yards, and cracker shells and rubber slug/bird shot were used most at ranges of less than 25 yards. Each hazing encounter has different situations which should dictate what hazing method is most appropriate. Common sense and proper training should be used in every hazing encounter. The success of all hazing methods mentioned was high, however, all hazing methods were unsuccessful at ranges greater than 300 yards. These hazing distances should be taken as the general effective ranges of the above hazing methods.

Electric fences were very effective in protecting camp field gear, even from aggressive, habituated bears.

Avoidance allows hazing methods to be utilized only when necessary and may prevent habituation to these devices by bears. Perhaps the best method of avoiding dangerous bear encounters is to limit the chances that they will occur through proper planning and training.

## RECOMMENDATIONS

1. The use of "Bear observation forms" and "bear incident report forms" by field camps on the Alaska Peninsula should continue so that hazing methods and bear encounters can be documented. The information gathered on what hazing methods work best and what methods are preferred by personnel in the field as well as the details of all bear encounters may help field camps and brown bears to continue to coexist without serious incident.
2. Safety courses in bear safety should be given to all field camp personnel before they are sent into the field. Prevention and common sense should never be replaced by hazing methods and these methods should never be thought of as 100% effective. The course should include bear identification (sex and age approximation); bear biology, habits, and behavior; camp design in bear country; human behavior around bears; bear hazing methods; firearms training for bear protection (rifle and shotgun); FWS bear policy and "Defense of Life and Property" procedures as outlined by Rogers (1991).
4. Prevention is probably the best action to avoid dangerous encounters with brown bears. However, if hazing methods should be employed, it seems best that they should be used only within their effective range and in increasing order of severity. If more severe methods are employed than are needed there is the possibility that bears may become habituated to them which may render the lesser methods as well as the more severe methods ineffective.
5. All bears should be hazed if they are found within the perimeter of the camp. They should receive negative reinforcement for entering the camp so that they do not return. This may prevent damage to property, personnel, and to the bear itself should it become habituated and return continually.
6. Cracker shells should be substituted for live shots fired in the air to prevent dangerous situations when live ammunition is discharged.
7. Field personnel should remain "bear aware" throughout their entire field season. Individual bear behavior is unpredictable and caution should always be exercised when in bear habitat. The closer a bear is allowed to get to camps or personnel, the more chance that hazing may have to be used.
8. Areas of thick vegetation and heavy growth such as riparian corridors should be avoided whenever possible. If this is not possible, all caution should be taken as most close hazing encounters occur in such habitats. Noise should be made while travelling so as to avoid a surprise encounter.
9. Bears should be given right-of-way in all habitats except inside the camp perimeter.

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Biological Technician Greg Thomson and Volunteers Denise White, Zeke Peters, Hilda Sexauer, Mike Cook;  
Puale Bay Field Camp -  
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- 1990 Puale Bay Field Camp -  
Biological Technician Greg Thomson and Volunteers Bill Stahl, Gregor Yanega, Chris Simoniello, Lynn Schwartz, Patrick Opay;  
Ugashik Narrows Field Camp -  
Park Ranger Bill Struble and Volunteers Jeff Morales, Alison Zirkle, Mary Auburn;
- 1991 Puale Bay Field Camp -  
Biological Technician Christine Berkman and Volunteers Toby Burke, Jim McCarthy, Carol Snetsinger, Mike Moore;  
Gertrude Creek Field Camp -  
Fisheries Biologist Jeff Adams, Biological Technician John Crye and Volunteers Dan Rogers, Bridget Callahan;  
Ugashik Narrows Field Camp -  
Fisheries Technician Selso Villegas and Volunteers Pete Anselmo, Yoshi Taniguchi;  
Becharof Lake Field Camp -  
Fisheries Technician Dewey Eaton and Volunteers Molly Stolarczyk, Mike Vaughn;  
Cinder River Field Camp (Autumn) -  
Biological Technician Amy Seidl and Volunteer Toby Burke;  
Strogonof Point Field Camp (Autumn) -  
Biological Technician Dave Wolfe and Volunteer Dave Boyd;
- 1992 Puale Bay Field Camp -  
Biological Technician Kevin Boden and Volunteers Jim McCarthy, Laurie Cleary, Nikki Benjamin, Nancy Cook, Dave Anderson, John Gerlach, Meredith Bridgers;  
Ugashik Narrows Field Camp -  
Fisheries Technicians Selso Villegas, Toby Burke, Pete Anselmo; and  
Becharof Lake Field Camp -  
Fisheries Technicians Dewey Eaton, Scott Springer, Eric Dhruv.

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## **APPENDICES**



Appendix I. Comparison of field camps on the Alaska Peninsula, Alaska, 1989-1992.

Year of camp:		1989	1990	1991
Location:		Oil Creek	Puale Bay	Puale Bay
# People		5	6	4
Facilities				
cooking	weatherport a	weatherport a	weatherport a	weatherport a
working	weatherport b	weatherport b	weatherport b	weatherport b
sleeping	weatherport b	weatherport b	weatherport c	weatherport c
overall	2 weatherport	2 weatherport	3 weatherport	3 weatherport
Surveys		avian	avian	public use
Hazing Available				
rifle	yes	yes	yes	yes
shotgun w/slugs	yes	yes	yes	yes
cracker shells	yes	yes	yes	yes
rubber slugs	yes	yes	yes	yes
flares	yes	yes	yes	yes
pepper spray	yes	yes	yes	yes
electric fence	no	no	no	yes <sup>1</sup>
if yes, where				on beach
Food Storage				
storage type	barrel, cooler	barrel, cooler	barrel, cooler	barrel, cooler
	refrig.	refrig.	refrig.	cabinet, refrig
where stored	weatherport a	weatherport a	weatherport a	weatherport a
distance from	40 yards	20 yards	15 yards	20 yards
sleep facilities				
Trash Disposal				
incinerator barrel	yes	yes	yes	yes
fire pit	yes	no	no	no
back-haul	yes	yes	yes	yes
bury	no	no	no	no

<sup>1</sup> Electric fence constructed after bears damaged inflatable boats and 4-wheeler.

Appendix I. (Cont.) Comparison of field camps on the Alaska Peninsula, Alaska, 1989- 1992.

Year of camp:		1991	1991	1991	1991
Location:		Gertrude Creek	Ugashik Narrows	Becharof Lake	Cinder River
# People		3	3	3	2
Facilities					
cooking		weatherport a	large tent a	cabin a	cabin a
working		weatherport a	large tent a	cabin a	cabin a
sleeping		tents (3)	tents (3)	tents (3)	1 tent
overall		1 weatherport	1 large tent	1 cabin	1 cabin
		3 sleep tents	3 sleep tents	3 sleep tents	1 tent
Surveys		fish	fish	fish	avian
Hazing Available					
rifle		yes	yes	yes	yes
shotgun w/slugs		yes	yes	yes	yes
cracker shells		yes	yes	yes	yes
rubber slugs		yes	yes	yes	yes
flares		yes	yes	yes	yes
pepper spray		yes	yes	yes	yes
electric fence		no	no	no	no
if yes, where				yes <sup>1</sup>	yes <sup>1</sup>
				around camp	around camp
Food Storage					
storage type		boxes, coolers	boxes, coolers	boxes, coolers	boxes, coolers
		refrig.	refrig.	refrig.	
where stored		weatherport	large tent	in and near cabin	cabin, tent
distance from		20-25 yards	20 yards	10 yards	5 yards
sleep facilities					2 yards
Trash disposal					
incinerator barrel		no	no	yes	no
fire pit		no	no	yes	yes
back-haul		yes	yes	yes	yes
bury		no	no	no	no

<sup>1</sup> Electric fence was used around camp after bears broke into and acquired camp food.

Appendix 1. (Cont.) Comparison of field camps on the Alaska Peninsula, Alaska, 1989-1992.

Year of Camp:		1992		1992			
Location:		Puale Bay		Ugashik Narrows		Becharof Lake	
# People		4		3		3	
<u>Facilities</u>							
cooking		weatherport a		weatherport a		cabin a	
working		weatherport b		weatherport a		cabin a	
sleeping		weatherport c		tents (3)		tents (3)	
overall		3 weatherport		1 weatherport		1 cabin	
				3 tent		3 tent	
Surveys		avian		fish		fish	
<u>Hazing Available</u>							
rifle		yes		yes		yes	
shotgun w/slugs		yes		yes		yes	
cracker shells		yes		yes		yes	
rubber slugs		yes		yes		yes	
flares		yes		yes		yes	
pepper spray		no		no		no	
electric fence		yes		no		no	
if yes, where		on beach <sup>1</sup>					
<u>Food Storage</u>							
storage type		barrels, coolers boxes, coolers cabinet, refrig. refrig.		boxes, coolers refrig.			
where stored		weatherport a		weatherport a		in and near cabin	
distance from		20		15-18		5-8	
sleep facilities							
<u>Trash Disposal</u>							
incinerator barrel		yes		yes		no	
fire pit		no		no		yes	
back-haul		yes		yes		yes	
bury		no		no		yes	

<sup>1</sup> Electric fence was used to protect 4-wheeler and inflatable boats.



Appendix II. Brown bear non-hazing/observation form, Alaska Peninsula, Alaska, 1989-1992.

## ALASKA PENINSULA -- BROWN BEAR NON-HAZING/OBSERVATION RECORDS

[illegible]

KEY:

## Sex

B = Boar

I = Sub-adult

**S = Sow**

S/2 = Sow w/ 2 cubs

U = Unknown

### Vegetation

T = Tundra

G = Grass

W = In water

Habitat

R = Riparian

L = Lake

U = Upland Tundra

B = Upland Brush

Be = Beach

H = Hills & Dunes

M = Mountains

La = Lagoon

Behavior

F = Feeding/Fishing

L = loafing

D = digging

T = traveling

SA = Slow avoidance

FA = Fast avoidance

AP = Aggressive approach

NA = Non-aggressive approach

St = Stationary

I = Interacting w/other bears

S1 = Sleeping





Appendix III. Brown bear incident report form for hazing encounters, Alaska Peninsula, Alaska, 1989-1992.

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**BEAR INCIDENT REPORT FORM**

**Alaska Peninsula/Becharof NWR - Puale Bay Field Camp**

**Name of Person Reporting Incident** \_\_\_\_\_

**Date** \_\_\_\_\_ **Time (24 hr clock)** \_\_\_\_\_

**Names of persons involved in incident** \_\_\_\_\_

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**Species:** Brown Bears

**Category (#):** Unknown      Sub-adult      Boar      Lone Sow  
Sow w/ Newborns      Sows w/yearlings+      Unknown

<b>Habitat:</b>	<u>Terrain</u>	<u>Vegetation</u>	<u>Visibility</u>
	flatlands	tundra	< 5 yds
	riparian	grass	5-10 yds
	hills/dunes	brush	10-25 yds
	mountains	trees	> 25 yds
	beach/lakeshore	water	
	In Camp		

**Known Bear Attractants in Area:**

Spawning fish      Carrion      Human Food      Garbage      None known

**Human activity prior to incident:**

<u>Camped</u>	<u>Surveys</u>	<u>Other Activities</u>	<u>Human behavior</u>
cabin	Avian	Hiking	Stationary
weatherport	Vegetative	Boating	Avoidance
tent	Creel	Fun fishing	Approach
	Electroshock	Other _____	

**Bear activity leading to incident:**

Feeding on Vegetation	Unknown
Feeding on Fish/Carrion	Stationary
Digging	Slow Avoidance
Sleeping	Fast Avoidance
Fishing	Aggressive Approach
Interacting w/ other bears	Non-agress approach
Destruction of Property	Stationary aggression

**Distance from bear when incident began (yds/m)** \_\_\_\_\_

**Equipment Available:** Rifle      Shot Gun (w/slugs)      Crackers  
Flares      Boat Horn      Chem repell      Rubber slugs

Initial Action (Human)

Avoidance  
Talking Calmly to bear  
Waving/shouting  
Cracker shells  
Flares (gun/handheld)  
Crackers w/flares  
Rubber slugs  
Shot in Air  
Other \_\_\_\_\_

Bear(s) Response

Resumed previous behavior  
Slow Avoidance  
Fast Avoidance  
Stop/Alert  
Stands Upright  
Aggress Approach  
Non-aggress Approach

Second Action (Human)

Avoidance  
Talking Calmly to bear  
Waving/shouting  
Cracker shells  
Flares (gun/handheld)  
Crackers w/flares  
Rubber slugs  
Shot in Air  
Other \_\_\_\_\_

Bear(s) Response

Resumed previous behavior  
Slow Avoidance  
Fast Avoidance  
Stop/Alert  
Stands Upright  
Aggress Approach  
Non-aggress Approach

Third Action (Human)

Avoidance  
Talking Calmly to bear  
Waving/shouting  
Cracker shells  
Flares (gun/handheld)  
Crackers w/flares  
Rubber slugs  
Shot in Air  
Other \_\_\_\_\_

Bear(s) Response

Resumed previous behavior  
Slow Avoidance  
Fast Avoidance  
Stop/Alert  
Stands Upright  
Aggress Approach  
Non-aggress Approach

Did Group have Designated Shooter:    Yes    No

Contributing Factors:    Poor Visibility    Background Noise  
Downwind from Bear    Other \_\_\_\_\_

If Deadly Action was required:

Total Shots fired: \_\_\_\_\_ Total Hits: \_\_\_\_\_ Rifle/Shot Gun

# Shooters \_\_\_\_\_ Human Injury:    Yes/No

Bear Result:    Death    Injured but not found

If Camp was a factor in the incident:

Was bear successful in acquiring food:    Yes    No

How was food stored: Metal drums    Cooler    Plastic Bags    Open

Where was food stored: Cabin    Tent    Weatherport    Pack    Ground

Distance food stored from camp:    in camp    < 20 yds    20-50 yds  
50-100 yds    >100 yds

Camp Deterrent Systems Used:    Electric Fence    Other \_\_\_\_\_

Appendix IV. Terminology and explanation of terms and definitions used to classify encounters and hazing events, Alaska Peninsula, Alaska, 1989-1992.

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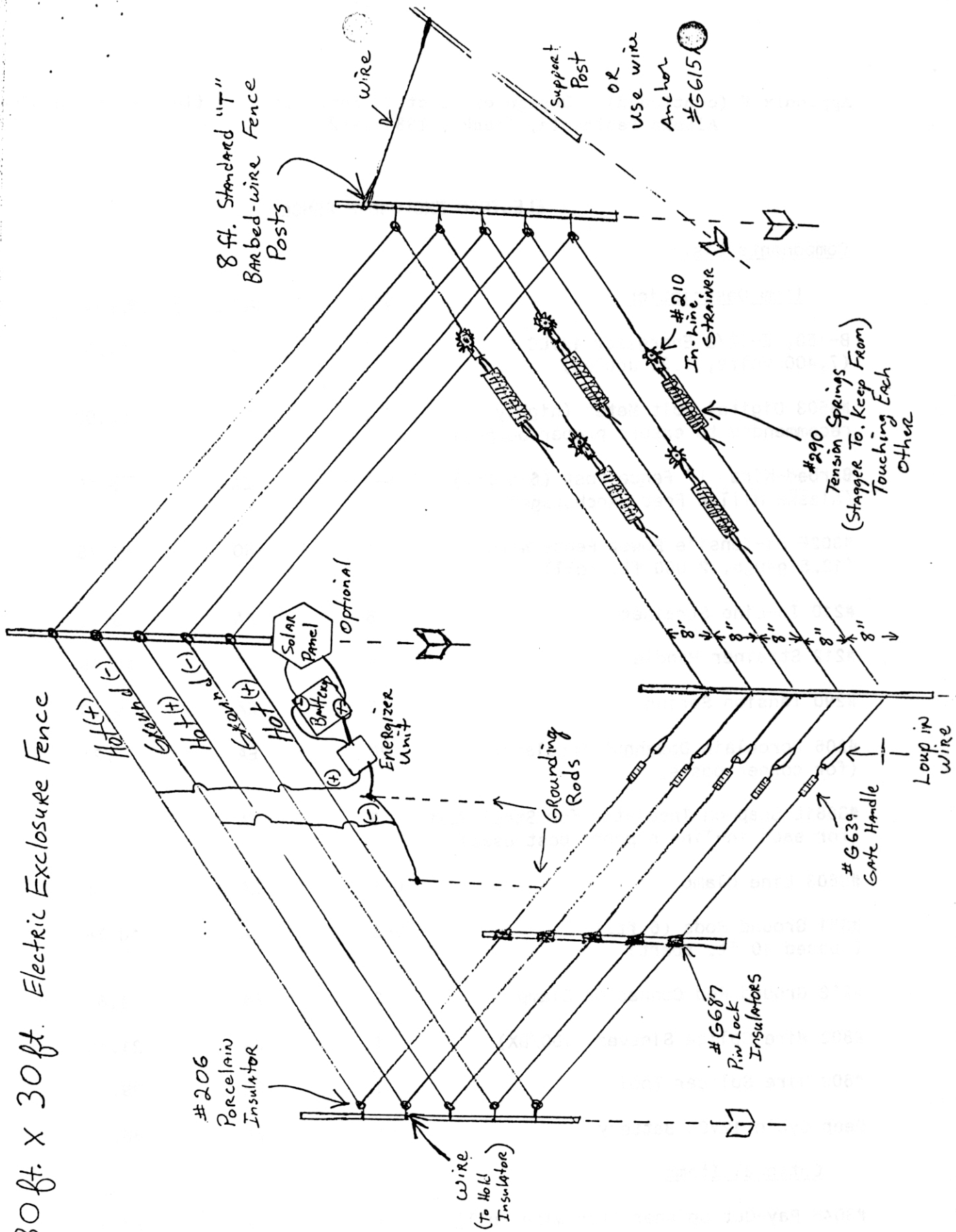
Encounter	-- Any bear incident or sighting at any distance whether or not hazing was required.
Hazing	-- An action taken to deter or repel a bear for protection of personnel or property.
Non-hazing encounter	-- Non-hazing encounters are encounters where bears are sighted but hazing was not used.
Hazing encounter	-- Hazing encounters are encounters that involve the use of bear deterrent/repellents
Hazing action	-- Hazing action is a single application of a hazing method used during a single encounter.
Hazing method	-- Hazing method is a specific deterrent/repellant technique. For example, if 3 cracker shells were fired during a single hazing encounter then there were three hazing actions and cracker shells were the hazing method used for each action.
Habituation	-- Habituation describes a situation where a bear has been exposed to and made familiar with human presence by frequent repetition or prolonged exposure. It also describes the tolerance of habituated bears towards human presence and the hazing methods employed.
Brown bear response	-- A brown bear response was recorded after every hazing encounter. The response is the behavior of the bear once hazed and was categorized into one of the behaviors listed on the incident form.
Resumed previous behavior	-- Resumed previous behavior is a response category used to describe a bear's lack of reaction to a hazing method. The behavior of the bear remained the same as that observed before the hazing method was employed.
No response	-- The term used in the report to describe a lack of reaction.
Stop/Alert	-- Stop/alert is a bear response category used to describe the behavior of ceasing its pre-hazing behavior and initiating behaviors related to evaluating its environment and situation such as sniffing the wind and standing up.
Slow avoidance	-- Slow avoidance is a bear response category which describes the bear as moving away from the hazer in any direction or distance at a slow pace, that is, not running.
Fast avoidance	-- Fast avoidance is a bear response category which describes the bear as moving away from the hazer in any direction or distance at a fast pace, that is, running.

Appendix IV (cont.). Terminology and explanations of terms and definitions used to classify encounters and hazing events, Alaska Peninsula, Alaska, 1989-1992.

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Aggressive approach	-- Aggressive approach describes a bear as approaching the hazer at any direction or distance showing signs of aggression such as ears back, head position low, gnashing teeth, running, swatting the ground, rocking back and forth on stiffened legs, or popping jaws.
Non-aggressive approach	-- Non-aggressive approach describes a bear as approaching the hazer at any direction or distance without showing signs of aggression.
Successful hazing	-- Successful hazing is a description of a hazing action if the bear responds by either a slow or fast avoidance.
Unsuccessful hazing	-- An unsuccessful hazing is a description of a hazing action if the bear responds by any behavior other than a slow or fast avoidance.
Positive habituation	-- Habituation which would decrease the possibility of a bear becoming involved in a potentially fatal encounter.

# 30 ft. x 30 ft. Electric Enclosure Fence



Appendix V (continued). Design of electric fence used in field camps on the  
Alaska Peninsula, Alaska, 1989-1992.

ELECTRIC EXCLOSURE FENCE

Components List:

<u>Item Description</u>	<u>Qty</u>	<u>Unit</u>	<u>Price Each</u>
B-150, E-12/2 Energizer 12VDC (7,400 Volts, 1.35 Joules)	1	EA	\$214.50
#G503 Digital Volt Meter (highly recommended to ensure proper output)	1	EA	82.00
Barbed-Wire "T" Fence Post (6-8 ft.) (Alaska Mill & Feed, Anchorage)	5-9	EA	5.15
#302F Hi-Tensile Power Fence Wire (12.5-gauge, 2,000 ft. roll)	1	RO	52.75
#210 In-Line Strainer	5	EA	3.75
#212 Strainer Handle	1	EA	10.75
#290 Tension Spring	5	EA	9.50
#206 Porcelain Doughnut Insulator (for corner posts)	20	EA	.31
#G681L Snap-on Insulator for Steel Post (for each in-line support post used)	5	EA	.42
#G603 Line Clamp	0-6	EA	.49
#351 Ground Rods (6 ft.) (spaced 10 ft. apart)	2-3	EA	10.75
#352 Ground Rod Connector Clamp	2	EA	1.65
#802 Wire Splice Sleeves (100/BX)	1	BX	21.10
#809 Wire Splicer Tool	1	PR	99.50
Deep Cycle 12VDC Battery	1	EA	80.00
<u>Optional Items</u>			
#304H Pay-Out Spinner (for wire roll)	1	EA	70.00
Post Driver	1	EA	???
#G615A Screw-in Tie Down (anchor for each corner post)	4	EA	3.00
#G616A Screw-in Tie Down Handle	4	EA	16.00



Appendix V (continued). Design of electric fence used in field camps on the Alaska Peninsula, Alaska, 1989-1992.

#522 Power Fence Pliers	1	PR	29.00
#131 Solar Panel (10 watt)	1	EA	290.00

The above electric fence supplies can be procured through the Gallagher Power Fence, Inc. representative in Alaska at:

Alaska Power Fence  
Mile 15.5 East End Road  
H.C.R. 35250 Schade Lane  
Homer, AK 99603  
(907)235-7055 or 8949

In 1989, we operated a field camp on the Pacific Coast of Becharof Refuge at Paule Bay. For a variety of reasons we had to leave the Zodiac inflatable boat and 4-wheel ATV on the beach at the base of the dunes. Two instances occurred where brown bears "sampled" (bit or clawed) the boat and ATV causing severe damage.

In 1990, this 30 ft. x 30 ft. electric exclosure fence was set up. No bears got inside the fence therefore we incurred no damages. All factors were constant except for the new fence. One bear was actually observed approaching the fence and being repelled (it ran away). Another bear was observed approaching the fence, the observer ran to get a camera/gun, upon returning the bear was headed away from the fence.

It is our opinion the fence works and is well worth the minor expense to procure. Our resident expert is Deputy Manager Rick Poetter and if you have questions feel free to contact him.

