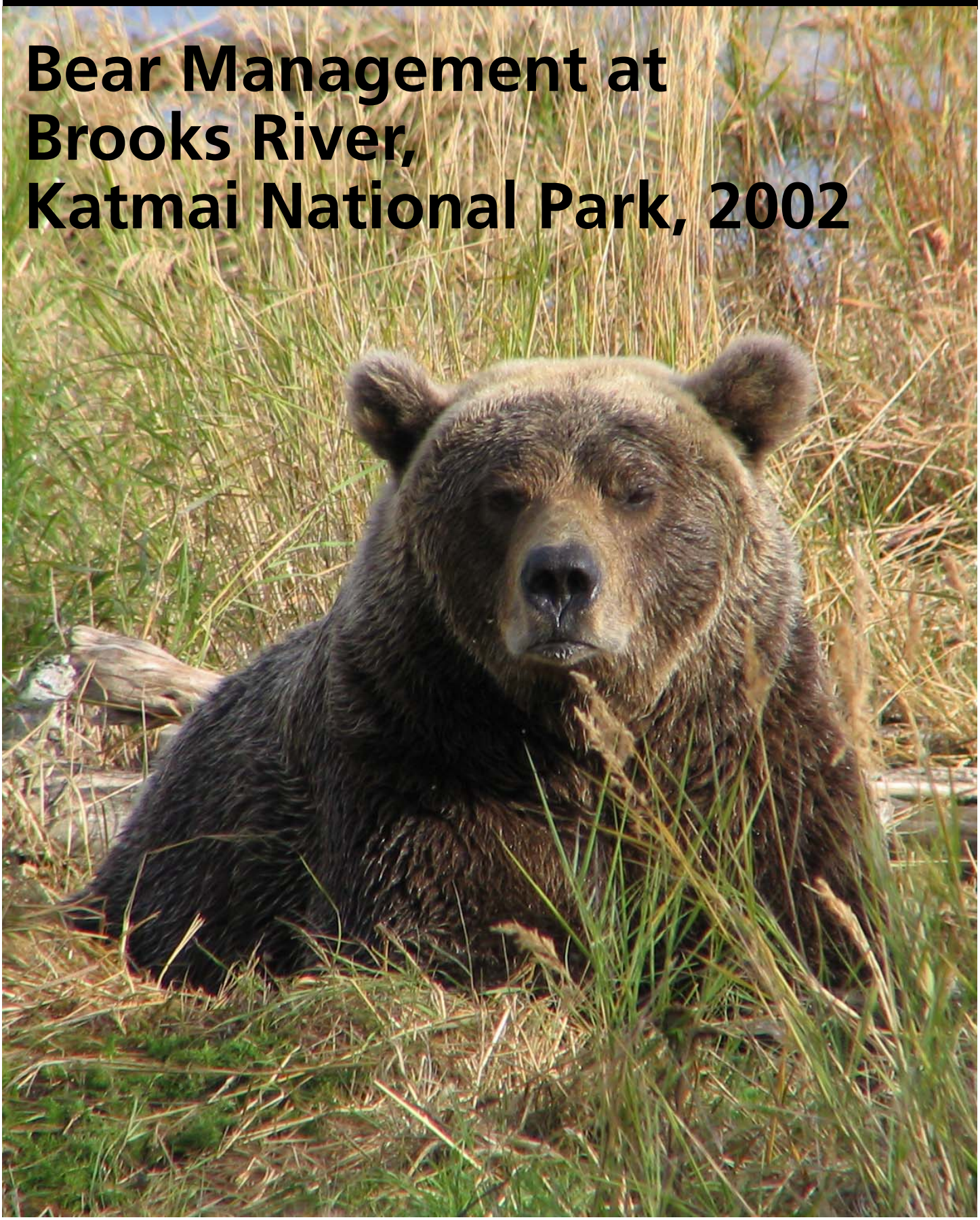
Katmai National Park and Preserve

National Park Service
U.S. Department of the Interior

Bear Management at Brooks River, Katmai National Park, 2002



Alaska Region Technical Report Series

Natural Resources Technical Report NPS/AR/NRTR-2007-62.

The National Park Service Alaska Region carries out scientific research and resource management programs within 16 different park areas in a wide range of biological, physical, and social science disciplines. The purpose of the Alaska Region Technical Report Series is to make the written products that result from these activities readily available. They are prepared primarily for professional audiences and internal use within the National Park Service, but copies are also available to interested members of the public.

Alaska Region's team of scientists and other professionals work to inventory, monitor, and protect both the natural and cultural resources of the park areas and to bring an understanding of these resources to both the professional and lay public. A wide variety of specialists, including archaeologists, biologists, ethnographers, geologists, hydrologists, and paleontologists; conduct ongoing studies of every type and description in the Alaska parklands. Each year the National Park Service adds new information about Alaska's parks and reports in this technical series are representative of the Service's commitment to share these findings with the larger world.

Copies of Technical Reports can be obtained by contacting Greg Dixon, Cultural Resources Technician at the National Park Service, Alaska Regional Office, 240 W. 5th Avenue, Room 114, Anchorage, AK 99501-2327, or by telephone at (907) 644-3465, or e-mail at greg_dixon@nps.gov

Front Cover: **A brown bear rests on the bank of Brooks River, Katmai National Park, Alaska. Photo by Howard Maltby, NPS.**

BEAR MANAGEMENT at BROOKS RIVER, KATMAI NATIONAL PARK, 2002

Erin K. Bentley
Tamara L. Olson
and
Carlton I. Vaughn

Katmai National Park and Preserve
PO Box 7
King Salmon, AK 99613

November 2007

Alaska Region Natural Resources Technical Report
NPS/AR/NRTR-2007-62

National Park Service
U.S. Department of the Interior

Bear Management at Brooks River, Katmai National Park, 2002

ERIN K. BENTLEY, Katmai National Park and Preserve, King Salmon, AK 99613, USA
TAMARA L. OLSON, Katmai National Park and Preserve, King Salmon, AK 99613, USA, email: tammy_olson@nps.gov
CARLTON I. VAUGHN, Katmai National Park and Preserve, King Salmon, AK 99613, USA

Abstract

Bear-human interactions and other bear management events of concern were documented at Brooks River, Katmai National Park, from 20 May–8 October 2002. A total of 165 reports of undesirable incidents involving bears and people were recorded for the 139 days between the first and last documented events. Most interactions (71%) were recorded during July and September. Bears directly or aggressively approached people in 11 instances, 3 of which involved bear charges. Only 1 incident was recorded in which a bear obtained human food (the bear bit into a beverage can). Although 3 incidents were documented during July in which bears obtained fish from people, a multi-year comparison suggested that the regulation limiting human retention of fish at Brooks River to below the floating bridge may have contributed to a reduction in "fish stealing" incidents. Eighty instances of NPS staff actively hazing bears from the Brooks Camp residence area were documented; however, many similar responses went unrecorded. We suggest that increased staff presence to directly oversee human behavior around bears, along with several changes to the current configuration of local infrastructure, could help to reduce bear-human conflicts at Brooks River.

Key Words

Alaska, Brooks River, bear-human interactions, brown bear, *Oncorhynchus nerka,* salmon, *Ursus arctos*

Brooks River, a significant salmon stream for brown bears (*Ursus arctos*) in Katmai National Park and Preserve (KATM), has averaged >9,500 visitor days of use per year over the past decade (B. Brock, KATM, unpublished data). Bear viewing is currently the predominant visitor activity at Brooks River; however, sport fishing is also popular. Because human-bear conflicts can ultimately result in bears being removed from the population or in human injury or death, preventing undesirable interactions is of concern to park managers. Consistent with the KATM's General Management Plan (NPS 1986), a bear-human conflict management plan (BMP) has been updated and revised (NPS 2001) with an emphasis on preventative management primarily through education and proper storage and handling of food and garbage. The BMP also provides guidance on responsive management, including use of hazing equipment to prevent or eliminate undesirable bear behavior. To evaluate the effectiveness of the bear management program, as well as to collect data on human-bear interactions that may be useful for park planning, the BMP tasked resource management with documenting bear-human interactions at Brooks River using Bear Management Report Forms (BMRFs). This report summarizes Brooks River BMRF data collected during the 2002 field season.

STUDY AREA

Brooks River is located approximately 53 km east of King Salmon, Alaska. The river is 2.5 km in length, flowing from Brooks Lake into Naknek Lake, with a 2-m high falls midway (Fig. 1). Sockeye salmon (*Oncorhynchus nerka*) migrate up Brooks River during late June through July and spawn in the river during late August through October (Merrill 1964). A small run of coho salmon (*Oncorhynchus kisutch*) also occurs in the river in early September. The seasonal pattern of brown bear activity at Brooks River follows the pattern of salmon activity. During July, bear activity is focused at Brooks Falls, where migrating salmon are particularly vulnerable to bear predation. During the fall, bear activity is more focused downstream of the falls, where spawned-out salmon carcasses tend to accumulate. People come to Brooks River to view and photograph bears and to fish for salmon, rainbow trout (*Oncorhynchus mykiss*), arctic grayling (*Thymallus arcticus*), and other species.

Brooks Camp, which is located just north of the mouth of Brooks River along the Naknek Lake shoreline, provides services for visitors to the area, including a 60-person lodge, a visitor center, and employee housing and support facilities. A 60-person campground is located about 200 m north of Brooks Camp along the shoreline (Fig. 1). All access to Brooks River is by floatplane or boat.

Elements of the Bear-Human Conflict Management Program at Brooks River, 2002

Wildlife Viewing Structures.—There were 3 viewing platforms available on the south side of Brooks River for visitor use (Fig. 1). To reach the bear viewing platforms from Brooks Camp, visitors traveled along a hardened path that led to the mouth of the river then paralleled the river about 100 m. A floating bridge allowed visitors to cross the river by foot (in 2002 the bridge was available to visitors past the end of the second week of October, when it was removed). The Lower River Platform is located adjacent to the bridge on the south side of the river. To reach the Riffles and Falls platforms, visitors continue along a gravel road to the Brooks Falls trailhead, and then proceeded through the woods along a hardened trail that connected to an elevated walkway. The elevated walkway led to an elevated covered intersection, where separate walkways connected to the Riffles Platform and to the Falls Platform. The Riffles Platform and the elevated walkways were constructed during the summer and fall of 2000. The 2002 field season was the second year of use for these structures.

Visitor Access.—Although the established trails and viewing structures were recommended routes and destinations for bear viewers, Brooks River visitors were permitted relatively unrestricted access throughout the area. However, several restrictions applied. Visitors were required to: 1) stay at least 50 m from any single bear and 100 m from any female with young, 2) camp only in the electric-fence-enclosed campground or at least 8.05 km (5 mi) beyond Brooks Camp; 3) upon arrival at Brooks Camp, receive an

approved bear orientation from an NPS ranger (or in some cases by a guide approved through the Brooks River Guide Training Program); and 4) leave no gear unattended (Appendix A). In addition, the Falls and Riffles viewing platforms, walkways, and surrounding areas were closed between 2200 and 0700 hours (Appendix A), the Falls Platform was actively managed for use by a maximum of 40 people (NPS 2000), and the boardwalks were managed as travel routes only (loitering along the way was discouraged). State of Alaska regulation prohibited fishing within 91 m (300 ft) of the Brooks Falls fish ladder (05 AAC 75.050). Anglers avoiding this stretch of the river were asked to use the boardwalk-platform complex to travel through the area. Lodge facilities and the Brooks Campground were open through 18 September 2002 (last overnight visitor stays occurred 17 Sep).

Food and Garbage Storage and Handling.—Storage of food, garbage, and harvested fish was only permitted in an approved bear resistant food container, a designated food cache, a hard-sided building, or within a secured section of an aircraft or boat (Appendix A). Fish harvested by visitors were stored whole in the Fish Freezing Building. Because of past problems with bears breaking into bear-resistant garbage containers, garbage receptacles have been kept inside hard-walled structures since mid-season, 1998 (Carden and McFarland 1998). Picnicking was restricted to the Brooks Campground, the food cache near the Visitor Center, and the Brooks Lake shelter (Appendix A). Due to its deteriorating condition, in 2002 the historic elevated food cache in the Brooks Camp Visitor Center picnic area was replaced with a ground-level hard-walled shed. In addition, because the gear and food caches in the Brooks Campground were within the campground's electric perimeter fence, in 2002 the smaller electric fence surrounding these structures was removed. State of Alaska regulation permitted retention of human-caught fish on Brooks River only below the floating bridge (regulation implemented 1998; 05 AAC 67.022(a)), and the bag limit was one fish per day (36 CFR 13.66(b)(3)). Anglers were required to immediately bag and take any fish caught to the Fish Freezing Building in Brooks Camp.

Bear Management Actions.—The BMP provided detailed guidance on use of various hazing techniques to deter undesirable bear behavior (e.g., trespassing within residence areas, obtaining food or fish from people, directly approaching and following people; NPS 2001). Hazing techniques used at Brooks River included yelling and clapping, air horns, bird scare devices (bangers and screamers) fired from a 15-mm pistol-like launcher, and 12-gauge deterrent rounds (cracker shells, beanbags, and rubber/plastic bullets). Only NPS staff that had received requisite training used deterrent rounds.

NPS Staffing.—Three seasonal resource management staff were stationed at Brooks River in 2002: 2 bear management technicians and 1 bear monitoring technician. In addition, KATM's wildlife biologist assisted with bear monitoring at Brooks River, supervised bear management technicians, and assisted with bear management response activities when available. Bear management technicians maintained the BMRF database, investigated bear management problems, patrolled the Brooks River area to identify and

address potential bear management concerns, and conducted bear management activities. Other available NPS staff assisted with accomplishing these tasks. In particular, law enforcement staff often assisted with responses that involved use of deterrent rounds. NPS interpreters staffed the Lower River and Falls platforms during most peak visitor hours during July and during morning and afternoon hours through the middle of September. In addition, in July the interpretive staff provided coverage on the corner of the trail leading from Brooks Camp to the floating bridge (Fig. 1) between 1200 and 1800 hours, and in September (1-18 Sep) between 1300 and 1700 hours. Law enforcement and bear management staff provided on-call assistance with management of human traffic at the corner and assisted with staffing the corner between the hours of 0800–1200 and 1800–2230. Scheduled staffing in the lower river was in part intended to manage human traffic such that impacts to bears were minimized.

Projects Potentially Affecting Bear Activity in 2002

From 20 May to 21 June and 6 August to 13 September 2002, an archaeological dig was conducted on the edge of the eroded riverbank known as the Cutbank (Fig. 2). The dig site was located on a heavily used bear trail that paralleled the river. A solar-powered electric fence was installed around the dig site to protect the site and equipment from bears during non-work hours.

METHODS

We collected data from 20 May–8 October 2002. Resource management staff completed most BMRFs; however, other NPS staff sometimes filled out forms as well. When possible, the age-sex class of any bears involved was noted along with bear identification numbers if known, based on bear identification records maintained as part of the bear management and monitoring program.

All known serious or unusual bear-human interactions were documented on BMRFs (NPS 2001; Appendix B), including any incidents in which bears: 1) obtained food, garbage, or fish from humans or their facilities; 2) were hazed using deterrent rounds or capsaicin spray; 3) caused property damage; 4) exhibited overtly aggressive or dominant behavior toward humans; 5) injured/killed a human; 6) were killed in defense of life or property; or 7) were harassed by people. We also recorded any observations of gear or food stored inconsistent with park regulations and any close-range (<50 m) human-bear interactions of particular note (e.g., fishing <50 m from a bear, interacting with a bear <<50 m). People were often observed in brief surprise interactions with bears at distances of <50 m; these were generally not recorded unless the interaction was unusually close or was otherwise atypical.

Bear trespasses into residence areas or onto viewing structures were also recorded when possible, particularly if staff challenged the trespass. However, because trespasses were at times frequent and other tasks could distract staff from completing a BMRF, trespasses sometimes went unrecorded. To address this problem, we continued to use the short trespass form (STF; Appendix C) developed in 2001 (Olson et

al. 2002). The STF was primarily intended to capture information on unchallenged bear trespasses in Brooks Camp; however, some challenged trespasses were only recorded in this log.

We summarized the data using some of the general incident categories defined in Appendix B. Some records fell into >1 incident category. For example, a property damage incident may also have been food-related. Consequently, in some cases counts of incidents by these general categories may not be additive. We used a 1-tailed Student's *t*-test to determine whether the number of human-caught fish obtained annually by bears was lower during years when retention of fish was limited to below the bridge (1998–2002; Carden and McFarland 1998, Pierce and DeBruyn 2000, Proffitt 2002, Olson et al. 2002) than it was during 5 years in which bear incidents were documented immediately prior to the limitation (1992–1994 and 1996–1997; Holmes 1992, Holmes 1993, Holmes 1994, Boyd 1996, Boyd 1997). No bear management technicians were stationed at Brooks Camp in 1995 and only limited records of human-bear interactions were maintained that year. Because records of human-bear interactions in 1995 were not maintained consistent with other years, BMRF data from 1993-1994, which were more consistently recorded, were used in the aforementioned multi-year comparison instead. $P < 0.05$ was considered significant. Means are presented ± 95% confidence limit.

RESULTS

A total of 137 BMRFs and 28 STF entries were recorded for the 139 days between the first and last documented records at Brooks River in 2002. Seventy-one percent of the BMRF records ($n = 96$), and all STF records ($n = 28$) were for events that occurred within the Brooks Camp residence area (including Brooks Lodge, NPS facilities, and the residence areas) and on the Naknek Lake beach between the campground and Brooks Camp. Twenty-seven percent of all BMRFs and STFs ($n = 44$) specifically identified Bear 468, a female with 2 yearlings, as involved. Eighty-nine percent of the BMRF records that specified this family group ($n = 39$) documented events that occurred near or within the Brooks Camp residence area.

Dominance Interactions

There were 11 records of a bear (or bears) directly approaching ($n = 8$) or charging people ($n = 3$) to an average minimum distance of 13 ± 9 m. Five of the 7 directed approaches were food-related. There were also 8 records of bears withdrawing slowly or running away from people or planes outside Brooks Camp (excluding management responses). Six of these records involved guided groups of anglers continuing to fish within 50 m of bears, then hazing bears away.

Food-Related Incidents

Ten independent food-related incidents (incidents in which a bear obtained or attempted to obtain an angler-caught fish, human food, or garbage; and incidents in which human handling or storage of food,

garbage, or fish was improper) were documented on BMRFs in 2002. Half of these incidents involved anglers. In 3 incidents, bears obtained angler-caught fish—2 cases involved females with spring cubs obtaining fish from abandoned fishing rods, and 1 case involved an angler dropping a bagged fish back into the river when he observed a female with spring cubs walking along the beach nearby (the female obtained a fish in the vicinity of where the angler's fish was deposited; however, it was unclear whether the bear associated the angler with the fish she acquired). In 2 other incidents, bears almost obtained angler-caught fish. In 1 case, an angler failed to break a fish off with a bear traveling past the Lower River Platform about 10 m away. The angler dragged the fish, still hooked on his line, up onto the platform with him. This left a slime trail that attracted the bear to the area (the bear followed the scent trail up onto the platform steps, and then was hazed away by NPS personnel) for several minutes. In the other case, as an angler carried an un-bagged fish towards the Fish Freezing Building, a bear followed the angler and was hazed back by NPS staff with an air horn.

Four of the 5 other food-related records involved people eating outdoors (the other incident involved a bear sniffing a cabin door where fish was being cooked indoors). Two of these incidents occurred outside of approved picnic areas and the other 2 occurred at the picnic area adjacent to the Brooks Camp Visitor Center (Fig. 1). The only food obtained by a bear in these events was a beverage can that was bitten into.

A multi-year comparison suggested that the regulation limiting human retention of fish to below the bridge (Appendix A) may have contributed to a reduction in “fish stealing” incidents. The documented annual number of human-caught fish obtained by bears was significantly higher during 5 years without the regulation (1992–1994 and 1996-1997, range 2 to 11, total fish = 28) than it was during the 5 years following its implementation (range: 0 to 3; total fish = 6; $t = 2.51$, df = 5.8, $n_{pre} = 5$ and $n_{post} = 5$, $P = 0.024$).

Eleven BMRFs also documented bear trespass events that were related to grey water disposed outdoors. Ten of these records documented bears digging in the gray-water pits underneath the NPS tent cabins numbered BRT-3 and BRT-4. These 2 tent cabins had sinks with running water, but the water drained directly from the sinks into a sunken 55-gallon barrel filled with rocks located beneath the deck of the 2 structures. Consequently, any food matter washed down the drain accumulated in the barrel and surrounding mud. All of these incidents occurred during the fall after the tent cabins had been in use most of the season. Another BMRF documented a female with 2 yearlings rolling in the grey water dump area used by lodge staff to dispose of water from mopping the lodge floors (dump site was located just behind the lodge kitchen at the edge of the Oxbow marsh). There was an additional 13 records of a female with 3 yearlings entering or leaving camp in close proximity to the dump site.

Property Damage

Six cases of bear-caused property damage were recorded, including 2 at Brooks Lake, 2 associated with boats stored in the mouth of Brooks River, and 2 in Brooks Camp. Bears were hazed to stop ongoing property damage in 3 cases; in the other 3 instances responders arrived after the bear(s) involved had left or the damage was discovered at some point after it had occurred. One of the documented incidents in Brooks Camp involved yearlings chewing on the corners of 2 lodge buildings; the other involved damage to the seats of an NPS gator, which had been left unattended near the Fish Freezing Building. The Brooks Lake property incidents involved damage to a bicycle seat and to siding on a building. The 2 boat-related incidents involved a female with 2 yearlings, who chewed on foam rubber boat seats, pulled out and damaged personal flotation devices stashed in boat storage compartments, and chewed on an anchor line. The total estimated cost for the 5 records of property damage with cost estimates specified was $475 (the other report was for very minor damage).

Bear Management Responses

There were 110 STF and BMRF records of bears trespassing in Brooks Camp. Of the 82 BMRFs, 79 documented NPS staff displacing or attempting to displace bears from Brooks Camp, (occasions to displace bears did not appear to be consistently recorded on the STFs; 3 STFs indicated hazing). Documentation indicated that staff provided for the safety of up to 15 people in the vicinity during bear trespass response activities. However, because numbers of people in the vicinity were often not recorded and counts often reflected only people in the immediate vicinity of the responder(s), this number should be considered a minimum estimate. During these bear trespass responses, staff operated at an average minimum distance of 17 ± 2 m from the bears involved. Fifty-four percent of Brooks Camp trespasses documented on BMRFs occurred near the main trail through camp between the Fish Freezing Building and the Ranger Station, and 37% occurred between the Ranger Station and the Generator Building (Fig. 1). Most Brooks Camp BMRF trespass records with age-sex specified involved subadults (33%) and females with dependent young (56%).

Air horn use was indicated on nearly half (49%) of the Brooks Camp BMRF hazing records. In all but 1 case, air horns were at least accompanied by yelling. Use of deterrent rounds was documented for 8 different responses (May–Jul, $n = 5$; Sep-Oct, $n = 3$), including 4 to bear trespass events, 1 to attempt to displace a resting bear family group away from the trail between Brooks Camp and the floating bridge, 1 to haze a bear family group while it was damaging items in a boat., 2 to haze bears investigating facilities at Brooks Lake. A plastic slug was used in 1 response, rubber slugs were used in 2 responses, and bird bangers or cracker shells were used in 6 responses (most in combination with other hazing techniques). Bears were displaced from the immediate area by deterrent rounds in all cases; however, in 5 cases bears were described as moving off slowly (sometimes described as moving at "their own pace").

DISCUSSION

Bear Management Issues and Observations

Human Traffic near the Floating Bridge.—Research to date has indicated that the lower river was important to some family groups and to subadults (Olson et al. 1990, Olson 1993, Olson and Gilbert 1994, Olson et al. 1997), particularly during fall. In 1998, KATM appended the BMP to permit consideration of hazing when a stationary bear held up human traffic for >30 minutes on the trail that led from Brooks Camp to the bridge and in the vicinity of the Lower River Platform (Carden and McFarland 1998). Hazing was to start at the lowest level (e.g., human noise), followed by higher intensity methods (e.g., air horns before deterrent rounds) only until the bear(s) moved off. During the first season with this policy, 3 such NPS management actions were taken (and several were documented involving non-NPS staff that were not sanctioned; KATM, unpublished data, 1998). None of these actions involved use of deterrent rounds (an air horn was used in 1 case). In 1999, although the BMP was not modified, the area in which NPS personnel moved bears expanded to include the trail leading to Brooks Campground. That year 8 management actions were documented in which bears were displaced to accommodate human traffic. All of these actions involved use of air horns and 5 involved use of deterrent rounds (KATM, unpublished data, 1999). In 2000, 11 instances of hazing bears to allow for human movements were documented, with 10 involving use of deterrent rounds. Most occurred along the trail leading to the bridge from Brooks Camp; however, an action was also taken on the Brooks Falls trail. The 2001 revised BMP (NPS 2001) modified the original policy to emphasize use of alternative routes in preference to hazing of bears. However, the 30-minute provision remained as an option if alternative routes were unavailable.

In practice, similar to 2001 (Olson et al. 2002), staff typically waited for longer than 30 minutes before exploring options, and hazing was rarely considered. Rather, 2 alternative routes were often used by NPS staff to re-direct human foot-traffic around bears when the primary trail from camp to the bridge was impassable: 1) along the Naknek Lake beach, then upriver around the point at the river mouth to the primary trail paralleling the river; and 2) along the tree edge of the marsh from near the Fish Freezing Building and connecting to the primary trail about midway along the section of the trail that paralleled the river (Fig. 1). When sufficient NPS personnel were available, people were escorted along the alternative routes. Otherwise, people were typically directed to the route and a ranger stationed on the Lower River Platform monitored use of the route. The marsh route was generally not used after the third week of July because parts of the route became covered with water as the river level rose.

One female with yearlings (Bear 468) regularly spent extended periods of time in the vicinity of the trail leading from camp to the bridge in 2002. On 3 occasions, after many people had been held up from crossing the river for ≥1 hour, the family group was hazed away from the primary trail between camp and

the bridge to allow for human use of the trail. The trail leading from camp to the bridge will likely remain an area where human traffic can become congested due to bear activity. Displacing bears is stressful, increases safety concerns, can be disruptive to other bears in the area, and may bring visitor complaints. Minimizing impacts to bears through patiently waiting for bears to move on, as well as using alternative routes around bears when necessary, worked reasonably well, but visitors and staff should anticipate the possibility of delays.

NPS staffing was reduced by September, which resulted in no scheduled staff presence in the vicinity of the river mouth after about 1800 hr. Ten-minute interval scan counts of people recorded during 19 bear monitoring sessions conducted 1–18 September (KATM, unpublished data, 2002) suggested that maximum numbers of people using the area remained relatively high into the evening hours. The maximum number of people observed from the data collection site ranged from 7 to 43 (median = 24 [13 sessions]) before 1800 hr and from 5 to 27 (median = 20 [6 sessions]) later than 1800 hr. Olson et al. (1998) reported that bear activity during daylight hours in September–October at Brooks River peaked 1800–2200 hours and was concentrated on the river below Brooks Falls. This appeared to be the case in 2001 and 2002 as well; however, data have not yet been analyzed (T.L. Olson, KATM, personal observation). Sometimes if a bear management technician was on duty during evening hours (about half of the Sep evenings when the lodge was open), that individual spent some time near the bridge, or they were called out to the bridge by bear monitoring staff collecting data from the Lower River Platform. However, sometimes spending time in the lower river area resulted in bear management staff being cut off from camp for prolonged periods by bear traffic. They were then unavailable to respond to any bear management issues that arose in or near camp. Bear monitoring staff sometimes resorted to shouting directions at people (as did an NPS volunteer who often spent his personal hours on the Lower River Platform in the evening), but many times they were too busy tracking bears to either direct human traffic or document close-range human-bear interactions that occurred. Similar to 2001 (Olson et al. 2002), the behavior of people around bears during the hours of peak bear activity in the river mouth remained largely unsupervised and most close-range interactions went undocumented during 1–18 September.

Brooks Campground.—An electric fence remained around the Brooks Campground until it was closed in the fall (18 Sep 2002), at which time the fence was removed. No bear entries into the campground were recorded in 2002. However, interactions occurred between people using the trail to travel to and from the campground and bears near or on the trail. Interactions also occurred between people standing inside but close to the electric fence and bears close to the fence perimeter. The campground and campground trail will likely continue to be areas requiring management attention, as some bears use the beach regularly and the campground trail is immediately adjacent to the beach.

Brooks Camp Residence Area.—Bears that entered the Brooks Camp residence area were typically displaced by yelling, clapping, using an air horn, or simply following them out. Although an effort was made to document these incidents, many went unrecorded. Trespass statistics should therefore be regarded as minimum documentation of occurrence. Beginning about the third week of July, the water level in the river and lake began to rise noticeably. Whereas early in the season there was a wide strip of beach, by August the beach in front of Brooks Camp was reduced to a relatively narrow strip in places. Early in the season if visitors were on the beach in the path of a bear, the bear would often continue its activity while staying close to the lake edge. Later in the season when the width of the beach was reduced, we observed bears sometimes move into camp, presumably because they had little room to negotiate their way around human activity and other bear traffic on the beach.

One incident was documented in which bears obtained human food in 2002. The incident, which involved 2 young subadult bears, occurred in the picnic area adjacent to the Brooks Camp Visitor Center. The 2 subadults trespassed into Brooks Camp, and then approached a guided group of anglers. The group retreated after the guide gathered up all of the food he could carry, leaving a container of carbonated beverages behind. One of the 2 subadults investigated the container and bit into one of the beverage cans, but was startled away by the spray from the can. NPS maintenance staff then became aware of the situation and made noise to scare the bears away. Four days later, another incident was documented in which the same bear that had bit into the beverage can approached guided anglers eating at the same picnic site.

Despite the fact that the picnic area was located within the Brooks Camp residence area, it was clearly not ideally situated relative to bear use and the potential for close encounters with bears. The picnic area was located within about 40 m of the beach (Fig. 1), which was a commonly used bear travel route and an area frequented by bears searching for dead fish during fall. In addition, a main foot trail led from the beach into camp past the picnic area and toward the Oxbow, sometime funneling bear traffic through camp directly past the picnic area.

Oxbow and Cutbank.—A number of undesirable angler-bear interactions in the Cutbank and Oxbow (n = 15) were documented by bear monitoring staff. Monitoring was conducted in the Cutbank for only a few hours daily and during the midday human-use peak only every 3 to 4 days. Also, some angler-bear interactions were not documented by monitoring staff because their priority was recording bear and human use data. Consequently, we believe that our records of bear-angler interactions only represent a minimal sampling of what actually occurred. Other NPS personnel were rarely observed on the river above the bridge during bear monitoring sessions (KATM, unpublished data, 2002). Therefore, most of the interactions observed during monitoring either occurred without any NPS follow-up to contact the people involved, or in some cases with monitoring staff resorting to yelling instructions at anglers.

We periodically checked the voltage of the electric fence that was maintained around the Cutbank archaeological dig site. None of our readings exceeded 4.5 kV, and the readings were often less than 1.5 kV (on 2 occasions there was no measurable voltage). General recommendations for an effective fence voltage to deter bears is 5 to 7 kV (e.g., Davis et al. 2001); however, we are aware of only 1 incident in which a bear gained entry to the site (2 cubs of the year entered the site through the fence while it was turned off and only 1 person was at the site). Due to misunderstandings regarding permit stipulations, the dig area was lined with plastic and jute matting prior to being back-filled with dirt. The electric fence was removed 13 September 2002. Bears later tore up and chewed on the edges of the plastic and jute matting.

Data Limitations

1) Events observed by NPS staff were more likely to be reported than those observed by concession staff or visitors, and NPS staff were most often present in and near Brooks Camp. Consequently, the BMRF data were biased toward that area and were likely not proportionately representative of interactions that occurred elsewhere through much of the season. By October, virtually all remaining NPS personnel were housed at Brooks Lake, and resource management staff were focused on sampling bear activity below Brooks Falls. Consequently, during October sampling was biased toward the river below Brooks Falls and the residence areas along Brooks Lake.
2) Many interactions between bears and people at <50 m went unrecorded because they were brief and frequent enough to not draw the attention of staff who became accustomed to such events. This was also true to a lesser extent for commonplace bear management actions such as shouting or using an air horn to displace a bear from Brooks Camp.
3) Because regulations prohibited feeding wildlife, leaving gear unattended, etc. (Appendix A), people may have been hesitant to report such incidents to NPS staff. Our data largely reflect only incidents that staff observed or became aware of through casual conversations with visitors, guides, and lodge staff.
4) The BMRF and STF data were collected opportunistically. This resulted in variable sampling intensity. Rates of occurrence should be regarded only as minimum estimates, and caution should be exercised in comparing numbers among years in particular. For example, incident types that occurred infrequently and that were of significant management concern, such as bears obtaining fish from people, were likely documented whenever observed or reported; however, more common incident types such trespasses may have been variably recorded in different years.
5) Many of the bear-human interactions documented on BMRFs involved a small subset of the bears using the Brooks River area, and are likely not representative of most bears that frequented Brooks River. For example, although >50 different adult bears were identified between late June and mid-

October at Brooks River (KATM, unpublished data, 2002), Bear 468 and her yearlings were identified in 27% of all BMRF and STF records completed in 2002.

RECOMMENDATIONS

Although the current location of Brooks Camp and the level of visitation are obvious factors contributing to the frequency and nature of human-bear conflicts at Brooks River, we offer the following recommendations regarding other aspects of Brooks Camp operations that we believe could help to minimize bear-human conflicts there.

Staffing and Schedules

1) Implement a coordinated staffing schedule that incorporates involvement of interpreter, law enforcement, and resource management staff to manage human traffic in the "corner" area near camp (Fig. 1). With a schedule in place, staff could better manage their time to accomplish other projects.
2) Increase NPS staff presence on the river above the bridge: a) to contact visitors and provide information regarding proper behavior around bears; b) to contact visitors who engage in undesirable behavior around bears; and c) to provide some degree of accountability to the Brooks River Guide Training Program.
3) To help minimize bear-human conflicts, increase scheduled NPS staff presence in the river mouth during evening hours in the fall.
4) General seasonal and diurnal patterns of bear activity at Brooks River have been well documented in recent years (e.g., Warner 1987, Olson et al. 1990, Olson 1993, Olson and Gilbert 1994, Olson et al. 1997, Olson et al. 1998); a report including this information is being prepared for the 2001 field season as well. To minimize human-bear conflicts in accordance with the park's GMP and BMP, schedule projects that may affect bear use of the Brooks River area to avoid peak bear use periods whenever possible.

Structures

1) Periodically inspect the gates on the viewing platforms and report any problems with the gates promptly so that repairs are made.
2) Reposition the gates on the Lower River Platform so that there are gates at both the bottom and top of the stairs and back ramp. This reconfiguration would keep bears off of the platform stairs and would likely also reduce damage to the stairway railings.
3) Regularly inspect food cache doors and any garbage containers within them to make sure that the latches work properly and that garbage is not left for prolonged periods.
4) Access to the floating bridge was often temporarily blocked due to bear activity on or near the main trail between camp and the bridge. Use of alternative routes often allowed access when people had

been delayed from crossing due to bear activity; however, an alternate route was not always available. An alternative bridge placement, such as connecting the bridge to the trail at the corner (Fig. 1) might alleviate some of the human traffic delays.

5) To reduce the potential for food-related bear-human conflicts, relocate the picnic area that is currently adjacent to the Brooks Camp Visitor Center to a site further removed from the beach. Any new site should also have good visibility so that picnickers can detect approaching bears.
6) Move the campground trail further inland away from the beach (for example, along the water pipe route to the campground). This could reduce encounters between people and bears that use the beach as a travel corridor.
7) Whenever possible, remove any items that could be damaged by a bear from boats left unattended. Also, off-anchor boats whenever possible to minimize any investigation by bears.

Education

1) When providing information to campers, emphasize that: (a) because the Naknek Lake beach is commonly used by some bears as a travel corridor, campers needs to be aware of the likelihood of encountering bears along the trail, and they need to be prepared to respond appropriately; and (b) the campground fence is not intended to be used to view and photograph bears at <<50 m.
2) Specifically address the regulation regarding unattended property during staff training sessions, emphasizing that the regulation pertains to employee activities as well as those of visitors.
3) Make staff aware of the BMRF and STF during training and encourage them to fill out the forms or report relevant information to resource management staff.

Data Collection and Management

1) Incorporate additional programming into the BMRF database to allow users to print out data entered in a format similar to the existing BMRF. In many cases, the printout could be signed and used as the completed data form, thus eliminating the handwritten form.
2) To better document bear-related incidents, bear management technicians should regularly query other staff and encourage them to enter information on a STF/BMRF. Information should also be actively solicited from lodge staff and commercial guides.

LITERATURE CITED

Boyd, D. L. 1997. Bear management 1997. Resource Management Technical Report NPS/KATM/97-002, Katmai National Park and Preserve, King Salmon, Alaska, USA.

Boyd, H.M. 1996. Bear Management-1996. Resource Management Technical Report NPS/KATM/96-002, Katmai National Park and Preserve, King Salmon, Alaska, USA.

Carden, K.N., and B.A. McFarland. 1998. Brown bear management 1998, Brooks Camp, Katmai National Park. Resource Management Technical Report NPS/KATM/98-002, Katmai National Park and Preserve, King Salmon, Alaska, USA.

Holmes, B. H. 1992. Summary: bear management incidents, Brooks Camp, Katmai National Park, 1992. Katmai National Park and Preserve, King Salmon, Alaska, USA.

Holmes, B. H. 1993. Summary: bear management incidents Brooks River area 1993. Katmai National Park and Preserve, King Salmon, Alaska, USA.

Homes, B. H. 1994. Summary: bear management incidents 1994, Brooks Camp, Katmai National Park. Katmai National Park and Preserve, King Salmon, Alaska, USA.

Merrill, T.R., Jr. 1964. Ecological studies of sockeye salmon and related limnological and climatological investigations, Brooks Lake, Alaska, 1957. U.S. Fish and Wildlife Service Special Scientific Report-Fisheries No. 456, Washington, D. C., USA.

National Park Service (NPS). 1986. General management plan, land protection plan, wilderness suitability review, Katmai National Park and Preserve. U.S. Department of the Interior, National Park Service, Denver Service Center, Denver, Colorado, USA.

NPS. 2000. Brooks River bear-viewing facility, Katmai National Park and Preserve, finding of no significant impact. Katmai National Park and Preserve, King Salmon, Alaska, USA.

NPS. 2001. Bear-human conflict management plan, Katmai National Park and Preserve, Aniakchak National Monument and Preserve, Alagnak Wild River. Katmai National Park and Preserve, King Salmon, Alaska, USA.

Olson, T. L. 1993. Resource partitioning among brown bears at Brooks River in Katmai National Park and Preserve. Thesis, Utah State University, Logan, Utah, USA.

Olson, T. L., B. K. Gilbert, and S. F. Fitkin. 1990. Brown bear behavior and human activity at salmon streams in Katmai National Park, Alaska. Final Report for U.S. National Park Service Contract IA 9700-7-8028, Utah State University, Logan, Utah, USA.

Olson, T. L., and B. K. Gilbert. 1994. Variable impacts of people on brown bear use of an Alaskan river. International Conference on Bear Research and Management 9:97–106.

Olson, T. L., B. K. Gilbert, and R. C. Squibb. 1997. The effects of increasing human activity on brown bear use of an Alaskan river. Biological Conservation 82:95–99.

Olson, T. L., M.T. Moran, and E.K. Bentley. 2002. Bear management at Brooks River, Katmai National Park, 2001. Resource Management Technical Report KATM-NR-02-02, Katmai National Park and Preserve, King Salmon, Alaska, USA.

Olson, T. L, R. C. Squibb, and B. K. Gilbert. 1998. Brown bear diurnal activity and human use: a comparison of two salmon streams. Ursus 10:547–555.

Peirce, K., and T. DeBruyn. 2000. A summary of bear/human interactions during 1999 and recommendations for future management of the Brooks River Area, Katmai National Park and Preserve. Resource Management Technical Report NPS/KATM/99-002, Katmai National Park and Preserve, King Salmon, Alaska, USA.

Proffitt, K. M. 2002. Brooks Camp brown bear management end of season report 2000. Resource Management Technical Report KATM-NR-02-01, Katmai National Park and Preserve, King Salmon, Alaska, USA.

Warner, S. H. 1987. Patterns of brown bear and visitor use and recommendations for management. Katmai National Park and Preserve, King Salmon, Alaska, USA.

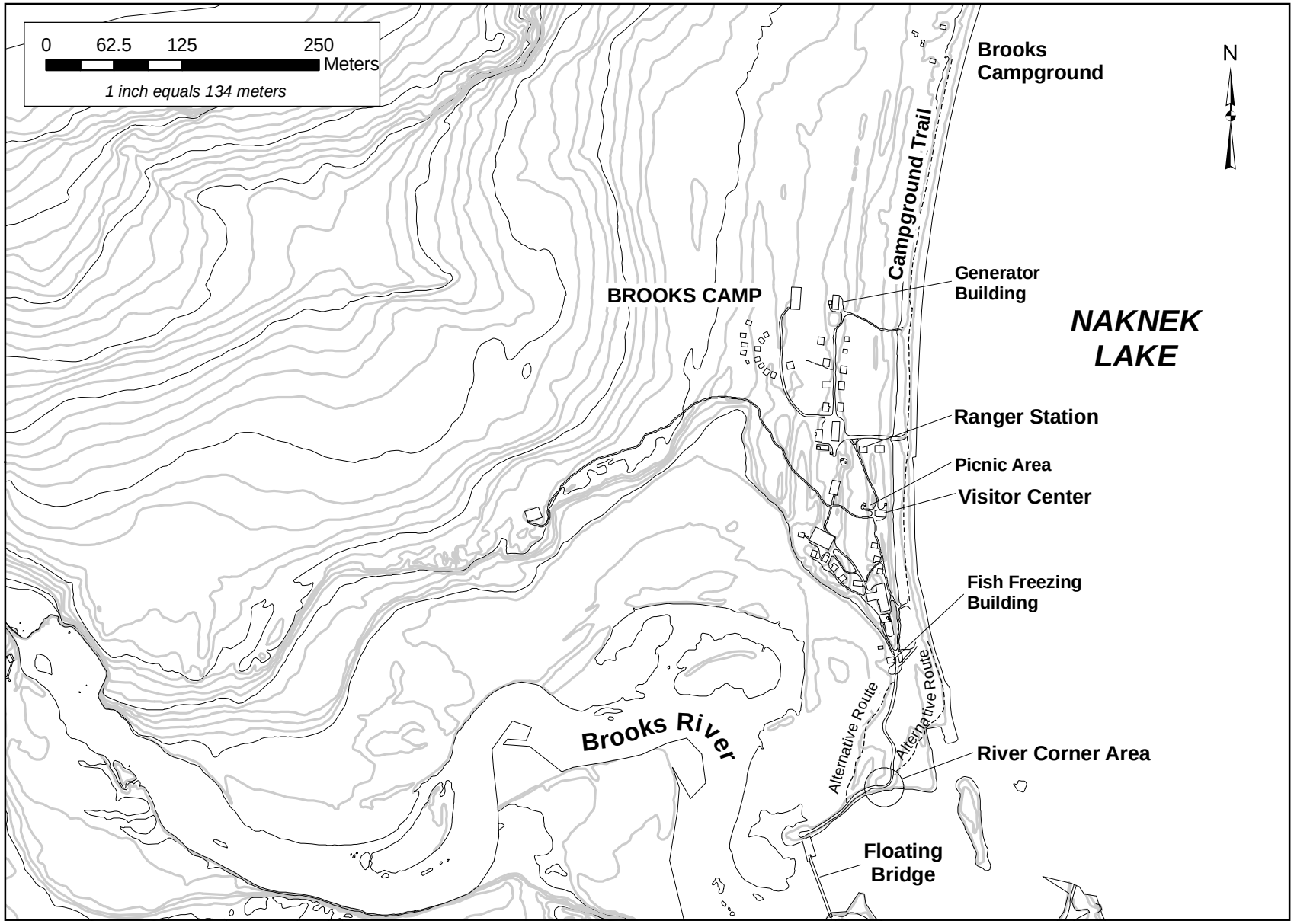


Figure 1. Location of Brooks Camp along Naknek Lake, Katmai National Park, Alaska.

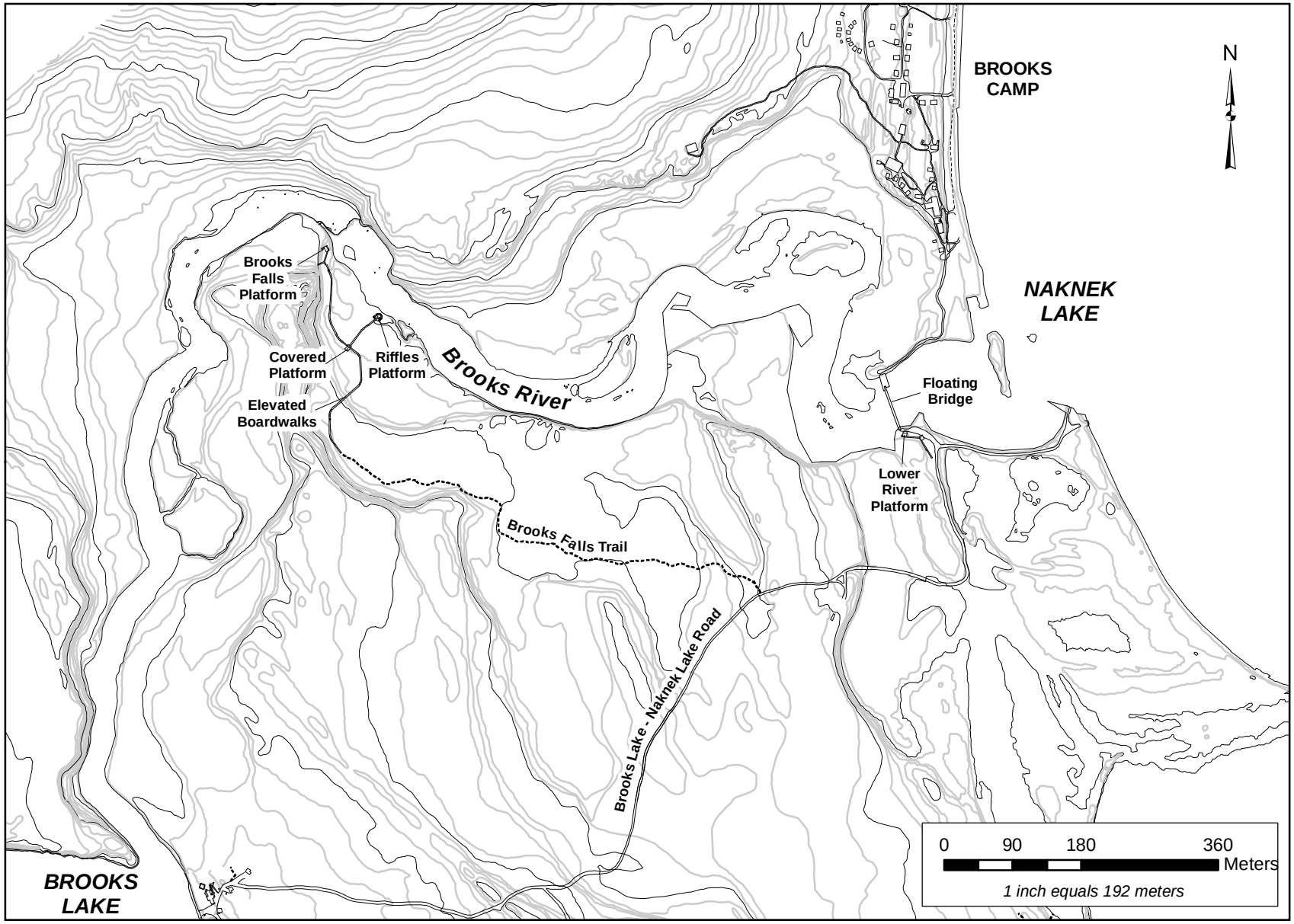


Figure 2. Brooks River vicinity, Katmai National Park, Alaska.

Appendix A

2002 Regulations Related to Bear Management

Excerpts from the Compendium for Katmai National Park and Preserve, Aniakchak National Monument and Preserve, and Alagnak Wild River

36 CFR 1.5(a)(1) Visiting Hours.—Visiting hours at the Falls and Riffles bear viewing platforms and surrounding areas will be from 7:00 AM to 10:00 PM daily. . . .

36 CFR 1.5(a)(2) Wildlife Viewing Conditions.—Persons may not be within 50 yards of a bear or any large mammal or within 100 yards of a bear or any large mammal with young. This regulation does not apply to persons engaged in a legal hunt, persons on a designated bear viewing structure, or if otherwise directed by NPS personnel.

36 CFR 2.10(d) Food Storage.—All food, food containers, garbage, and harvested fish must be secured within a building, designated food cache, a bear resistant section of a vehicle, vessel, or aircraft, or a bear resistant food container. Any fish caught and kept within the Brooks Camp Developed Area must be immediately stored within a designated facility.

A bear resistant section or container is securable and constructed of material capable of withstanding a minimum of 200-ft/lbs of energy. Some examples include: PVC plastic backpacker canisters, steel drums and locking rings, modified military ammo cans, and metal raft dry boxes. Ice chests, coolers, tents, and plastic packing boxes are not approved bear resistant food containers.

Designated fish storage facilities within the Brooks Camp Developed Area are the Fish Freezing Building for the public, and employee residences.

36 CFR 2.14(a)(5) Sanitation–Bathing and Washing.—Within the Brooks Camp Developed Area, the water spigot located adjacent to the food cache is the only outdoor location approved for washing of cooking utensils.

36 CFR 2.23 Designated Recreation Fee Use Area.—The Brooks Camp Developed Area is the only designated recreational fee area within the parks. As a condition of use, all persons arriving at Brooks Camp must receive an approved bear orientation from the National Park Service or other authorized persons.

36 CFR 13.18(a) Camping.—Brooks Camp Campground: camping in the Brooks Camp Campground is limited to 7 nights during the month of July; groups are limited to no more than 6 persons per site; camping is prohibited in the Brooks Camp Campground from September 18th – May 15th; and camping is prohibited within 5 miles of Brooks Camp Developed Area.

Backcountry camping: Camping in 1 location is permitted up to 7 consecutive nights at which time the camp must be moved at least 1 mile.

For the purpose of this section, camping is defined as any planned overnight stay in the backcountry areas of the above listed parks, excluding stays at the Brooks Campground or commercial lodges.

36 CFR 13.18(b) Picnicking.—Picnicking is restricted at Brooks Camp to the Brooks Campground, the Visitor Center food cache, the Brooks Lake shelter, and a site designated in the employee housing areas.

For the purpose of this regulation, picnicking is defined as preparing or consuming food or beverage. Water is not considered a beverage.

36 CFR 13.22(c) Unattended or Abandoned Property.—Brooks Camp: no personal property of any kind may be left unattended for any length of time in the Brooks Camp Developed Area except for: the lodge porch, the campground, or in the caches at the Visitor Center.

Rest of the park: personal property may not be stored or left unattended for more than 24 hours without written permission from the superintendent.

Other Excerpts from Title 36, Code of Federal Regulations (36 CFR), that were Relevant to Bear Management

36 CFR 2.2 Wildlife Protection.—(a) The following are prohibited: . . . (2) The feeding, touching, teasing, frightening or intentional disturbing of wildlife nesting, breeding or other activities . . .

36 CFR 13.66(b) Katmai National Park and Preserve.— . . .(3) No person may retain more than one fish per day caught on Brooks River, on the waters between the posted signs 200 yards from the outlet of Brooks lake, or on the water between the posted signs 200 yards from the mouth of the Brooks River on Naknek lake.

Appendix B

2002 Bear Management Report Form (BMRF) and BMRF Instructions

BEAR MANAGEMENT REPORT FORM
Katmai National Park & Preserve • Brooks River

CIR Number | BMRF Number

When did the interaction happen?

Date______/______/______
Month Day Year

Time ______ am pm

How long did it last?
(Specify units-hr/min/sec)

Where did it happen?

General Location:

0 Campground
1 Beach
2 Brooks Camp
3 Mouth below bridge
4 Oxbow and marsh
5 Cutbank
6 Falls/Riffles/Boardwalks
7 Upper river
8 Road/Falls Trail/Cutbank Trail
9 Brooks Lake residence area
10 Other______________

Brooks Camp subarea, if applicable:

0 Unknown
1 Fish Freezing Bldg. and Lodge vicinity to VC
2 Overlook/Skytel to Auditorium
3 Visitor Center (VC) to Ranger Station
4 NPS warehouse and NPS housing
5 Leach field and Tuckerville
6 Other__________________________

PEOPLE INVOLVED (Names, addresses, role in incident)

How many people interacted with bear(s)? ______________________

Where will you be tonight? __________________________________

GROUP TYPE

0 Park Visitor
1 NPS employee
2 Brooks Lodge employee
3 Guide
4 Other _______________

If group was guided, specify company if known:

Closest distance between bears and people?
(Specify units-ft/yd/m)

BEAR DESCRIPTIONS

If >5 bears were involved, include additional descriptions in "What Happened" block on next page.

Total no. independent bears involved *(do not include dependent offspring in this count)*

First Bear	***Second Bear***	***Third Bear***	***Fourth Bear***	***Fifth Bear***
COLOR	**COLOR**	**COLOR**	**COLOR**	**COLOR**
0 Unknown	0 Unknown	0 Unknown	0 Unknown	0 Unknown
1 Blonde	1 Blonde	1 Blonde	1 Blonde	1 Blonde
2 Light brown	2 Light brown	2 Light brown	2 Light brown	2 Light brown
3 Medium brown	3 Medium brown	3 Medium brown	3 Medium brown	3 Medium brown
4 Dark brown	4 Dark brown	4 Dark brown	4 Dark brown	4 Dark brown
5 Black	5 Black	5 Black	5 Black	5 Black
CLASS	**CLASS**	**CLASS**	**CLASS**	**CLASS**
0 Unknown	0 Unknown	0 Unknown	0 Unknown	0 Unknown
1 Subadult	1 Subadult	1 Subadult	1 Subadult	1 Subadult
2 Adult male	2 Adult male	2 Adult male	2 Adult male	2 Adult male
3 Adult female	3 Adult female	3 Adult female	3 Adult female	3 Adult female
4 Female w/COY	4 Female w/COY	4 Female w/COY	4 Female w/COY	4 Female w/COY
5 Female w/Yrlg	5 Female w/Yrlg	5 Female w/Yrlg	5 Female w/Yrlg	5 Female w/Yrlg
6 Cub of year	6 Cub of year	6 Cub of year	6 Cub of year	6 Cub of year
7 Yearling	7 Yearling	7 Yearling	7 Yearling	7 Yearling
8 Unknown single	8 Unknown single	8 Unknown single	8 Unknown single	8 Unknown single
9 Adult single	9 Adult single	9 Adult single	9 Adult single	9 Adult single
Description/ID#	Description/ID#	Description/ID#	Description/ID#	Description/ID#

What was happening before the interaction?

Bear

0 Unknown
1 Stationary
2 Traveling (land)
3 Traveling (water)
4 Grazing/browsing
5 Fishing
6 Playing
7 Fighting
8 Eating a fish
9 Not applicable
10 Other ____________

Human

0 Unknown
1 Stationary
2 Walking/wading
3 In automobile
4 In boat
5 In airplane
6 Photographing/Filming
7 Fishing
8 Bicycling
9 In building
10 Not applicable
11 Other ____________

What were the predominant responses to the interaction?

Bear

0 Unknown
1 Stopped
2 Withdrew slowly
3 Ran away
4 Aggressively approached
5 Nonaggressively approached
6 Stationary aggression
7 Directed approach
8 Attacked
9 None
10 Not applicable
11 Other ____________

Human

0 Unknown
1 Stopped
2 Withdrew slowly
3 Ran away
4 Aggressively approached
5 Nonaggressively approached
6 Stationary aggression
7 Assault
8 None
9 Not applicable
10 Other ____________

Figure A1. Bear management report form for Brooks River, Katmai National Park, Alaska, 2002.

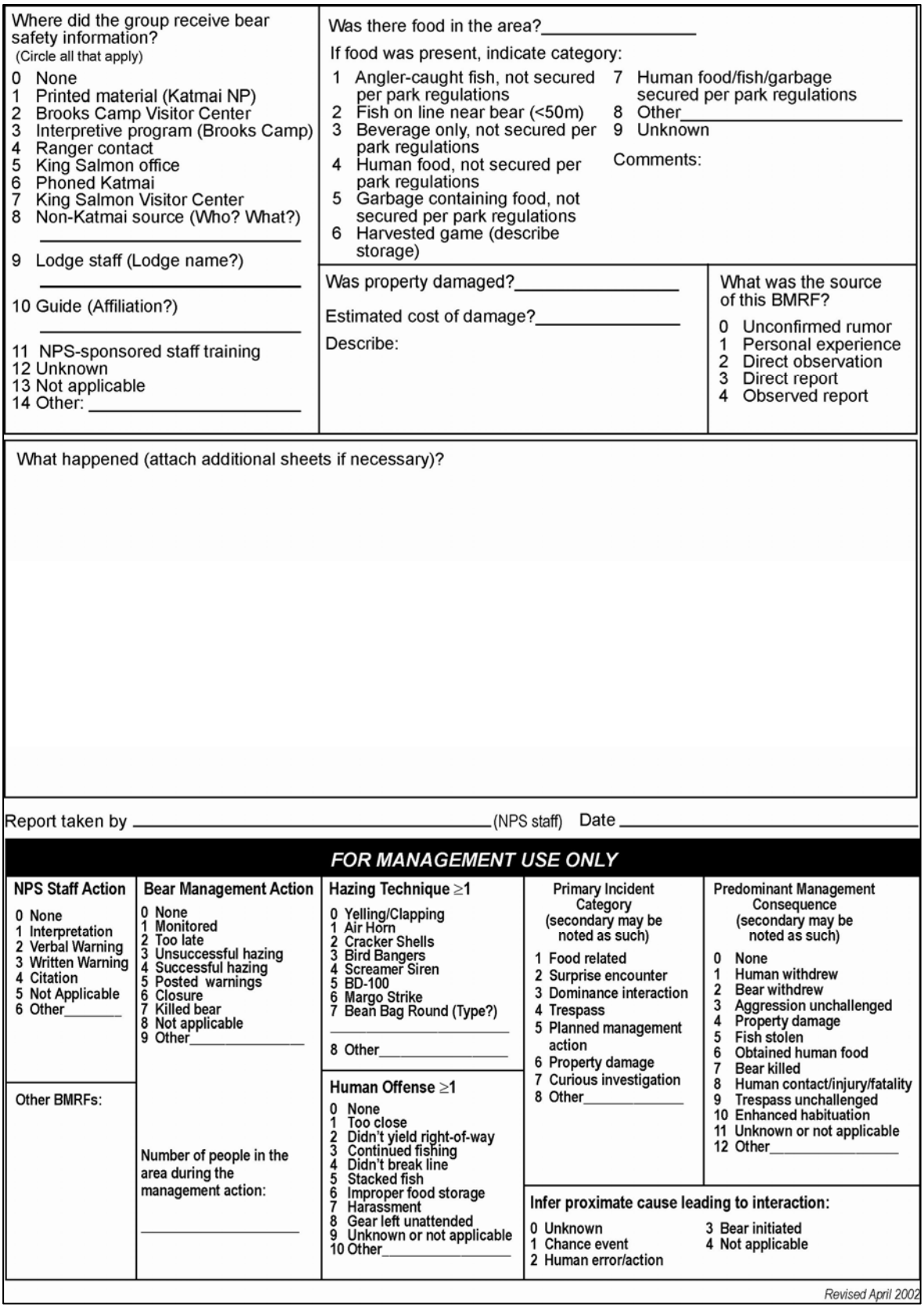


Figure A1, Continued. Bear management report form for Brooks River, Katmai National Park, Alaska, 2002.

BEAR MANAGEMENT REPORT FORM (BMRF) INSTRUCTIONS

BROOKS RIVER FORM, REVISED 2002

The BMRF is the primary tool for documenting bear-human interactions throughout the park. It is a means for monitoring bear activity, evaluating the bear management program, and identifying potential problems that need attention. Use the form to document all serious and unusual bear-human interactions. This includes the obvious such as bears obtaining food/garbage/fish from humans or their facilities, hazing of bears, property damage, bears behaving aggressively towards humans, human injuries/fatalities, bears killed in defense of life and property (DLP), and poaching incidents.

It is unnecessary to document innocuous events in which human behavior was appropriate and reasonable and bears were behaving naturally and non-aggressively outside of residence areas, i.e., do not try to complete a report for every time that visitors happen to be within 50 yards of bears when the visitors appropriately try to withdraw. However, when humans behave such that one would expect a bear to respond aggressively, the interaction should be reported regardless of the bear's behavior. For example, if someone approaches a bear within a short distance or harasses it in some way, a form should be completed. This will be a subjective interpretation on your part.

Bears entering residence areas (trespasses) should be documented. It is not realistic to complete a BMRF every time a bear enters the Brooks Camp residence area; however, an effort should be made to record as many instances as possible.

A Ranger will also complete a case incident report (CIR) whenever a bear damages property, a bear injures or kills a human, or if a violation is involved. In those cases, a copy of the CIR should be attached to the BMRF.

Whenever NPS personnel discharge a firearm or capsaicin spray to haze a bear, or a bear charges a human, a CIR number should be obtained from Park Dispatch or the Chief Ranger and recorded on the BMRF (see Appendix 7, BMP). For each BMRF assigned a CIR number, a copy of the form should be submitted to a Bear Management Technician or the Park Wildlife Biologist for incorporation into the BMRF database, and the original form should be submitted to the Chief Ranger.

Visitors should be able to fill out this form with minimal assistance. When a visitor completes a BMRF, be sure to read through it to be sure it is as complete as possible and that a sufficient description of the interaction was written in the "What happened" section. Then complete as much information in the "Management Use Only" section as you can. A Bear Management Technician or the Park Wildlife Biologist can determine the "Management Consequences" if you aren't sure, assuming the interaction is sufficiently described.

If you do not have all the information requested on the BMRF, fill out as much as you can. A partially completed BMRF is better than no BMRF. Record exactly what you observed or exactly what the witnesses observed; do not fill in the missing parts or record witnesses attempts to do so. Make sure the observations described are tangible such as specific behaviors, sizes, or distances. Do not record intangible interpretations such as a bear's intent or mood.

If you are not sure whether you should fill out a form, go ahead and do it.

Brooks River BMRF:

Use this form for all interactions occurring in the Brooks River area, along the VTTS road, and near the Three Forks cabin. This includes the area within a five mile radius of camp. Use the backcountry form for all other locations.

Leave the "BMRF #" in the upper right corner of page 1 blank. A Bear Management Technician will assign each form a unique record number.

CIR number – Include the case incident report number if applicable. If a CIR was written but you don't know the number, write "Y-unknown" in pencil and the Bear Technician will add the number later.

When did the interaction happen? – Use numbers to indicate month, day, and year. Be sure to circle a.m. or p.m.

How long did it last? – Indicate the length of the interaction. Be sure to include units, i.e., hours, minutes, seconds.

Where did it happen? - Circle from the following choices:

General Location

0 Campground – Brooks Campground and vicinity, excluding the beach.
1 Beach – the beach of Naknek Lake as high as the trail just within the trees, from 50 m beyond Brooks Campground to the mouth of the river.
2 Brooks Camp – the area of the buildings and their vicinity from concessions housing and the generator to the Fish Freezing Building, and from the beach to the leach field, excluding the Pithouse and trail.
3 Mouth below bridge – mouth of Brooks River below and including the floating bridge, including the trail 25 m beyond the Fish Freezing Building, the old concessions housing area, marshy areas near the trail, and exposed land extending from the beach into the mouth.
4 Oxbow and marsh – Brooks River above the floating bridge to the upper end of the oxbow marsh, including the oxbow marsh to the foot of the bank below the Skytel.
5 Cutbank Brooks River from Zone 4 upriver to the beginning of the riffles below Brooks Falls; include the Riffles Platform and boardwalk as part of 6 below.
6 Brooks Falls, the Riffles, and boardwalks – from 100 m above Brooks Falls to Zone 5, including the Falls Platform, Riffles Platform, boardwalks, and gathering area and immediate vicinity, excluding the riffles area of the river.
7 Upper river – from Zone 6 upriver to the river entrance.
8 Road/Falls trail/Cutbank trail – roads within 2 miles of Brooks River, the old overflow campground, Golden Squirrel Camp, the Falls Trail to the boardwalk, the Cutbank trail to the river, the residence areas and picnic area on Brooks Lake.
9 Brooks Lake residence area – the area of residence areas and their vicinity along Brooks Lake.
10 Other – Describe in the space provided. Use for other locations near Brooks River.

Brooks Camp subarea, if applicable

0 Unknown
1 Fish freezing building and Brooks Lodge vicinity to Visitor Center (VC) – between the VC and the fish freezing building.
2 Overlook/Skytel to auditorium – Oxbow overlook to Skytel and to NPS auditorium.
3 VC to Ranger Station – between the Ranger Station and the VC.

4 NPS warehouse and NPS housing – NPS warehouse, ranger cache, incinerator building, and residence area; includes the trail that leads from warehouse down to Naknek Lake beach.
5 Leach field and Tuckerville – leach field to Tuckerville.
6 Other – Describe in the space provided.

You can further describe the location of the incident and/or attach a map or draw one in the "What happened?" section. If you are uncertain of the location category, just describe it in the "What happened" box and a Bear Management Technician will complete this section.

People involved – List the names and addresses of the people involved in the interaction and the role each person played. Include the total number of people involved in the interaction. Indicate if the group was guided and the guide's and company's names if applicable. It is useful to identify where at least one of the people can be contacted that night if more information is needed.

Group type – Circle the group type. If "Other", describe.

Closest distance between bears and people? – How close did the bear and nearest person get during the interaction? Write a range if necessary, i.e., 20–30 yards. Be sure to include units, i.e., feet, yards, meters. Write "Unknown" or "Not Applicable" if appropriate.

Bear descriptions – Each vertical column represents a different bear. Circle the color and age class of each bear (up to five) involved in the interaction. Add distinguishing characteristics if possible. If known, include the bear's identification number. If you are not absolutely certain of the bear's identification, qualify your suspected identification as such. Indicate the total number of independent bears involved in the interaction in the box in the upper right corner. Do not include dependent offspring in this count. If more than five bears were involved in the interaction, describe them in the "What happened?" section.

What was happening before the interaction? – Circle the activity the bear and human were engaged in immediately before the interaction occurred. If multiple bears or people interacted, circle the predominant activity exhibited by each species. For family groups, the predominant activity is typically considered that of the sow. For instance, if five people encountered a bear while three of them were fishing and two were simply watching, circle "Fishing." If someone encountered a bear family in which the sow was fishing, one cub was playing with a pine cone, and another cub was sleeping, circle "Fishing."

Choices in Bear column:
0 Unknown – There was no data or no bear was involved.
1 Stationary – The bear was standing, sleeping, suckling young, or otherwise not going anywhere.
2 Traveling (land) – The bear was walking or running to go somewhere.
3 Traveling (water) – The bear was swimming or wading to go somewhere. Do not include fishing.
4 Grazing/browsing – The bear was foraging for vegetation.
5 Fishing – The bear was apparently foraging for fish.
6 Playing – The bear was engaged in play. (Bears do not vocalize while playing.)
7 Fighting – Bears were engaged in dominance interactions with each other. This does not necessarily involve bears making physical contact with each other.
8 Eating a fish – The bear was eating a fish.
9 Not applicable
10 Other – Describe.

Choices in Human column:
0 Unknown – There was no data or no humans were involved prior to the interaction.

1 Stationary – People were not going anywhere and were not involved in other activities listed below.
2 Walking/wading – People were going somewhere by foot.
3 In automobile – People were in or traveling in a Cushman, Suburban, truck, bus, etc.
4 In boat – People were in or traveling in a boat. This includes fishing from a boat.
5 In airplane – People were in or traveling in a plane.
6 Photographing/filming – People were photographing, video taping, etc. bears. Report photographing other subjects as "Stationary."
7 Fishing – People were actively fishing. Record fishing from a boat as "In boat."
8 Bicycling – People were riding bicycles.
9 In building – People were inside a building.
10 Not applicable
11 Other – Describe.

What were the predominant responses to the interaction? – Circle the response category that best describes the main, predominant, or most noteworthy behavior for each species during the interaction. Prior activities and predominant behaviors do not necessarily relate in a chain of actions and reactions, i.e., they are not meant to document that the bear did this, them the person did that, then the bear did this, etc. For example, if an angler throws rocks to move a fishing bear out of the area, the bear charges, and then the angler runs away, circle "Assault" rather than "Run" as the predominant human behavior. The predominant bear behavior is "Aggressive approach." The prior activity is "Fishing" for both the bear and the angler. If a group of three people encountered a bear while hiking to the Falls Platform, and one person talked to the bear while slowly backing away, one person played dead, and one person took a photo, the predominant human response would be recorded as "Other" with the specifics written in the blank space below the choices.

A note regarding hazing: use the guidance above to determine what the predominant behavior of humans was during the interaction. Two examples: (1) When people withdraw into a building in response to a bear in camp, then NPS staff arrive and use deterrent rounds to displace the bear, the predominant human response should be recorded as "Withdrew slowly", and the primary bear response as "Nonaggressively approached." (2) If staff responded to a trespassing bear with deterrent rounds and other people were not involved, then the predominant human response should be recorded as "Assault" and the bear's predominant behavior as "Nonaggressively approached."

Choices in Bear Column:

0 Unknown – There were no data or no bear was involved.
1 Stopped – A bear's progress was stopped by human actions.
2 Withdrew slowly – A bear left the immediate vicinity of the interaction without running.
3 Ran away – A bear ran from the immediate vicinity of the interaction.
4 Aggressively approached – A bear's attention was obviously focused on the person it approached and it exhibited aggressive behavior(s) such as vocalizing, excessively salivating, jaw popping, baring teeth, lowering its head, flattening ears, approaching on hind legs, charging, swatting forepaws against the ground, or swinging forepaws in the air. A bear that approached a human while charging another bear would be recorded as "Inadvertently approached", regardless of how terrified the human was.
5 Nonaggressively approached – A bear moved closer to a person, gear, vehicle, or facility in the course of continuing its ongoing behavior, i.e., traveling, foraging, play, etc. It would have likely followed a similar route even if these elements had not been there. Its behavior did not include aggressive elements.
6 Stationary aggression – A bear's behavior indicated aggression focused on an object it did not approach.

7 Directed approach – A bear's movements appeared directed toward a person or object in its environment, but no aggression was expressed. For example, a bear may have appeared to be traveling or foraging, but there was an acceleration or change of direction towards the person. A bear may run at someone in a bounding lope with ears up to steal a fish off the line in the same way that a sub-adult may run at gulls to flush them. Sometimes bears, especially subadults, will approach people out of curiosity.
8 Attacked – A bear aggressively made physical contact with a person.
9 None – A bear's behavior did not appear to change in response to the interaction.
10 Not applicable
11 Other – Describe.

Choices in Human Column:

0 Unknown – There were no data or no humans were involved.
1 Stopped – Someone's progress was stopped by a bear's actions.
2 Withdrew slowly – The people left the immediate vicinity of the interaction.
3 Ran away – At least one person ran from the immediate vicinity of the interaction.
4 Aggressively approached – People approached a bear aggressively with obvious intent to displace it; includes use of air horns, shouting, and banging of pots and pans while approaching a bear. This includes vehicles used for this purpose.
5 Non-aggressively approached – People approached a bear without intending to displace it. The bear's awareness of the approach and its perception of the intent are not important.
6 Stationary aggression – People did not approach a bear, but aggressively tried to displace it. This includes stationary yelling, banging of pots and pans, and use of air horns to displace a bear.
7 Assault – Humans threw things at a bear, used chemical repellents, used deterrent rounds, or struck at a bear. Even if assault was initiated from a stationary position, report it as assault.
8 None – The people's behavior did not appear to change in response to the interaction.
9 Not applicable
10 Other – Describe.

Where did the group receive bear safety information? – Circle all that apply.

0 None – Received no information
1 Printed material (Katmai National Park) – This includes all Katmai publications, i.e., park newspaper, brochures (not Bear Facts), etc.
2 Brooks Camp Visitor Center
3 Interpretive program, Brooks Camp
4 Ranger contact
5 King Salmon office – Katmai National Park office in King Salmon.
6 Phoned Katmai
7 King Salmon Visitor Center
8 Non-Katmai source (Who? What?) – Please describe.
9 Lodge staff – Include name of lodge.
10 Guide – Note business affiliation.
11 NPS-sponsored staff training
12 Unknown
13 Not applicable
14 Other – Describe.

Was there food in the area? – Write "Yes", "No", or "Unknown." Consider items provided by humans that a bear might eat like human food, garbage, scented toiletries, fish caught by anglers, and carcasses killed by hunters. List all of this type of food items that were in the area. Do not include natural food sources like vegetation, salmon that was not caught by anglers, and carcasses that died of natural causes.

If food was present in the area, circle the applicable food category:

1 Angler-caught fish, not secured per park regulations
2 Fish on line near bear – Fish on line within 50 m or less of a bear.
3 Beverage only, not secured per park regulations
4 Human food, not secured per park regulations – Choose this category if unsecured food or unsecured food and beverage were present.
5 Garbage containing food, not secured per park regulations
6 Harvested game – Describe how the game was stored.
7 Human food/fish/garbage secured per park regulations
8 Unknown

Was property damaged? – Write "Yes", "No", or "Unknown." Estimate the cost of the damage. If a visitor plans to put a $2.00 patch on a $500.00 tent, write $2.00. Describe the items and level of damage to each. If more space is needed, continue in the "What happened? section.

What was the source of this BMRF? – Circle the source of the report.

0 Unconfirmed rumor – Source unknown, story cannot be confirmed, or otherwise doesn't fit below
1 Personal experience – Recorder was involved in a large part of the interaction
2 Direct observation – Recorder saw most of it happen
3 Direct report – Recorder interviewed someone who had personal experience or direct observation
4 Observed report – Recorder interviewed someone who received a direct report

What happened? – Describe the interaction in as much detail as possible. Include diagrams, drawings, etc. if helpful. Attach additional paper if necessary. This is the most important section on the form!

Report taken by – Write the name of the National Park Service staff member who completed the report. If a visitor completed the form, write the name of the staff member who helped them.

Date report taken – Write the date that the report was taken.

FOR MANAGEMENT USE ONLY – This section should only be completed by NPS staff. If you are uncertain how to complete of any of the sections, a Bear Management Technician will finish it for you.

NPS Staff Action – Circle the action NPS staff took toward the people involved in the interaction.

0 None – No action was taken or minimal communication occurred which did not include a discussion of bear safety and how the interaction could have been handled differently.
1 Interpretation – NPS staff discussed the aspects of bear safety relevant to the interaction and made suggestions for avoiding or improving similar interactions.
2 Verbal warning – Interpretation and a verbal warning that their behavior violated regulations were given.
3 Written warning – Interpretation and a written warning that their behavior violated regulations were given.
4 Citation – Interpretation and a citation notice were given.
5 Not applicable
6 Other – Describe.

Other BMRFs – Record the BMRF numbers of other interactions related to this event.

Bear Management Action – Circle the predominant action of NPS staff during or in response to the interaction. Because this section is used to evaluate the Parks' bear management program, do not include

hazing conducted by other people here unless they were part of a hazing effort orchestrated by NPS personnel (but describe any hazing actions taken by other people under the "What happened" section). Also, indicate the number of people that were present during the management action (include in that total any people that you are aware of that were moved into buildings, etc.).

0 None – NPS staff did not respond.
1 Monitored – NPS staff monitored the situation.
2 Too late – NPS staff arrived after the interaction was over.
3 Unsuccessful hazing – NPS staff tried to haze the bear(s) out of the area, but the bear(s) would not leave (although they may have eventually left on their own).
4 Successful hazing – NPS staff drove the bear(s) out of the area by hazing them.
5 Posted warnings – Signs informing visitors about potential dangers were posted.
6 Closure – A closure was imposed as a result of bear activities.
7 Killed bear – A bear was killed by NPS staff.
8 Not applicable
9 Other – Describe.

Hazing Technique – Circle all of the hazing techniques that were used by NPS staff. Because this section is used to evaluate the Parks' bear management program, do not include hazing conducted by other people here unless they were part of a hazing effort orchestrated by NPS personnel (but describe any hazing actions taken by other people under the "What happened" section). If multiple techniques were used, describe the progression and the bear's reaction to each in the "What happened?" section. Also report the number of times each technique was used, i.e., 3 cracker shells fired. If bean bag rounds were used, specify the model (e.g., MK Ballistics Deer Thumper).

Human Offense – Circle everything the person did that violated Park regulations and guidelines.
0 None – Nothing, or no knowledge of an offense.
1 Too close – People were within 50 yards of a bear or within 100 yards of a sow with dependent cubs.
2 Didn't yield right-of-way – People did not withdraw to let a bear continue on its path.
3 Continued fishing – An angler continued fishing when a bear was within 100 yards, or after being directed by NPS staff to stop or withdraw from the river.
4 Didn't break line – An angler tried to land a fish rather than break the line when a fish was within 100 yards, or after being directed by NPS personnel to do so.
5 Stacked fish – An angler stored a caught fish on the bank rather than immediately taking that fish to the Fish Freezing Building.
6 Improper food storage – Park regulations regarding food/garbage storage or consumption were violated.
7 Harassment – People actively harassed bears beyond what was necessary or reasonable for protection or to drive bears from the campground or residence area.
8 Gear left unattended – People left gear unattended.
9 Unknown or not applicable
10 Other – Describe.

Primary Incident Category – Circle the primary category for the incident. If an incident falls into more than one category, identify the category that appears to have the greatest management consequences as the primary incident category, and mark any others as secondary. For example, if a bear damaged a bike while trespassing in camp, "Property damage" would be the primary incident category, and "Trespass" would be a secondary category.

1 Food related – Human food or garbage was obtained by bear; a bear stole a fish from an angler; a bear attempted either of above; or human handling, storage, or behavior related to human food, garbage, or

fish was improper. A bear's attempt must be active, e.g. loitering near the incinerator building or fish freezing building. is "trespass"; whereas, attempted entry of a building containing food is "food related."

2 Surprise encounter – A bear responded when it was apparently surprised by a human at close range.
3 Dominance interaction – Competition for space occurred between bears and humans when a bear was not surprised (e.g., anglers did not withdraw for a bear coming down the river, photographers stalked too close to a bear, a taxiing floatplane displaced a bear, or a bear aggressively displaces people).
4 Trespass – A bear was within the campground or developed area (and not involved in categories 1, 2, 3, or 6—may then indicate trespass as secondary category), or a bear was on a viewing structure.
5 Planned management action – The incident was a planned action of bear management whether or not successful, excluding responses to bear incidents (e.g. closures, ambushes).
6 Property damage – A bear damaged property and the incident was not food-related.
7 Curious investigation – A bear investigated unattended property, a boat, a plane, etc., the incident was not food-related, and no property damage occurred.
8 Other – Describe.

Predominant Management Consequence – Circle predominant management consequence of the interaction; others that are secondary may be noted as such.

0 None – There were no significant management consequences.
1 Human withdrew – Humans left the general area.
2 Bear withdrew – The bear(s) left the general area.
3 Directed approach or aggression unpunished – Although physical consequences (5, 6, 7, or 8 below) did not occur, human responses to the bear's unprovoked directed approach or aggression may have resulted in undesirable learning by the bear. Incidents such as a bear repeatedly displacing human who had already gotten out of its path or a bear rushing at anglers without stealing fish should be recorded here. An incident of a sow charging humans who could reasonably be perceived as a threat to her young should be recorded as 1 or 2 above.
4 Property damage – Property was damaged by a bear.
5 Fish stolen – A bear obtained a fish that it may associate with humans. This includes bears taking fish off fishing lines; bears obtaining fish from recently broken lines; bears obtaining recently abandoned fish; bears removing fish from boats, planes, coolers, or other human structures; and bears obtaining fish being transported by humans.
6 Obtained human food – A bear obtained items from people or their facilities that might be considered food (whether consumed or not). This includes human food and beverages, garbage, scented toiletries, fish caught by anglers, and carcasses killed by hunters. This does not include natural food sources like vegetation, salmon that was not caught by anglers, and carcasses that died of natural causes.
7 Bear killed – This includes bears being killed as Management Actions, Defense of Life and Property (DLP) kills, legal hunts, and incidents of poaching.
8 Human contact/injury/fatality – Any incident in which direct physical contact is made between a bear and a human.
9 Trespass unpunished and unchallenged – A bear was within a residence area and was neither punished nor challenged.
10 Enhanced habituation – The interaction likely contributed to habituation of the bear to humans, their activity, or habitation, although no immediately serious consequence resulted, e.g., people remained closer than 50 yards from a bear and the bear did not obviously respond.
11 Unknown or not applicable
12 Other – Explain.

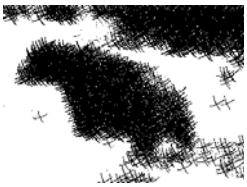
Infer proximate cause leading to interaction – Circle the cause of the interaction. Beware of observer bias. Do not guess. Circle "Unknown" unless the evidence strongly indicates a certain event. Proximate

means the event immediately preceding the interaction, as opposed to ultimate cause. For instance, a proximate cause could be that an angler failed to cut his line soon enough resulting in a bear stealing the fish; do not assign an ultimate cause such as fishing is allowed in the river.

0 Unknown – If you are unsure whether to use this choice or another, then you probably do not know the proximate cause.
1 Chance event – The human behaved appropriately according to Park regulations and management plans, the bear behaved appropriately according to management plans, the bear was apparently unaware of or did not respond to the human presence, and the interaction resulted from coincidence, i.e., a surprise encounter.
2 Human error/action – A human violated Park regulations or otherwise exhibited inappropriate behavior according to management plans. Choose this category even when there was inappropriate behavior by the bear if it was triggered by inappropriate human behavior. For instance, choose this category when a bear was among the buildings because a departing float plane scared it from the beach.
3 Bear initiated – Human behavior was entirely appropriate according to Park regulations and management plans, it was not a chance event, and bear's behavior initiated the interaction. For example, a bear entered the residence area from the beach when the beach was completely clear of human activity.
4 Not applicable

Appendix C

2002 Brooks Camp Short Trespass Form (STF)



Brooks Camp Bear Trespass
Short Form Records – 2002

Please record no. of bears by age-sex category

Date	Time	Sub	AdM	AdF	COY	Yrlg	Ukn	Trespass location; if bear was displaced from camp, describe how	Radio Call #