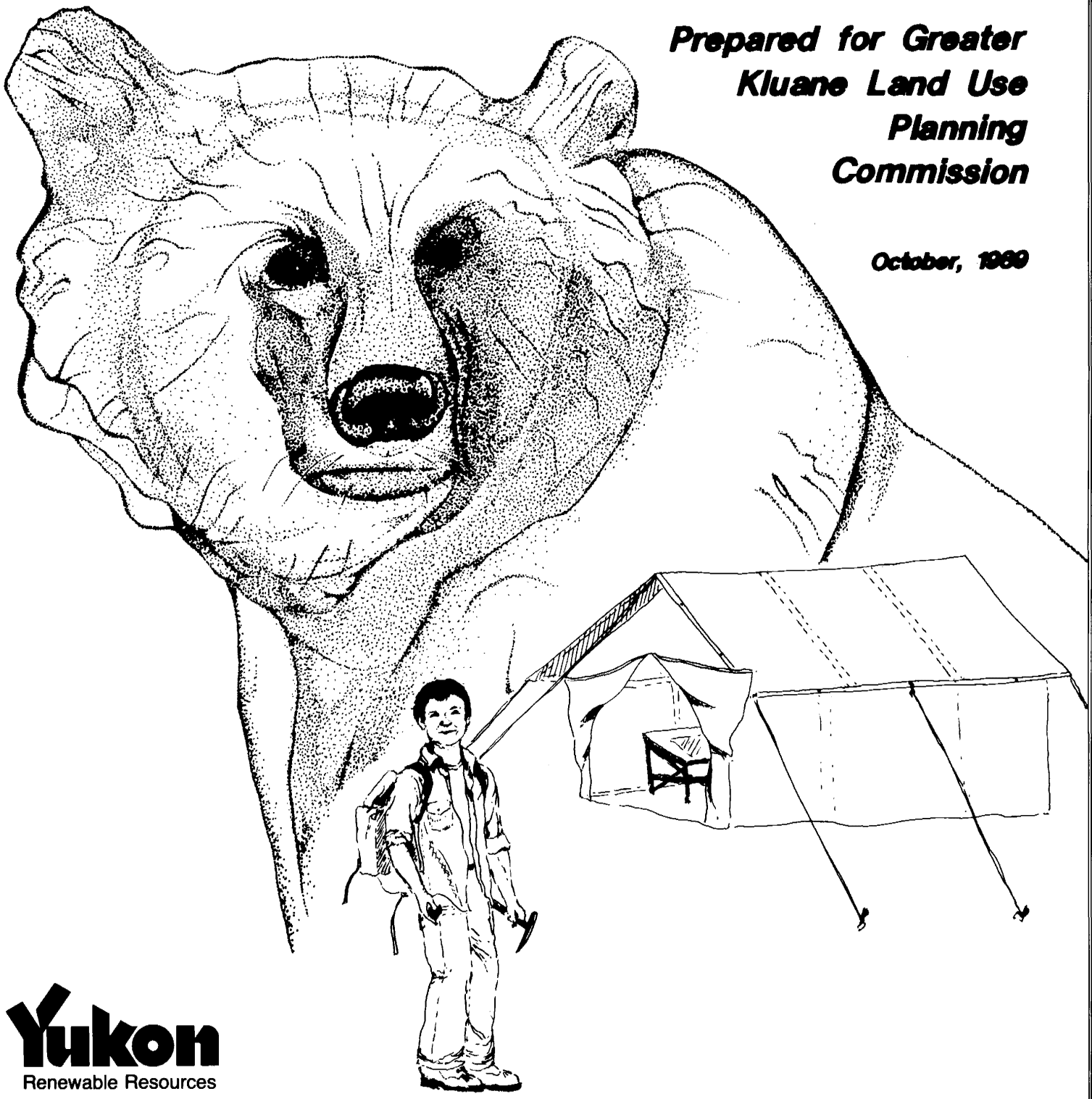
LAND USE GUIDELINES TO MINIMIZE CONFLICTS BETWEEN BEARS AND PEOPLE

Prepared for Greater Kluane Land Use Planning Commission

October, 1989



Yukon
Renewable Resources

FINAL REPORT

LAND USE GUIDELINES
TO MINIMIZE CONFLICTS BETWEEN
PEOPLE AND BEARS

A report prepared for the
Greater Kluane Land Use Planning Commission

Debbie van de Wetering
and
Barney Smith

Fish and Wildlife Branch
Department of Renewable Resources
Government of Yukon

Approved:

Brian O. Pelchat A/Director
Director, Fish and Wildlife Branch

Brian O. Pelchat
Chief, Big Game Management

Manfred Hagen
Supervisor, Habitat & Research

December 1989

SUMMARY

1. The Greater Kluane Land Use Planning Region (GKLUPR) is home to about 1,000 grizzly bears which is 10 percent of Canada's grizzlies and two percent of the North American grizzlies. Although no estimate is available, black bears are presumed to be more abundant than grizzly bears within the planning region.

2. Recently, the Governments of Canada and the Yukon began to plan land uses in the Region and recognized that, since grizzly bear conflict with people in the region was significant and largely preventable, planning could benefit from guidelines to minimize bear human conflict.

3. Evidence shows that the failure to design land uses to avoid bear problems is relatively recent, following centuries of care and attention by aboriginal peoples. The reliance on killing bears, in the absence of recent planning, has been ineffective in preventing problems. Levels of conflict and hazard are unacceptably high in some parts of the region.

4. The Yukon is in an excellent position to benefit from several decades of research and management directed at preventing bear conflicts with people. This research reveals that reducing bear abundance, often perceived as an effective management tool, will not prevent bear human conflict. Instead, particular attention is needed to eliminate bear access to garbage, prevent bears being attracted to developed areas, and cultivate wildness in bears. A solid body of research confirms how successful these factors can be to reduce conflict.

5. This paper presents guidelines that are best recommended management practices. The guidelines are tentative and will benefit from trial implementation and review. This work only addresses the prevention of injury to humans and their property. Additional measures are needed to ensure that developments have minimal impact on bear populations.

6. General guidelines are advanced regarding the location of developments. It is recommended that all land use activities avoid key grizzly bear habitat and concentration areas to reduce the likelihood of encounters and development of conflicts. It is stressed, however, that all locations have potential for bear activity because grizzly bears have very large home ranges. Therefore, the guidelines emphasize the importance of proper design of facilities and management of operations regardless of site location. It is recommended that all potential land uses require consultation and review by the Fish and Wildlife Branch prior to development.

7. Methods of designing facilities and managing operations are prescribed and viewed as the most critical aspect of the

guidelines. They stress preventing the attraction of bears to facilities and eliminating the availability of unnatural food sources. Site operation plans, developed in consultation with the Fish and Wildlife Branch, are recommended as an important and flexible way to achieve sound management procedures.

8. A series of specific guidelines, grouped into 7 categories of land use activities, are presented at the end of the report. They are to be used in conjunction with the general guidelines presented in section 3.0.

9. Appendices describe garbage incinerator designs, electric fence designs, non-lethal deterrents and additional data on problem bear management in the Greater Kluane Region.

ACKNOWLEDGEMENTS

Funding for this project was provided by the Greater Kluane Land Use Planning Commission and the Habitat and Research Section of the Fish and Wildlife Branch, Yukon Department of Renewable Resources.

T. Fox and D. Cooley summarized and prepared the data tables. B. Hawkings, R. Sumanik, B. Kuiper, L. Mychasiw, R. Leef, M. Waterreus, R. Breneman, R. Gates, and R. White reviewed early drafts of the paper and provided helpful suggestions. Dr. E. Follman, W. McCrory, E. Mallam and B. Hawkings are thanked for their critical review of the final manuscript. D. Milne, C. Lajoie, and V. Aschacher typed and edited the paper.

TABLE OF CONTENTS

TABLE OF CONTENTS CONTINUED

1.0 INTRODUCTION

The Greater Kluane Land Use Planning Region comprises 44,000 km^2 and is adjacent to the Kluane National Park Reserve (KNPR) (22,015 km^2). The human population is concentrated in several communities along the Alaska Highway and Haines Road, and the remainder of the area is generally wilderness in close to pristine conditions. The Region, is home to an estimated 1,000 grizzly bears and a large, but unknown population of black bears. Both are distributed throughout the area, with the exception of the St. Elias Icefields.[32] From a broader perspective, these grizzlies are about 10% of the Canadian population[16] and 1.7% of the North American population.[29]

In 1989, the Governments of Canada and the Yukon and the Greater Kluane Land Use Planning Commission began to formalize broad plans to guide development in the region. This process of planning was preceeded by a long period in which crown land was frozen for most purposes, except mining, awaiting the settlement of aboriginal land claims. Development prior to this was largely unplanned. Recognizing that bear related problems were significant, and largely preventable, the Commission supported the development of guidelines designed to minimize conflict between people and bears.

For millennia, aboriginal peoples and bears shared many of the same foods and were in close proximity, particularly in rich berry patches and salmon spawning areas. There was much respect and caution among these early inhabitants. Families lived in groups in secure structures built with vertical log walls. The presence of domestic dogs helped to detect and deter bears. Bears would quickly learn to detect and avoid the woodsmoke, barking dogs, and human activity at these sites.

Despite using preventative techniques to avoid and deter bears, at times Indians deliberately removed bears. Although weapons were limited, spears and clubs were effective towards aggressive bears

or bears were killed in dens when attacked by groups of hunters with dogs. Deadfall traps were also effective with elusive bears.

The advent of firearms and the trade in bear pelts in the early 1900's resulted in increased harvests. Archival documents reveal that bears were largely regarded as pests. Potentially dangerous bears were shot and little effort was made to deter the animals. Caches still secured foods while inhabitants were away, but increasingly bear death replaced preventative measures.

As intensive hunting associated with big game guiding began and following construction of the Alaska Highway and Haines Road, harvests of grizzly bears increased. Greater hunting in remote areas left populations less able to tolerate localized removal, and as a result restrictions on hunting opportunities were initiated.

Garbage dumps proliferated in the region. The adaptable bears learned to associate many developed areas with easy foraging and, in one area of Kluane Park, to follow hikers until they dropped backpacks. Tourist facilities were built and new subdivisions were located in important bear habitats. Over the decade 1978-88, 217 bear complaints were received by the Fish and Wildlife Branch (outside the Park), and a minimum of 59 grizzly bears were killed in defence of life or property. Bear incidents in some areas of Kluane Park became so frequent that bear-proof food containers and frequent trail closures were necessary. Fifteen grizzly bears lived in the vicinity of the Haines Junction dump in 1989. In the Dezadeash Lake area, a lodge employee was scratched and bitten by a black bear. Outfitters complained about the high number of control kills that were deducted from their potential harvests. These problems suggested a clear need to return to serious and deliberate programs to prevent bear problems. The need for guidelines was clear.

In the past two decades, guidelines and policies to minimize conflict between bears and people have been developed in most

North American parks. In addition, there has been several decades of research on how to best manage the interface between bears and people.[3, 4, 7, 22] The Yukon is now in a good position to benefit from this research.

To reduce bear-people conflicts, and to "cultivate wildness in bears", guidelines must be established that prevent attraction and access to garbage. This is the resounding conclusion of decades of study. There is no evidence that reduced bear densities, alone, will reduce bear problems. If this were the case, grizzly bear problems would be 20 times more common in coastal Alaskan villages where there are 400 grizzlies per 1,000 km^2 than at a community like Faro where there are only 17 grizzlies per 1,000 km^2.[27, 31] Garbage, not bear abundance, is the important factor. There is no question that eliminating bear access to garbage, alone, would dramatically reduce bear-people conflict in the Kluane Region.

Bears are important to the Kluane region. They are a cornerstone of the outfitting industry, and offer great potential for wildlife viewing in certain natural concentration areas. As grizzly bear populations dwindle to the south and wilderness is lost, these wilderness values will greatly increase. Steps taken now, through implementation of these guidelines, will lead to long-term benefits to Kluane area residents, tourists, and bear populations.

Scope:

This paper presents tentative guidelines that are as close to state-of-the art as possible. They are tentative because they are not fixed in stone and should be revised as better data become available. The guidelines reflect state-of- the art information as far as grizzly bears are concerned, but may not for northern black bears because data is so limited. Their primary intent is to reduce bear-people conflict. Habitat protection needs for the adaptable and wide ranging bears in our northern environment have received insufficient study. Some preliminary comments follow, and provide the link between guidelines and the key habitat maps mapped by Sumanik.[33]

The guidelines are deliberately termed as "guidelines" and not "conditions." They reflect best recommended management practices that should be followed. As such, they are also consistent with the Environmental Policy of the Mining Association of Canada, adopted by the Klondike Placer Miners' Association, the Yukon Chamber of Mines, and the Yukon Mine Operator's Association.

The link to grizzly bear key habitat maps:

Bear distribution is almost exclusively related to the location of feeding grounds and their season of use[16]. Since the majority of these feeding opportunities involve plants, vegetation communities that have been mapped can be evaluated as to their potential importance to bears. These maps then provide some indication of areas of natural bear concentration areas where some developments, for example campgrounds, should be excluded if bear conflict is to be minimized.[23]

Sumanik[33] defines areas of probable and observed natural concentration areas of grizzly bears as key habitats for the Kluane Region. Based on interviews with long-term residents and on vegetation descriptions, much of the Greater Kluane Planning Area could be evaluated. This work revealed much of the Shakwak Trench and most floodplains as high quality bear habitat. When applying the guidelines yet to be discussed, the land use proponents should take particular note of 3 cautions made by Sumanik.[33] First, since grizzlies have enormous home ranges (up to several thousand square kilometers), there are no areas not used by bears. For this reason, most guidelines apply to the entire region. Secondly, small habitats, termed microsites can be extremely important to bears and may not be mapped. A female and her offspring (and their offspring) may return year after year to a specific ravine rich in ground squirrels or berries. The mapping could not identify these microsites. Finally, there are limitations in our vegetation mapping and knowledge of bear diets. On the ground evaluation of bear use of areas should precede extensive residential and recreational development.

2.0 METHODS

Information for developing the guidelines was obtained from 1) literature reviews, 2) interviews with persons experienced with land use planning and/or bear-people conflicts, 3) interviews with local residents, 4) summary reports of problem bear incidents, and 5) contact with government agencies in other jurisdictions with grizzly bears. To ensure the guidelines reflected state of the art knowledge three bear biologists critically reviewed the paper; Dr. Erich Follmann from Alaska, and Wayne McCrory and Erica Mallam from British Columbia.

2.1 Structure of the Paper

The guidelines developed for this report were designed to be relevant throughout the Yukon, not just for the GKLUPR. A format was chosen that would allow information to be easily extracted and distributed to government agencies and industries involved in land use development.

Current bear management policies and objectives, which the guidelines are designed to support, are reviewed in section 3.0. Section 4.0 describes general location, design and management guidelines that are relevant for all types of land use development. Section 5.0 is separated into 7 sub-sections, each describes bear-people conflicts associated with a specific type of land use and recommends best management guidelines to minimize conflicts. Each sub-section is a complete unit when combined with section 4.0.

3.0 BEAR MANAGEMENT OBJECTIVES

Within the GKLUP Region, bears are managed by the Yukon Department of Renewable Resources and the Canadian Parks Service. However, bear movements are not restricted by the jurisdictional boundaries of Kluane National Park. To improve the management of bears in the Kluane ecosystem the Department of Renewable Resources and the Canadian Parks Service signed an agreement to co-ordinate their bear management programs (Appendix C). Although this has been a positive step towards improving bear management, it does not ensure their conservation. Neither agency has the mandate to significantly influence land uses outside the Park. The conservation of bear populations and reduction of bear-people conflicts in the GKLUPR, and throughout the Yukon, requires the co-operation of all government agencies and land users that affect bear populations and their habitat.

3.1 Yukon Department of Renewable Resources

Bear management objectives of the Yukon Department of Renewable Resources[10] are to:

- manage grizzly bears primarily as a trophy animal to provide sustainable trophy harvest opportunities for resident and non-resident hunters
- provide a variety of viewing and photographic opportunities
- minimize conflicts between bears and people
- manage grizzly bear abundance, in selected areas, to promote moose population growth.[11]

To achieve these objectives the Department:

- closely monitors and regulates the harvest of bears
- encourages the conservation of crucial habitat through wise land use management
- promotes strict food and waste management techniques
- supports research and education programs

- controls, through death or transplant, bears which are considered a threat to human safety.

3.2 Canadian Parks Service: Kluane National Park Reserve

Grizzly bear management objectives of Kluane National Park[11] are to:

- maintain a natural and healthy grizzly bear population
- provide safe recreational opportunities for park visitors

To achieve these objectives the Park:

- promotes and enforces proper food and garbage management
- regulates access into backcountry areas
- promotes the use of areas which have a low potential for bear-human conflict
- educates park visitors on how to behave in bear country through pamphlets, personal contacts, and interpretive programs
- relocates problem bears to areas where there is little human activity
- destroys bears which are considered a threat to human safety
- annually monitors the effectiveness of its Bear Management Plan.

4.0 GUIDELINES FOR PLANNING AND MANAGEMENT OF LAND USES

Bear-people conflicts can be reduced if the negative effects associated with various land uses are addressed and minimized. In general, this means careful planning and management of facilities and human activities. To be most effective, guidelines for minimizing bear-people conflicts should be established early in the planning phase of developments[6]

The following section outlines basic planning and management guidelines that are relevant for every type of land use. These guidelines should be followed by prospective developers and government agencies that review development proposals.

4.1 Location of Developments

Background

Since bears concentrate in key feeding areas such as soapberry patches or fish spawning sites, avoiding the location of future land uses and more careful management of existing land uses in or adjacent to key bear habitats will help reduce bear-people conflicts.

Key grizzly bear habitats in the GKLUPR have been identified and mapped.[33] Although similar data for key black bear habitats in the GKLUPR do not exist, data gaps can be filled by ground checking proposed land use sites.

Guidelines

All proposed land uses should be reviewed in the following manner;

1) **Where sites present a high risk of bear-people conflicts, because of location in or near key bear habitats, alternatives should be reviewed.**

2) Where no alternatives exist, the cost-benefits of the development should be carefully weighed against the potential impacts on bear populations and threats to public safety.

3) Should a facility proceed in a prime bear area, emphasis should be on designing and managing the development to minimize conflicts with bears.

4.2 Design of Facilities

Background

Modifications to facility designs can reduce bear-people conflicts and are often inexpensive if considered early in the design process. Simple facility designs, such as installing windows near doors and removing brush from around a camp, allow the early detection of bears and help prevent surprise encounters.[1] Electric fences can deter bears from approaching facilities and can secure food and garbage.

Guidelines

Facilities should be designed so that they;

1) decrease the attraction of bears to the facility,

2) deter curious bears,

3) ensure people detect approaching or nearby bears, and

4) deny bears the opportunity to learn to associate developed areas with easily-obtained food.

4.3 Management of Facilities and Operations

Background

The majority of bear problems at human habitations are the result of bears being attracted to poorly stored food or improperly disposed wastes. Bears which are conditioned to feeding on human food and habituated to people are more likely to cause human injury than bears which feed on natural food sources. Herrero[16], in his intensive review of bear-caused human injuries in National Parks, found that two-thirds of all human injuries were caused by bears that had a history of feeding on garbage.

Proper management of bear attractants has reduced bear-people conflicts in many national parks[2, 35] and at many industrial and residential sites.[6, 12, 30] For instance, in the Slims River Valley of Kluane National Park, a noticeable decrease in the number of bear-people conflicts has occurred since the implementation of mandatory bear-proof food containers and the closure of a nearby open-pit garbage dump.[5, 34]

Managing the behaviour of people also plays an important role in reducing bear-people conflict. People that deliberately feed or bait bears nullify all other efforts to minimize bear-people conflicts and seriously jeopardize human safety and the lives of the bears they feed.[7]

Guidelines

Land use proposals should clearly state;

1) **how attractants such as food and garbage will be managed to prevent bears being attracted to them for food,**

2) **how people working at or using the facilities will be managed to prevent them from acting in a manner which may attract bears to the site or provoke conflict with bears.**

5.0 SPECIFIC GUIDELINES

This section provides guidelines for minimizing bear-people conflicts associated with various types of land use. To be effective these guidelines need to be adopted and enforced.

5.1 Solid Waste Management Disposal Sites

Background

When garbage is accessible, bears will incorporate it into their diet and learn to associate developed areas with easy foraging. Bears congregate at dumps as they do in other good foraging areas such as fish spawning sites. This creates a hazardous situation, as most dumps are located near communities. In Faro, "dump bears" in search of food wandered through the community creating a public safety hazard. As well, the majority of local and regional bear-caused damage in Faro is caused by bears that are conditioned to feeding on garbage.[30]

Some people like to view bears at a dump. Bears that are viewed while feeding at a dump become more tolerant of people and are more dangerous than bears which avoid people.[16] These bears are also more susceptible to poaching. Evidence of poaching activities at dumps has been found, but the extent of this activity is not known.[30]

People that view bears at dumps often get the false impression that bears are slow, stupid, and unaggressive. They may also falsely assume that local bear populations are abundant and productive as many bears, including family groups, can be viewed feeding at the same time.

Bears that feed at a dump are also exposed to many health hazards. Bears will consume toxic substances and often damage their mouth, paws, and skin on sharp objects such as broken glass and tin cans.

Relocating bears that feed at garbage dumps tends to be futile. A bear relocated 80 km from the Faro dump returned within 2 days of its release. Similar situations have occurred elsewhere. Consequently, bears that frequent garbage dumps and become a nuisance are usually shot. Controlling problem bears is expensive and can reduce local bear hunting opportunities. Open pit garbage dumps undermine efforts to reduce bear problems at other facilities such as campsites and mining camps.

To prevent bear problems associated with garbage dumps, it is necessary to eliminate the opportunity for bears to obtain garbage. Electric fencing can eliminate access to bears that attempt to visit a sanitary landfill. Methods for properly disposing of garbage include incineration, or bear-proof transfer stations are available and have been well tested. Proper disposal of garbage will save potentially attracted bears from being killed and may prevent serious bear-people conflicts. Eliminating bear access to garbage is without question the single most important step in reducing bear conflict with people.

Guidelines

5.1.2 **Regional solid waste management plans should strive to minimize the number of solid waste disposal sites and should phase out all existing open pit garbage dumps.**

5.1.3 **Solid waste disposal sites should secure garbage within a bear proof enclosure.**

5.1.4 **Solid waste disposal sites where garbage is available to bears should not be located within 5 km of a community, residence, or tourist facility.**

5.1.5 **Bear proof collection, transport, storage, and disposal systems should be included in operational planning associated with all solid waste disposal sites.**

5.2 Residential Areas

Background

Residential development can destroy bear habitat and disrupt their normal behavioural patterns. Since many people have a low tolerance for bears, many bears are shot when they approach residential areas. Most of the non-sport grizzly bear kills in the GKLUPR were in human settlement areas (Appendix A). It is likely that community dumps were responsible for many of the bear problems, but residents have also been responsible for attracting bears to the community. Residents of the Yukon, especially those in small communities, should do everything they can to prevent attracting bears to their homes.

Guidelines

5.2.1 **Proposed residential development must avoid key bear habitats.** The Yukon Fish and Wildlife Branch should be contacted for site specific information.

5.2.2 **Zoning bylaws should not allow back-yard swine and large scale poultry operations within residential subdivisions, or near recreation areas.**

5.2.3 **Rural residents should store garbage in air-tight, bear-proof garbage cans or indoors until it is delivered to an authorized solid waste disposal site.** Neighborhood bear-proof storage containers are preferred to curbside collection from conventional cans. Burn barrels are not recommended due to fire hazard, low combustion temperatures that release airborne pollutants, and their incomplete burning of garbage.

5.2.4 **Information programs should educate the public about bear behaviour and how to avoid conflicts.** Education programs should aim at increasing human tolerance and understanding of bears. People should be taught how to use non-lethal bear deterrents (Appendix H).

5.3 Industrial Camps: Placer Mining, Exploration, Pipeline, Other

Background

In addition to the adverse affects renewable and non-renewable resource extraction industries can have on bear habitat[20, 26] food and garbage at industrial camps often attracts bears which can lead to their destruction. For example, construction of the Trans Alaskan Pipeline resulted in at least 13 grizzly bears killed and another 12 translocated.[16]

In the Yukon, there are many active and remote industrial camps during the summer season, such as placer mining, hardrock mining, geological surveys, forestry, prospectors, fisheries, and highway camps. Camps may range in size from one person to many hundred. It may seem insignificant if, on average, each camp has to shoot one bear per season; however given the high number of industrial camps in the Yukon one bear killed per camp would be significant. It is essential that each camp does its part to minimize bear-people conflicts by strictly managing food and garbage. How successful this can be was seen in the Shakwak Highway Reconstruction. These General Enterprises Ltd. camps employed chain link perimeter fences and used garbage incinerators and enjoyed no bear problems.

Guidelines

5.3.1 **Where possible, avoid locating industrial camps near key bear habitats and avoid sites where bears have been a problem in the past.** The Yukon Fish and Wildlife Branch should be contacted for site specific information.

5.3.2 **Design camp facilities so that human safety is maximized by eliminating opportunities for surprise encounters with bears**
The Yukon Fish and Wildlife publication "Field Guide to Yukon Bears for the Exploration and Placer Industries" provides detailed information on how to best set up camps.

- choose sites where terrain or vegetation does not limit visibility and where loud noises (such as creeks) do not drown out sounds.

- remove brush from within 50 m of camp.

- install windows near all exits.

- ensure all activity areas are well lit.

- keep cooking, food storage, and latrine facilities at least 50 meters from sleeping areas, but within view.

- keep garbage incineration (and food storage area) at least 200 meters from sleeping areas.
- arrange tents or buildings in a semi-circle or straight line; this provides the bear with an escape route and will also decrease the risk of human injury should a bear need to be shot.

5.3.3 **Site operation plans (for dealing with bears in camp) should be developed in consultation with the Yukon Fish and Wildlife Branch (Section 6.3).**

5.3.4 **Food and garbage must be properly managed so that it does not attract or become available to bears.**

- all food should be kept in air-tight bags or containers and stored in a bear-proof location (Appendix G).

- if garbage can be delivered to a solid waste disposal site, on a regular basis, it must be kept in air-tight containers and stored in a bear-proof location (e.g. inside a building, behind bear-proof fencing) prior to delivery.

- small, remote camps (less than 15 people) should incinerate their garbage on a daily basis and bury the ash or transport

it to an authorized solid waste disposal site. A 45 gallon drum with suspended basket, lid and spark-arresting chimney is recommended for garbage incineration (Appendix D).

- large, remote camps (15 or more people) should burn their garbage on a daily basis using a commercially designed forced air, fuel-fired incinerator (Appendix D).

5.3.5 **Minimize all odours that may attract bears.**

- latrine facilities should be limed and covered with earth on a regular basis. Burn tampons and sanitary napkins in an incinerator. Do not put garbage in latrine facilities.

- dump waste water in a pit away from camp and treat with disinfectant or lye.

- store motor oil, diesel, gas, and anti-freeze in air-tight containers in a bear-proof location. Bears, dogs and other animals can be attracted to and ingest these fluids with fatal results.

- ensure that propane tanks do not leak. Bears may be attracted by the smell.

5.3.6 **Protect equipment that can be damaged by bears.** Bears have been known to chew on synthetic materials such as plastic, rubber, and styrofoam and also to roll on ground saturated with petroleum-based lubricants. Equipment should be secured in a bear-proof location, particularly if a camp is left unattended for a long period of time.

5.3.7 **Electric perimeter fencing (solar powered) should be used at all bush camps as a preventative measure. Chain link fencing may be required for larger, more permanent camps (Appendix F).** Some facilities may experience frequent bear problems despite

careful management of bear attractants. This can occur if facilities are located near key bear habitats or if bears in the area have previously obtained human sources of food. Inexpensive electrified fencing designed for livestock has been proven to be effective at deterring black bears from a Yukon placer mining camp for 2 seasons.

5.3.8 **Bears must not be fed.** Feeding wildlife is unlawful under the Wildlife Act (Appendix B) and must be enforced to be effective. People that feed or bait bears nullify all other efforts to minimize bear-human conflicts and seriously jeopardize human safety and the lives of the bears they feed.

5.3.9 **Bears should be scared away from human habitations using non-lethal deterrents (Appendix H).**

5.3.10 **Special attention should be given to shutting down camps.** Camps shut down for the winter should be left with doors ajar, kitchen area disinfected and food removed, freezers and refrigerators left disinfected and with doors open, and with all valuable gear removed or stored in an inaccessible cache. Bears can easily break through the wall of a trailer. Large, expensive, or elaborate camps should be occupied from April 1 to December 1 to minimize their vulnerability.

5.4 Hunting and Fishing Camps

Background

In addition to food and garbage, bears are attracted to hunter kills, hanging meat or fish, and odours associated with drying and smoking. It is not uncommon for a bear to be shot by a hunter in defense of life or property. The bear problems at Kloo Lake are typical of those at fish camps in the Kluane Region. Henderson[15a] reviewed bear conflict at Yukon River salmon camps and found serious levels of conflict. These operations killed, on average, one black bear a year and one grizzly bear every 4 years.

Guidelines

5.4.1 Hunting and fishing camps need to pay particular attention to managing attractants.

- store meat/fish in caches that are inaccessible to bears, and if possible transport from camp as soon as possible.

- whenever possible, game should be taken back to camp the same day it is shot and not left in the bush overnight.

- facilities where wildlife and fish are processed should be kept clean. All surfaces should be washed clean and tissue scraps collected and incinerated.

- all solid food wastes and garbage should be incinerated.

5.4.2 **Commercial fish smoking and processing plants in remote areas should use electrified perimeter fencing (Appendix F).**

5.4.3 **During periods when cabins are vacant, less damage may result from curious bears entering through doors left open than by entry through windows or roofs.**

5.5 Recreation Activities

Background

Studies elsewhere indicate that bear problems in recreation areas are often the result of facilities such as campsites and trails being located in key bear habitats. Many studies have been done to determine how best to design trails and campsites so that bears are not attracted to the sites and human safety is maximized. [17,18,23]

In Kluane National Park, recreational facilities are managed by the Canadian Parks Service.[23] Throughout the GKLUPR many roadside R.V. and tent campsites and roadside lodges are privately owned and operated. It is important that all recreational facilities, whether private or government operated, manage their food and garbage so that they do not attract bears. There is good reason that bear-proof garbage containers are used in Federal and Territorial campgrounds and visitor attractions in this region. Some of the greatest potentials for bear-caused threats to public safety in the region occur at poorly designed and maintained recreation areas in bear concentration areas (e.g. Dalton Post).

Guidelines

5.5.1 **Trails, campsites and other facilities should be planned to avoid key bear habitats.** Prior to development, the location of proposed facilities should be evaluated to determine their proximity to important bear habitats (ground surveys are an essential part of the evaluation process). If facilities cannot avoid key bear habitats, management steps should be taken to minimize conflict. For instance, trails and facilities may need to be closed during periods of high bear activity. Alternatively, use of trails could be limited to guided groups of 6 or more persons.

5.5.2 **All food and garbage must be strictly managed to be bear-proof.**

- use only bear-proof garbage cans at roadside pull-outs, rest areas, day use areas, and designated campsites (Appendix G).

- garbage should be removed from accessible facilities on a daily basis (preferably in the evenings) and delivered to an authorized solid waste disposal site.

- maintain a "pack-in/pack-out" policy for all backcountry trails and campsites. This should be promoted using educational materials such as signs and pamphlets and must be enforced to be effective.

- provide all designated backcountry camp sites with a food storage facility and enforce their use.

5.5.3 **Both the Yukon Fish and Wildlife Branch and the Canadian Parks Service should continue their efforts to educate the public on how to avoid conflict with bears.** Information should be available to the public on methods they can use to minimize the likelihood of bear-caused property damage or human injury.

5.5.4 **Fish should be cleaned on shorelines, and entrails placed in water courses away from camping areas.**

5.6 Agriculture

Background

Agricultural development, particularly livestock production, was a major factor in the eradication of grizzly bear populations from much of their historic range. Numerous reports document the negative impacts of agriculture on grizzly bears.[14,20] Negative impacts include:

- alteration or destruction of habitat,
- displacement from preferred habitats,
- competition with livestock for preferred forages,
- increased susceptibility to human-caused mortality through control actions, illegal killing, and relocations.

In turn, bears can damage crops and equipment, and kill or injure livestock. Domestic sheep appear to be more susceptible to bear predation than cattle.[19,20] Knight and Judd (1983) recommend that sheep grazing not be allowed in grizzly bear country and that cattle production be allowed only if farmers are willing to absorb the costs of predation losses. In the Yukon, there are a number of bear complaints each year which come from the agriculture sector. Small back-yard chicken or swine operations can attract bears as can large operations like the Pelly Farm.

Lortie reviewed the potential for carnivore depredation on Yukon livestock operations.[21] This was followed by a survey of livestock owners by Hayes and Tokarek.[15] These revealed a high incidence of conflict with bears and pigs. In addition, bears attracted to livestock carcasses posed significant risks. In one instance near Whitehorse, a grader partially exposed a horse carcass that had been buried for 5 years. The stink of the

partially-decomposed carcass attracted a bear to a rural residential subdivision, creating a public hazard.

Guidelines

5.6.1 **Proposed livestock operations, particularly sheep or swine, should not be allowed. Making such operations carnivore-proof would likely be prohibitively expensive.**

5.6.2 **All agricultural facilities should be designed to maximize human safety and protect livestock.**[9]

- build barns and pens that protect livestock from bears. Sheep and swine should be confined within electrified, chain link fencing. Use electric fencing to protect bee hives (Appendix F).

- whenever possible, keep livestock near areas with high levels of human activity.

- eliminate ground cover within 50 meters of buildings and pens.

- install windows near all exits.

- electrify perimeter fencing.

- ensure that all activity areas are well lit.

- arrange buildings in a semi-circle or straight line (this provides a bear with an escape route and will also decrease the risk of human injury should a bear need to be shot).

- utilize trained dogs to assist in detecting and deterring bears.[13]

5.6.3 **Manage odours from all attractants and eliminate the availability of food sources.** In addition to food and garbage, bears may be attracted by livestock smells and sounds, fruit and vegetable crops, compost, grain crops, fertilizers, feeds, manure, bedding straw, carcasses, and butchering areas.[9]

- store animal feed in air-tight containers in a bear-proof location (ie. inside a building, behind an electric fence).

- promptly incinerate animal carcasses or remove them to an authorized solid waste disposal site.

- design pens to allow easy removal of feces.

- organize husbandry so that vulnerable young calves and pregnant females can be protected.

5.7 Access Development

Background

Many studies have documented the effects of access development on grizzly bears. In general, grizzly bears are affected in a number of ways,[20] including:

- increased vulnerability of grizzly bears to legal and illegal harvest,
- loss of grizzly bear habitat due to road construction,
- increased human use of backcountry areas leading to a greater likelihood of human-bear conflicts.

The effect of roads on bear behaviour is less clear. Some researchers report that roads displace bears from important habitats while others suggest that bears may become habituated to roads and road activity.[20,25] The Kluane Region illustrates how access corridors for one purpose evolve into other uses. For example, the old mining roads in Kluane Park are now hiking, cycling, and horseback trails. Sections of these routes are not well located to minimize bear/hunter conflict. Routings chosen to minimize construction costs may concentrate subsequent human activity in flood plain and open forest habitats where grizzly bears concentrate. Bears frequent rarely- used roads as movement corridors.

Roads are not the only form of access that affect bears. Seismic lines, fire breaks, pipelines, trails and power lines create access for hunters, hikers and all terrain vehicles. Bears were not displaced significantly during construction of seismic lines through berry patches in late summer.[24] This could lead to potential conflicts between bears and construction workers, and

between bears and recreationists who might use the access routes after construction is complete.

In the Yukon, many industries rely on aircraft transport to and from work sites. As well, recreationists such as canoeists and hunters often charter aircraft to take them into remote areas. Aircraft traffic can disrupt normal bear behaviour patterns, such as denning and feeding, and can cause physiological stress. Helicopters tend to cause more stress than fixed-wing aircrafts.[20]

Access development can increase the availability of bear plant foods. Disturbance of permafrost can promote sedge and horsetail growth. Some clover, some gasses, and dandelions in ground cover mixes used to revegetate disturbed sites can attract bears.

Guidelines

5.7.1 **Roads should avoid key bear habitats.** Where this is not possible, road sequences within key habitats should be designed to be as straight as possible to minimize surprise encounters, and uses by the public that could increase contact with bears (e.g. camping, hiking, cycling) should be discouraged.

5.7.2 **Personnel involved in access design and construction should be trained in bear conflict avoidance, and particularly, in identification of key bear habitats.** Strict controls over feeding wildlife are needed. Reclamation of exposed soils in borrowpits and road margins should not include plant species that will attract bears, unless this is prescribed in wildlife viewing plans.

5.7.3 **Road construction should be scheduled for periods of low bear activity.** The Yukon Fish and Wildlife Branch should be contacted for site specific information.

5.7.4 **Road construction and maintenance camps should follow the guidelines outlined for industrial camps, sub-section 5.2.**

5.7.5 **Air traffic corridors should avoid key bear habitats.** Aircraft should maintain a minimum altitude of 200 meters for fixed wing and 1000 meters for helicopters.

6.0 BEAR CONFLICT PREVENTION SERVICES

The Yukon Department of Renewable Resources provides services to the public in many areas related to prevention and management of bear conflicts. While staffing is limited, the department will place high priority on consultation to minimize future bear problems and will place high priority on response to serious public safety hazards involving grizzly bears. To a large extent, response to less serious bear hazards arising from poorly designed or managed facilities is futile and receives lower priority. Specific services available are outlined below:

6.1 Training

The department will assist groups or individuals in the development of specific training programs to minimize bear human conflict. Educational booklets, slideshows, and videos are available, and specific materials or training programs can be developed. Conservation officers are qualified instructors in bear human conflict prevention, and, in addition, can provide specific training in safe firearm use.

6.2 Consultation

The location, design, and operation of facilities, particularly those related to attractants have been mentioned repeatedly in these guidelines as being critical. Experts within the department are available to informally and formally review plans, to provide referrals to experts in the field and to provide relevant information. In addition, conservation officers can provide site specific information on patterns in bear-people conflict, and provide referrals to knowledgeable local residents.

6.3 Site Operation Planning

Designation of responsibilities is common in industrial operations, particularly as far as personnel safety is concerned.

The department will provide, on request, assistance to industry to design and develop effective Site Operation Plans to Minimize Bear Human Conflict. These plans designate specific procedures to be followed: specified individuals, ensure that bear activity near the facility is detected, that personnel are properly trained, and that procedures to manage attractants are followed. This formalized plan provides specific direction on personnel access to firearms and the use of deterrents near facilities. Inspections can also be arranged to ensure personnel compliance with operating guidelines. The designation of responsibilities and procedures is in clear contrast to the confusion and panic that may result in a potentially hazardous situation.

6.4 Cooperative Research

The department is interested in cooperative research to develop practical technologies to prevent bear access to attractants and to train bears to avoid developed areas. In recent years, demonstration projects involving electrified perimeter fencing and home-fabricated garbage incinerators have been undertaken with individuals and industry. Some funding is available to assist individuals and industry test new products and technologies.

6.5 Response to Serious Bear Problems

The department responds to all complaints from the public involving aggressive, potentially hazardous bears. These responses vary greatly, depending on the situation, from instructions, to aerial darting and relocation. Early notification of potential problems permits the greatest flexibility of responses. All incidents involving property damage, human injury, or bear death must be reported to the nearest district office of the Fish and Wildlife Branch, or the R.C.M.P. Canadian Parks Service Wardens can also respond to emergencies.

6.6 Enforcement

Improper care of food and garbage by individuals can lead to food conditioned bears that may threaten the safety of the public-at-large and is contrary to provisions of the Wildlife Act. Reporting of such human behaviour is requested - strict confidentiality can be assured. Severe penalties are infrequent and typically individuals are compelled to solve the problem, for example, by installing an incinerator.

LITERATURE CITED

1. Bromley, M. 1987. Safety in Bear Country: A reference manual for site operations plan. Northwest Territories Department of Renewable Resources.

2. Cole, G.F. 1976. Management involving grizzly and black bears in Yellowstone National Park 1970-75. Natural Resources Report No. 9, U.S. Dept. of the Interior, Nat. Parks and Service.

3. Dalle-Molle, J.L., and J.C. Van Horne. 1989. Bear-people conflict management in Denali National Park, Alaska. In: Bear-People Conflicts: Proceeding of a Symposium on Management Strategies (1989). Northwest Territories Department of Renewable Resources.

4. Dood, A.R., R.D. Brannon, and R.D. Mace. 1986. Final programmatic environmental impact statement: The grizzly bear in Northwestern Montana. Montana Department of Fish, Wildlife, and Parks.

5. Environment Canada-Parks. 1988. Annual Bear Report Kluane National Park Reserve 1988. Park Warden Service 1988. Kluane National Park Reserve. Haines Junction. Yukon Territory.

6. Follmann, E. 1989. The importance of advanced planning to minimize bear-people conflicts during large scale industrial and transportation developments in the North. In: Bear-People Conflicts - Proc. of a Symposium on Management Strategies (1989). Northwest Territories Dept. of Ren. Res.

7. Follmann, E., R. Dieterich, and J. Hechtel. 1980. Recommended carnivore control program for the northwest Alaskan pipeline project including a review of human-carnivore encounter problems and animal deterrent methology. Final report. Prepared for Northwest Alaskan Pipeline Company under contract no. 478085-9-K071.

8. Frey, R. 1985. Bear Management Plan Kluane National Park. Draft copy. Environment Canada - Canadian Parks Service.

9. Government of Yukon. 1987. Managing Yukon Livestock operations to avoid predator problems. Second draft. Yukon Department of Renewable Resources. Fish and Wildlife Branch.

10. Government of Yukon. 1988. Grizzly Bear Management Direction. 2pp.

11. Government of Yukon. 1989. Recommendations towards the recovery of moose and caribou populations in the Whitehorse - Southern Lakes area (Draft). Yukon Department of Renewable Resources. Fish and Wildlife Branch.

12. Grant, R. 1980. Evaluation of industrial bear problems in six fish and wildlife districts in Alberta: 1977-79. Alberta Energy and Natural Resources, Fish and Wildlife Division.

13. Green, J.S. and R.A. Woodruff. 1989. Livestock-guarding dogs reduce depredation by bears. In: Bear-People Conflicts: Proceedings of a Symposium on Management Strategies (1989). Northwest Territories Department of Renewable Resources.

14. Harper, F. 1989. Wildlife Management Plan: Peace Subregion. Province of British Columbia. 88-93.

15. Hayes, R., and B. Tokarek. 1989.

15a. Henderson, L. 1982. Bear people conflict associated with the salmon fishery on the Yukon River. Yukon Wildl. Br. Tech. Rep.

16. Herrero, S. 1986. Bear Attacks: Their causes and avoidance. Nick Lyons Books, Winchester Press.

17. Herrero, S., W. McCrory, and B. Pelchat. 1983. Using grizzly bear habitat evaluations to locate trails and campsites in Kananaskis Provincial Park. Int. Conf. Bear Res. and Manage. 6:187-193.

18. Holcroft, A.C. and S. Herrero. 1988. Black bears and campground planning in Southwestern Alberta.

19. Knight, R.R. and S.L. Judd. 1983. Grizzly bears that kill livestock. Int. Conf. Bear Res. and Manage. S: 186-190.

20. LeFranc, M., M. Moss, K. Patnode, and W. Sug III. (eds.) 1987. Grizzly Bear Compendium. Interagency Grizzly Bear Committee.

21. Lortie, G. 1983. The implications of agriculture and livestock to the management of large carnivores in Yukon. Department of Renewable Resources. Government of Yukon.

22. Martinka, C.J. 1982. Effects of conterminous land use on grizzly bears in Glacier National Park. U.S. Natl. Park. Serv., Glacier Natl. Park, Mont. 25 pp.

23. McCrory, W., S. Herrero, and D. Whitfield. 1985. Using grizzly bear habitat information to reduce human-grizzly bear conflicts in Kokanee Glacier and Valhalla Provincial Parks, B.C. In: Proceedings-Grizzly Bear Habitat Symposium. Missoula, Montana. 1985.

24. McLellan, B.N. and D.M. Shackelton. 1988. Grizzly bears and resource - extraction industries: Habitat displacement in response to seismic exploration, timber harvesting and road maintenance. Journal of Applied Ecology (1988) 26:371-380.

25. _____, and _____. 1988. Grizzly bears and resource - extraction industries: Effects of roads on behaviour, habitat use and demography. Journal of Applied Ecology (1988) 25: 451-460.

26. Miller, S.D. 1987. Susitna Hydroelectric Project, Final Report. Vol. VI. Black bears and brown bears. Alaska Department of Fish and Game. 73 pp.

27. Miller, S.D. and M.A. Chihuly. 1986. Characteristics of non-sport brown bear deaths in Alaska. Int. Conf. Bear Res. and Manage. 7: 51-58

28. Mundy, K.R.D. and D.R. Flook. 1973. Background for managing grizzly bears in the National Parks of Canada. Canadian Wildl. Service. Report Series No. 22.

29. Peck, 1986.

30. Smith, B.L., and D.G. Lindsey. 1989. Grizzly bear concerns associated with a northern mining town garbage dump. In: Bear-People Conflicts: Proceedings of a Symposium on Mgmt. Strategies (1989). Northwest Territories, Dept. of Ren. Res.

31. Smith, R., V. Barnes, and L. VanDaele. 1989. Brown bear-human conflicts in the Kodiak Archipelago, Alaska. In: Bear-People Conflicts - Proceedings of a Symposium on Mgmt. Strategies (1989). Northwest Territories. Dept. of Ren. Res.

32. Smith and Osmond Jones. 1990.

33. Sumanik, R. 1989. Delineation of vegetation units important to grizzly bears in the Greater Kluane Land Use Planning Region Yukon Department of Renewable Resources. Fish and Wildlife Branch.

34. Sundbo, Bruce pers. comm. 1989. Kluane National Park Warden.

35. Taylor, J.S. 1984. Bear management plans in Canadian National Parks: fifteen essential elements. M.S. Thesis, Univ. of Calgary, Alberta.

ADDITIONAL REFERENCES

Chester, J.M. 1977. Factors influencing human-grizzly Bear Interactions in 7 Backcountry Setting. Fourth Int. Conf. Bear Research and Mgmt. Montana, 1977. pp. 351-357.

Clarkson, P.L., P.A. McComisky, L.R. Quaife, and J.G. Ward. 198-. Managing bear problems in northern development areas. Northwest Territories. 10 pp.

Craighead, J.J. 1980. A proposed delineation of critical grizzly bear habitat in the Yellowstone Region. Presented at the Fourth Int. Conf. on Bear Research and Mgmt. Montana. Bear Biology Association Monograph Series No. 1.

Harding, L. and J.A. Nagy. 1977. Responses of grizzly bears to hydrocarbon exploration on Richards Island, Northwest Territories, Canada. Fourth Int. Conf. on Bears - Research and Mgmt. Montana. 1977. pp 277-280.

Hugie, R.D. 1977. Species planning: an approach to black bear management and research in Maine. Fourth Int. Conf. on bear research and mgmt. Kalispell, Montana. Feb. 1977. pp. 127-129.

Martinka, C.J. 1982a. Status and management of grizzly bears in Glacier National Park. Montana Trans. North Amer. Wildl. and Nat. Res. Conf. 36:312-322.

Mealey, S.P. 1986. Interagency Grizzly Bear Guidelines. U.S.D.A. Forest Service. U.S.D.I. Natl. Park Serv., Bureau of Land Mgmt., Idaho Fish and Game, Montana Dept. Fish, Wildl., and Parks, Washington Game Dept., Wyoming Game and Fish Dept. 99pp.

Mining Association of Canada. 1989. Environmental Policy of the Mining Association of Canada.

Pearson, A.M. 1985. The Northern Interior Grizzly Bear Ursus arctos L. Canadian Wildlife Service. Report Series. Number 34.

Schallenberger, A. 1977. Review of oil and gas exploration impacts on grizzly bears. Fourth Int. Conf. Bears Research and Mgmt. Montana, 1977. pp. 271-276.

Schoen, J.W. and L.R. Beier. 1989. Brown bear habitat preferences and brown bear logging and mining relationships in Southeast Alaska. Alaska Dept. of Fish and Game. Division of Wildlife Conservation. Research Progress Report.

Singer, F.J. 1978. Seasonal concentration of grizzly bears, North Fork of the Flathear River, Montana. Canadian Field Naturalist. 92(3):283-286.

Tompa, F.S. 1987. Managing problem bears - a program review: Minister of Env. and Parks, Victoria, B.C. 23 pp.

United States Department of the Interior. National Park Service. 1981. Revised Draft Environmental Impact Statement: Grizzly Bear Management Program. Yellowstone National Park, Idaho, Montana, and Wyoming.

Young, E.L. and T. McCarthy. 1989. A problem of progress: bear conflict in Southeast Alaska. Alaska Fish and Game. Sept.-Oct. 1989. Vol. 19 No. 6.

APPENDICES

APPENDIX A

CONFLICTS BETWEEN BEARS AND PEOPLE IN
THE GREATER KLUANE LAND USE PLANNING REGION

TABLE 1: Bear/Human interactions reported to the Yukon Fish and Wildlife Branch from 1979 to 1988 in the Greater Kluane Land Use Planning Region.

Information in Table 1 was obtained from Problem Bear Interview forms (Figure 1). Table 1 does not represent every bear killed in non-hunting situations: illegal kills, research deaths, and road kills are not included. It is also reasonable to assume that not every bear/human encounter or bear kill is reported, therefore column totals represent the minimum number of occurrences.

Problem Bear Interview forms from 1979 to 1988 indicate that there were 224 reported bear/human interactions in the Greater Kluane Land Use Planning Region, excluding Kluane National Park. A minimum of 100 bears were killed and another 22 relocated. Forty-two occurrences resulted in over $11,000 dollars worth of property damage. Conservation officers spent approximately 1,667 hours responding to the bear complaints, which cost over $33,000 dollars in wages.

TABLE 1: Bear/Human Interactions reported to the Yukon Fish and Wildlife Branch from 1979 to 1988 in the Greater Kluane Land Use Planning Region. Does not include bear/human interactions occurring in Kluane National Park.

Location and Problem data were not collected for years 1979 to 1980.

YEAR	SPECIES	GMZ/GMS	LOCATION	PROBLEM	C.O. TIME (Hours)	PROPERTY DAMAGE	NUMBER OF NUISANCE BEARS	NUMBER OF BEARS KILLED	NUMBER OF BEARS RELOCATED
1979	GRIZZLY	3-04			1	.	1	1	0
1979	BLACK	5-41			5	.	1	1	0
1979	BLACK	7-01			6	.	1	1	0
1980	UNKNOWN	5-47			4	300	1	0	0
1980	GRIZZLY	5-44			13	.	1	1	0
1980	GRIZZLY	6-08			20	.	1	0	1
1980	GRIZZLY	6-09			20	.	1	1	0
1980	GRIZZLY	6-08			12	.	1	0	0
1980	GRIZZLY	7-07			10	.	2	0	1
1980	GRIZZLY	7-01			3	5	1	0	0
1980	GRIZZLY	7-01			6	.	1	0	0
1980	GRIZZLY	7-01			7	.	1	0	1
1980	GRIZZLY	5-41			12	25	1	0	0
1980	BLACK	7-05			6	.	2	1	0
1980	BLACK	3-04			1	.	1	1	0
1980	BLACK	5-46			4	10	1	1	0
1980	BLACK	5-18			24	50	2	1	1
1980	BLACK	5-18			15	.	1	1	0
1980	BLACK	5-41			6	25	2	0	0
1980	BLACK	5-18			6	.	1	0	0
1980	BLACK	5-47			1	.	1	1	0
1980	BLACK	5-18			60	300	3	0	0
1980	BLACK	5-05			26	.	1	1	0
1980	BLACK	7-03			12	150	1	1	0
1980	BLACK	7-01			1	.	1	0	0
1980	BLACK	5-38			10	340	1	1	0
1980	BLACK	5-47			4	.	1	1	0
1980	BLACK	7-03			6	50	1	1	0
1980	BLACK	7-01			1	.	1	0	0
1980	BLACK	7-01			8	.	1	0	0
1980	BLACK	7-01			6	50	1	0	0
1980	BLACK	7-01			1	.	1	0	0
1980	BLACK	6-08			14	.	1	1	0
1980	BLACK	6-08			14	.	1	1	0
1981	UNKNOWN	5-05			1	0	1	0	0
1981	GRIZZLY	5-44			21	300	1	0	0
1981	GRIZZLY	6-09			6	0	1	0	0
1981	GRIZZLY	5-21			1	0	1	1	0
1981	GRIZZLY	6-10			1	0	1	0	0
1981	GRIZZLY	6-12			10	0	3	0	0
1981	GRIZZLY	7-01			16	0	1	1	0
1981	BLACK	7-05			1	0	1	0	0
1981	BLACK	5-44			44	0	5	1	1
1981	BLACK	6-12			1	68	2	1	0
1981	BLACK	5-44			1	0	1	0	0
1981	BLACK	5-05			15	0	1	0	1
1981	BLACK	5-21			14	0	1	0	1
1981	BLACK	6-05			27	0	3	0	0
1981	BLACK	6-05			16	0	2	1	0
1981	BLACK	7-01			8	0	1	0	0

LEGEND: GMZ - Game Management Zone
GMS - Game Management Subzone
C.O. Time - Conservation Officer time spent responding to problem

(con't ....)

YEAR	SPECIES	GMZ/GMS	LOCATION	PROBLEM	C.O. TIME (Hours)	PROPERTY DAMAGE	NUMBER OF NUISANCE BEARS	NUMBER OF BEARS KILLED	NUMBER OF BEARS RELOCATED
1981	BLACK	7-07			7.0	0	1	1	0
1981	BLACK	7-01			1.0	0	1	0	0
1981	BLACK	7-03			7.0	0	5	0	1
1981	BLACK	7-01			3.0	0	1	0	1
1981	BLACK	7-07			6.0	0	1	1	0
1981	BLACK	5-06			1.0	0	1	0	0
1981	BLACK	7-01			2.0	10	1	1	0
1981	BLACK	5-06			32.0	0	1	1	0
1981	BLACK	5-06			20.0	0	1	0	1
1981	BLACK	5-06			40.0	0	1	0	0
1981	BLACK	7-01			1.0	0	1	0	0
1981	BLACK	5-41			4.0	0	1	0	0
1981	BLACK	7-01			1.0	0	1	1	0
1982	UNKNOWN	5-41			1.0	0	1	0	0
1982	GRIZZLY	6-12			12.0	0	1	0	0
1982	GRIZZLY	7-05			15.0	0	4	0	0
1982	GRIZZLY	7-07			1.0	0	1	0	0
1982	GRIZZLY	5-21			3.0	0	1	0	0
1982	GRIZZLY	7-01			8.0	0	1	0	1
1982	BLACK	5-46			3.0	0	1	1	0
1982	BLACK	5-43			1.0	0	1	0	0
1982	BLACK	5-06			11.0	0	1	1	0
1982	BLACK	5-35			1.0	0	1	0	0
1982	BLACK	5-46			1.0	0	1	1	0
1982	BLACK	7-01			2.0	0	1	1	0
1982	BLACK	5-41			6.0	0	2	1	0
1982	BLACK	7-07			6.0	0	2	1	1
1982	BLACK	6-13			32.0	0	1	0	0
1982	BLACK	7-03			3.0	0	1	0	0
1982	BLACK	7-01			1.0	0	1	0	0
1982	BLACK	7-01			4.0	0	1	0	0
1983	UNKNOWN	5-41			7.0	0	1	0	0
1983	UNKNOWN	5-38			4.0	0	1	0	0
1983	GRIZZLY	7-01			1.0	0	3	0	0
1983	GRIZZLY	6-09			1.0	0	1	0	0
1983	GRIZZLY	5-18			16.0	0	2	0	1
1983	GRIZZLY	5-41			1.0	0	1	0	0
1983	GRIZZLY	6-10			2.0	0	4	0	0
1983	GRIZZLY	7-07			13.0	300	3	0	0
1983	BLACK	7-01			1.0	0	1	0	0
1983	BLACK	5-41			5.0	0	1	0	0
1983	BLACK	5-41			4.0	0	1	0	0
1983	BLACK	5-41			1.0	0	1	0	0
1983	BLACK	6-12			5.0	.	1	0	0
1983	BLACK	5-41			21.0	0	3	3	0
1983	BLACK	6-12			12.0	0	1	0	0
1984	UNKNOWN	5-41	CATTLE PEN=TAIT	B+E SHED-PLAY N HIDE	3.0	100	.	0	0
1984	UNKNOWN	7-07	HAINES RD-KLUKSHU	SIGHTING	0.5	.	.	0	0
1984	UNKNOWN	7-01	DUMP-HAINES JUNCTION	BEAR IN DUMP	2.0	.	.	0	0
1984	GRIZZLY	5-41	TOWN-NEAR OLD SCHOOL	NEAR TOWN	1.0	.	1	0	0

LEGEND: GMZ - Game Management Zone
GMS - Game Management Subzone
C.O. Time - Conservation Officer time spent responding to problem

(con't ....)

YEAR	SPECIES	GMZ/GMS	LOCATION	PROBLEM	C.O. TIME (Hours)	PROPERTY DAMAGE	NUMBER OF NUISANCE BEARS	NUMBER OF BEARS KILLED	NUMBER OF BEARS RELOCATED
1984	GRIZZLY	5-21	TALBOT ARMS MOTEL	IN TRAP	5.0	.	1	0	1
1984	GRIZZLY	5-21	CABIN-KLUANE LK	IN YARD	3.0	.	1	0	0
1984	GRIZZLY	5-38	RESID=UPTON-SILV CTY	IN YARD-APPRS MAN	5.0	.	1	1	0
1984	GRIZZLY	5-41	RESID=HOTTE	IN YARD/FIGHT DOG	4.0	.	1	1	0
1984	GRIZZLY	6-13	BLANCHARD RIV	GB FOLLOWED C/N	2.0	.	1	0	0
1984	GRIZZLY	5-46	RD NEAR CANYON CRK	ATTACKED HORSE	4.5	0	1	0	0
1984	GRIZZLY	5-04	TOWN-FAR WEST	IN TOWN	0.5	.	1	0	0
1984	GRIZZLY	5-38	DUMP-SILVER CITY	IN DUMP	4.5	.	1	0	0
1984	GRIZZLY	6-12	RIVER(LK)-KLUKSHU	SIGHTING	0.5	.	1	0	0
1984	GRIZZLY	5-06	WHITE RIVER LODGE	NEAR LODGE	0.5	.	1	1	0
1984	GRIZZLY	6-12	FISH CAMP	NEAR CAMP	7.0	.	1	0	0
1984	GRIZZLY	7-01	DUMP-CANYON	SIGN	4.0	.	.	0	0
1984	GRIZZLY	5-41	MACINTOSH LODGE	IN YARD	7.0	.	1	0	0
1984	GRIZZLY	7-01	AK HWAY BY AIRPORT	SIGHTING	3.0	.	2	0	0
1984	GRIZZLY	6-08	DUMP-KLUANE WILD.VIL	BEAR IN WOLF SNARE	34.0	.	1	1	0
1984	GRIZZLY	7-01	RESID-INDIAN VILLAGE	IN YARD-27 YEAR OLD	3.0	200	1	1	0
1984	GRIZZLY	5-21	TALBOT ARMS MOTEL	INTO GARBAGE	33.0	.	2	1	1
1984	GRIZZLY	5-43	CAMP-NISLING RIV	HANG ARND BUFF.PENS	3.0	.	1	1	0
1984	BLACK	6-06	PULLOFF-DONJECK RIVE	FREQ PULLOFF	3.5	.	1	0	0
1984	BLACK	7-03	LODGE-KATHLEEN RIVER	SIGHTING	2.5	.	1	0	0
1984	BLACK	7-07	DUMP-DEZADEASH	SIGHTED IN DUMP/AREA	6.0	.	2	2	0
1984	BLACK	7-07	DUMP-DEZADEASH	IN DUMP	2.5	.	2	2	0
1984	BLACK	7-07	FISH CAMP	FREQ CAMP	12.0	.	1	1	0
1984	BLACK	5-46	MINE CAMP-AISH.RIV	IN CAMP	3.0	.	1	0	0
1984	BLACK	5-21	RESID-DESTRUCT BAY	IN YARD AND TRUCK	4.5	.	1	0	0
1984	BLACK	7-07	DUMP-DEZADEASH	BEARS IN DUMP	7.0	.	.	0	0
1984	BLACK	7-07	CPGRND-$MILLION FALL	IN CAMPGROUND	5.0	.	.	0	0
1984	BLACK	7-07	HAINES RD	WOUNDED	0.5	.	1	.	0
1984	BLACK	5-17	AK HWAY-DONJEK RIV	PANHANDLING	17.0	.	3	0	3
1984	BLACK	7-22	KUSAWA LK	WOUNDED	2.0	.	1	0	0
1984	BLACK	6-12	FISH CAMP	LOOKING INTO TENTS	1.0	.	1	0	0
1985	GRIZZLY	3-04	MINE CAMP-MATSON CRK	FREQ CAMP	14.0	.	2	0	0
1985	GRIZZLY	5-20	DUKE RIVER FLATS	SIGHTING	10.0	.	1	0	0
1985	GRIZZLY	6-08	MINING CAMP=DYE	BEARS IN CAMP?	0.0	.	.	0	0
1985	GRIZZLY	5-34	OUTFIT AREA 12=DRIFT	SEEMED AGGR.-KILLED	5.0	.	1	1	0
1985	GRIZZLY	5-20	RESID-DESTRUC BAY	IN YARD/GARDEN/GRNHS	3.0	30	1	0	0
1985	BLACK	5-51	ROAD-AK HWAY	ROAD-TRAFFIC HAZARD	20.0	.	1	1	0
1985	BLACK	7-07	RESID-DEZADEASH	IN YARD-KILLS 2 PIGS	2.0	150	1	1	0
1985	BLACK	6-08	PULLOFF-DONJEK RIVER	INFREQ RAIDS ON CANS	3.0	.	1	0	0
1985	BLACK	7-07	DEZADEASH LODGE	6(?) FREQ AREA	2.0	.	6	0	1
1985	BLACK	5-40	CAMP-AISHIHIK LK	FREQ CAMP	0.0	.	1	1	0
1985	BLACK	7-05	RESID-KUSAWA LK	IN YARD-ATE DOGFOOD	3.0	.	3	0	0
1985	BLACK	5-44	CAMP-BRAEBURN LK	HANGING AROUND CAMP	2.5	20	1	1	0
1986	GRIZZLY	5-38	CAMP-ARCTIC INSTIT	TRY.ENT. CABIN	0.0	.	1	1	0
1986	GRIZZLY	5-41	MCINTOSH LODGE	HANGING AROUND	13.0	.	1	1	0
1986	GRIZZLY	5-40	HUNT CAMP-GILTANE LK	CHARGING GB	0.0	.	1	1	0
1986	GRIZZLY	7-01	RESID/DUMP-AIRPORT	FREQ AREA	0.0	.	1	1	0
1986	GRIZZLY	5-38	ARCT INSTIT-KLUANE L	HANGING AROUND	0.5	.	1	1	0
1986	GRIZZLY	6-12	DALTON POST	HANGING AROUND	2.0	.	1	1	0
1986	GRIZZLY	7-03		BEAR/MAN ENCOUNTER	3.0	.	1	1	0

LEGEND: GMZ - Game Management Zone
GMS - Game Management Subzone
C.O. Time - Conservation Officer time spent responding to problem

(con't ....)

YEAR	SPECIES	GMZ/GMS	LOCATION	PROBLEM	C.O. TIME (Hours)	PROPERTY DAMAGE	NUMBER OF NUISANCE BEARS	NUMBER OF BEARS KILLED	NUMBER OF BEARS RELOCATED
1986	GRIZZLY	5-21		HANGING AROUND LODGE	6	.	1	0	0
1986	GRIZZLY	5-21	CONGDON CREEK DUMP	BEAR IN TRAP	15	.	1	.	1
1986	GRIZZLY	5-40	AISHIHIK CAMPGROUND	ENTERING CAMP	2	.	1	0	0
1986	GRIZZLY	5-18	MOUNTAIN VIEW LODGE	DEFENSE KILL	0	.	1	.	0
1986	BLACK	5-51	LAKE CRK CAMPGROUND	INTO GARB CANS/COOLR	0	.	1	1	0
1986	BLACK	5-40	AISHIHIK CAMPGROUND	GARBAGE/FISH GUTS	4	.	1	0	0
1986	BLACK	5-17	PINE VALLEY LODGE	HANGING AROUND	20	25	3	0	0
1986	BLACK	7-03		BEAR AT LODGE	15	.	1	0	0
1987	UNKNOWN	7-01	RESID-APTMT COMPLEX	SIGHTING	1	.	1	0	0
1987	UNKNOWN	5-21	CAMP-DUKE MEADOWS	IN CAMP	4	.	.	0	0
1987	UNKNOWN	5-21	PULLOFF NEAR BURNASH	INTO GARB CANS (NITE	1	.	.	0	0
1987	GRIZZLY	5-21	CAMPGROUND-COTTONWOO	IN PARK-NOSES AROUND	8	.	1	0	0
1987	GRIZZLY	6-00	SLIMS RIV-KLUANE PRK	NO PBI DONE	0	.	1	1	0
1987	GRIZZLY	5-21	RESID-DESTRUC BAY	HANGING AROUND	6	.	1	0	0
1987	GRIZZLY	5-21	RESID-BURNASH LNDG	IN YARD/SMOKE HOUSE	8	50	1	0	1
1987	GRIZZLY	6-10	EXPLOR CAMP	COLLARED GB KILLED	3	.	1	1	0
1987	GRIZZLY	5-21	RESID-DESTRUC BAY	ATE PIG	5	250	1	1	0
1987	GRIZZLY	5-04	RESTAURANT-BVR CRK	AT BACK DOOR OF REST	10	40	1	0	0
1987	GRIZZLY	5-04	RESID-WEISS-BVR CRK	IN YARD	10	.	1	0	0
1987	GRIZZLY	5-21	RESID-BVR CRK	IN YARD DAMAGE PRPTY	30	2110	2	2	0
1987	GRIZZLY	7-01	RESID=MOOSE	NEAR RESIDS IN TOWN	4	.	1	0	0
1987	GRIZZLY	5-04	RESID-BEAVER CREEK	B + E SMKE HSE-DAMAG	13	50	1	1	0
1987	GRIZZLY	5-21	KLUANE LAKE	TAGGD & KILLED $245	0	.	1	1	0
1987	GRIZZLY	6-08	MINING CAMP-KLUANE	IN CAMP	34	825	1	1	0
1987	GRIZZLY	5-17	PINE VALLEY LODGE	ENTER CABIN-DAMAGE	6	225	1	1	0
1987	GRIZZLY	6-07	BUSH-ST CLAIRE CRK	CHARGING GEOLOGIST	1	.	1	1	0
1987	BLACK	7-03	RCK GLAC AREA-KLUANE	FOLLOWS/BLUFF CHARGS	20	.	1	0	0
1987	BLACK	7-03	RESID=JOE-DEZADEASH	IN YARD/MEAT CACHE	2	50	1	1	0
1987	BLACK	5-41	FIRE TOWER	AT FIRE TOWER	2	1	1	0	0
1987	BLACK	5-17	PINE VALLEY LODGE	HANG AROUND-NO LEAVE	21	.	1	1	0
1987	BLACK	5-51	WHITERIVER LODGE	TRY.ENT. LODGE	4	100	2	2	0
1987	BLACK	5-04	LODGE-MARVINS ROOST	IN YARD ON PORCH	5	.	1	1	0
1987	BLACK	5-51	WHITERIVER LODGE	IN CMPGRND + YARD	5	.	1	0	0
1987	BLACK	5-17	LODGE(NAME=?)	IN CMPGRND + AREA	78	.	1	0	0
1987	BLACK	5-05	CAMPGROUND-SNAG JUNC	INTO GARB CANS	10	.	1	0	0
1987	BLACK	7-07	DUMP-DEZADEASH	GETNG BOLD-NO LEAVE	3	.	2	2	0
1987	BLACK	6-11	RESID-KIMBERLY CRK	TRY.ENT. TRAILER	4	150	1	1	0
1987	BLACK	5-44	RESID-NO MORE LAKE	SHOT-HEAD FOR LAKE	10	.	1	1	0
1987	BLACK	7-14	RESID=BLAIR	FREQ YARD	2	.	1	0	0
1988	UNKNOWN	5-38	ARCT INST TRAPLINE	SIGHTING	1	.	.	0	0
1988	UNKNOWN	7-03	DALTON TRAIL LODGE	IN AREA	2	.	.	0	0
1988	UNKNOWN	7-03	DEZADEASH LK-TRAIL	DAMAG PRKD SCHOOLBUS	2	.	.	0	0
1988	GRIZZLY	5-01	MINE CAMP-MOOSHRN MT	IN CAMP-DAMAGE	0	1000	1	1	0
1988	GRIZZLY	7-01	RESID-CANYON	NEAR HOME W KIDS	0	.	1	1	0
1988	GRIZZLY	5-21	RESID-BURNASH CRK	ENTER VACANT CABINS	4	1000	1	0	0
1988	GRIZZLY	6-08	RESID-REED CRK	DAMAGE 40' TRLR	5	1500	1	0	0
1988	GRIZZLY	7-07	RESID-DEZADEASH LK	IN YARD-ENTER CABIN	2	25	1	0	0
1988	GRIZZLY	6-09	TALBOT ARMS MOTEL	NEAR LODGE	2	.	2	0	0
1988	GRIZZLY	5-21	CONDGON CRK CAMPGROU	SIGHTED IN AREA	6	.	1	0	0
1988	GRIZZLY	5-21	CAMPGROUND (NAME?)	SIGHTED-TOURST GO TO	4	.	1	0	0

LEGEND: GMZ - Game Management Zone
GMS - Game Management Subzone
C.O. Time - Conservation Officer time spent responding to problem

(con't ....)

YEAR	SPECIES	GMZ/GMS	LOCATION	PROBLEM	C.O. TIME (Hours)	PROPERTY DAMAGE	NUMBER OF NUISANCE BEARS	NUMBER OF BEARS KILLED	NUMBER OF BEARS RELOCATED
1988	GRIZZLY	6-10	AK HIGHWAY	ROAD KILL	4.0	.	1	1	0
1988	GRIZZLY	5-38	RESID-KLOO LK	SIGHTED NEAR RESIDS	0.0	.	2	0	0
1988	GRIZZLY	6-09	CAMP-GRANITE CRK	IN CAMP-SCARED AWAY	5.0	.	1	0	0
1988	GRIZZLY	5-21	COTTNWD. CAMPGROUND	SIGHTED,FEEDNG BY HW	2.0	.	1	0	0
1988	GRIZZLY	7-07	RESID-KLUKSHU VILLAG	SIGHTING	3.0	.	1	0	0
1988	GRIZZLY	6-11	BEAR CRK FLATS	CHASES RESEARCHER	2.0	.	1	0	0
1988	GRIZZLY	5-36	RESID-=CHURCHILL	SIGHTING	6.0	.	2	0	0
1988	GRIZZLY	5-21	TOWN-DESTRUCT BAY	IN TOWN	30.0	.	2	0	1
1988	GRIZZLY	5-38	CAMP-NEAR SILV CITY	IN CAMP-DAMAGE	4.0	200	1	1	0
1988	BLACK	5-01	MINE CAMP-MOOSHRN MT	IN CAMP	0.0	500	1	1	0
1988	BLACK	5-18	AK HIGHWAY	APPRD CARS/PANHANDLG	3.0	100	2	1	0
1988	BLACK	5-05	AK HIGHWAY	CHASES CYCLISTS	4.0	.	1	1	0
1988	BLACK	5-51	WHITERIVER LODGE	ENTER HOUSE-LUNGE AT	5.0	.	1	1	0
1988	BLACK	6-08	MINE CAMP-DONJEK RIV	FREQ SITE-DAMAGE	4.0	1000	1	0	0
1988	BLACK	5-41	AK HIGHWAY	PANHANDLING	4.0	.	1	1	0
1988	BLACK	7-01	RESID-MARSHALL CRK	ATE CHICKENS	2.0	.	1	1	0
1988	BLACK	7-03	RESID=JOE	IN CACHE	20.0	50	2	1	0
1988	BLACK	7-03	LOBE HWAYS CAMP	IN CAMP	8.0	.	2	2	0
1988	BLACK	5-05	SNAG JUNT CAMPGROUND	IN CAMP,NOT AFRAID	10.0	.	1	1	0
1988	BLACK	5-06	PULLOFF-AK HIGHWAY	INTO GARB CANS	2.0	.	3	0	0
1988	BLACK	5-06	PULLOFF=CHISANNA G.T	INTO GARB CANS	3.0	.	3	3	0
1988	BLACK	5-01	MINE CAMP=HARRICK	IN CAMP (NUMEROUS X)	5.0	.	1	1	0
1988	BLACK	5-49	RESID-MENDENHALL SUB	IN YARD	3.0	.	1	0	0
1988	BLACK	7-05	KUSAWA LK CAMPGROUND	IN CMPGRD-APPRS MAN	0.5	.	1	1	0
					1667.0	11734	277	100	22

LEGEND: GMZ - Game Management Zone
GMS - Game Management Subzone
C.O. Time - Conservation Officer time spent responding to problem

Problem Bear Interview

District ____ Year ____ Occurrance # ____

Complainants Name _____ Contact _____

Complaint Received _____ Month _____ Day _____ Time

Problem Location- GMZ ____ Zone ____ Subzone

_____

_____

_____

_____

Problem Occurred _____ Month _____ Day _____ Time

Brief Problem Description _____

_____

MAP

Describe Bear: COLOUR ____ SIZE ____ SPECIES ____ CONDITION ____ NUMBER ____

How Aggressive Was (Were) The Bear (s)? Did The Bear (s):

1 YES	2 NK	3 N/A	
☐	☐	☐	ATTACK OR CHARGE _____ ☐
☐	☐	☐	CHASE OR FOLLOW _____ ☐
☐	☐	☐	HUFF OR PUFF _____ ☐
☐	☐	☐	HOLD ITS GROUND _____ ☐
☐	☐	☐	DAMAGE PROPERTY (Estimate cost) _____ ☐
☐	☐	☐	SNIFF AROUND _____ ☐
☐	☐	☐	TRAVEL NEARBY (Sighting ?) _____ ☐

Comments: _____

ANY PREVIOUS INCIDENTS ? IF SO, PLEASE FILL IN SECOND SHEET AND APPEND.

Describe Site

Type of Dwelling ? _____ ☐
CABIN, TENT, COTTAGE, HOUSE ETC.

Regularly Occupied ? _____ ☐
YEAR-ROUND, SUMMERS, NIGHTS ONLY ETC.

Food Storage ? _____ ☐
INSIDE DWELLING, CACHE, OUTSIDE SHELVES, AIRTIGHT CONTAINERS ETC.

Garbage Handling ? _____ ☐
TOWN, BAGS, PIT BURN, INCINERATOR ETC.

Pets or Livestock ? _____ ☐
DOGS, BEES, CHICKENS, HORSES, CATTLE, SWINE, ANIMAL FEED ETC.

Activity ? _____ ☐
FISHING, TRAPPING, OUTFITTING, INDUSTRY ETC. (BE SPECIFIC)

Legal Land Status ? _____ ☐
SQUATTER, BAND, TERRITORIAL, FEDERAL, CLAIM ETC.

Comments _____ ☐
ODD SMELLS, NOISES ETC.

Conservation Officer Response

1	2	
Y	N	ACTION NECESSARY
Y	N	ACTION IMPOSSIBLE
Y	N	SITE INVESTIGATED
Y	N	TRAP OR SNARE SET
Y	N	ANIMAL HUNTED
Y	N	AREA CLOSED TO PUBLIC
Y	N	PUBLIC ADVISED TO KILL
Y	N	ATTEMPT TO EDUCATE/WARN

Result

	ANIMAL 1	ANIMAL 2	ANIMAL 3
YBS #			
SEX	M F	M F	M F
AGE	J S A	J S A	J S A
COLOUR	☐	☐	☐
GMS			

NO. CAUGHT

NO. MARKED

NO. RELOCATED TO ☐☐-☐☐ GMS

NO. KILLED

C.O. Surname (1st 4 letters) ,Hours

Costs:

Manpower ____

Handling ____

Damage ____

Total ____

Yukon

Figure 1. Problem Bear Interview Form.

BEAR DETERRENT USED: ☐ YES ☐ NO

IF YES, SPECIFY BELOW (Mark one or more)

- ☐ SHOUTING/YELLING
- ☐ DOGS: SPECIFY NUMBER _____
- ☐ THROWING DEBRIS AT BEAR
- ☐ SCARING DEVICE
  - ☐ WARNING SHOTS
  - ☐ THUNDERFLASH
  - ☐ FLARES
  - ☐ RUBBER BULLET
  - ☐ AIR HORN
  - ☐ OTHER (SPECIFY) _____

IF BEAR WAS KILLED:

MEAT ☐ USED ☐ NOT USED

HIDE ☐ DESTROYED ☐ SPOILED ☐ TURNED IN

SKULL ☐ DESTROYED ☐ SPOILED ☐ TURNED IN

TABLE 2: Non-hunting, human-caused grizzly bear mortalities in the Greater Kluane Land Use Planning Region from 1979 to 1989 (incomplete).

The data in Table 2 was obtained from Yukon Biological Submission (YBS) forms which have been mandatory for grizzly bear kills since 1979. It is known that some grizzly bears are killed and not reported. YBS forms indicate that a minimum of 5- grizzly bears were killed in the Greater Kluane Land Use Planning Region from 1979 to September of 1989. The majority of these kills occurred near settlements located along the Alaska Highway (Figure 2).

TABLE 2. Non-hunting, human-caused grizzly bear mortalities in the Greater Kluane Land Use Planning Region from 1979 to 1989 (incomplete).

YR	ZONE	LOCATION	SEX	KILLTYPE	YBS#
79	3-04	Matson Creek Gold Mine	M	confiscated	414
80	5-21	Destruction Bay	M	DLP	1799
80	5-44	Near Braeburn Lodge	M	DLP	1797
80	6-08	Burwash Creek	M	DLP	1723
80	6-09	Burwash Creek	F	DLP	1796
81	5-21	Destruction Bay	F	DLP	4373
81	7-01	Granite Lake Mine Road	M	other	4376
82	6-09	Kluane Game Sanctuary	M	DLP	4313
82	7-01	Haines Junction Municiple Dump	M	DLP	3971
84	5-42	Buffalo Pens Neisling River	F	DLP	5028
84	5-21	Destruction Bay	F	DLP	5065
84	5-35	Upton Residence	M	DLP	5066
84	5-41	Haines Junction	M	DLP	5067
84	6-08	Kluane Wilderness Village	M	DLP	4501
84	7-01	Haines Junction Residence	F	DLP	4503
84	7-01	Bear Knob Junction Kathleen	F	other	4777
84	7-01	Bear Knob Junction Kathleen	F	other	4778
84	7-01	Junction Dezadeash, Kathleen	F	other	5035
84	7-22	Rose Lake Lower NW	F	other	5039
84	7-22	Rose Lake Lower NW	F	other	5040
84	7-22	Rose Lake Lower NW	M	other	5041
85	5-21	Congdon Creek Campground	M	DLP	5526
85	6-00	Sheep Buillion Platue	F	DLP	5161
85	6-00	Sheep Buillion Platue	F	DLP	5162
85	6-00	Sheep Buillion Platue	F	DLP	5163
85	7-22	Rose Lake	F	DLP	5253
85	7-29	Takhini Lake	F	other	5306
85	7-29	Takhini Lake	M	other	5307
86	5-38	Arctic Institute	-	DLP	6470
86	5-40	Giltana Lake mile 29 AIS	F	DLP	7342
86	5-41	McIntosh Lodge	M	DLP	6471
86	5-18	Old Mt. View Lodge	M	confiscated	7354
86	6-00	Kluane National Park	F	DLP	5601
86	6-12	Dalton Post	-	DLP	6468
86	7-01	Haines Junction Dump	M	DLP	7344
87	5-21	Destruction Bay	M	DLP	6807
87	5-21	Destruction Bay	M	DLP	6811
87	5-21	Destruction Bay	M	DLP	6813
87	5-04	Beaver Creek	M	DLP	6818
87	5-17	Pine Valley Lodge	M	DLP	6823
87	6-00	Slims River Valley	F	DLP	6870
87	6-07	St. Clare Creek	M	DLP	6894
87	6-08	Burwash Creek	M	DLP	6820
87	6-10	Telluride Creek Exploration	M	DLP	7364
87	7-22	Ark Mountain	M	other	6641
88	5-38	Drift Base Camp Kluane Lake	M	DLP	7330

continued...

YR	ZONE	LOCATION	SEX	KILLTYPE	YBS#
88	5-21	Burwash Landing	M	confiscated	7383
88	5-06	White River Lodge	M	DLP	7391
88	6-10	Alaska Highway Kluane Lake	F	roadkill	7346
88	7-01	Haines Junction Dump	F	confiscated	6831
89	5-21	Burwash Indian Village	F	DLP	7899
89	5-21	Destruction Bay	M	DLP	7939
89	6-13	Dalton Post	F	DLP	7887
89	7-07	Klukshu Village	M	DLP	7328
89	7-01	7 Miles East of Canyon-Alaska Hwy	F	DLP	7328
89	7-01	Haines Junction Dump	M	other	
89	7-01	Haines Junction Dump	F	other	

Other = 6 bears that died during research activities (drug related).
= 3 bears (sow and cubs) that were transplanted to the Dempster Highway area and later shot in Mayo as nuisance bears.
= 2 bears that died during tagging procedures (Fish and Wildlife Branch project) at the Haines Junction dump.

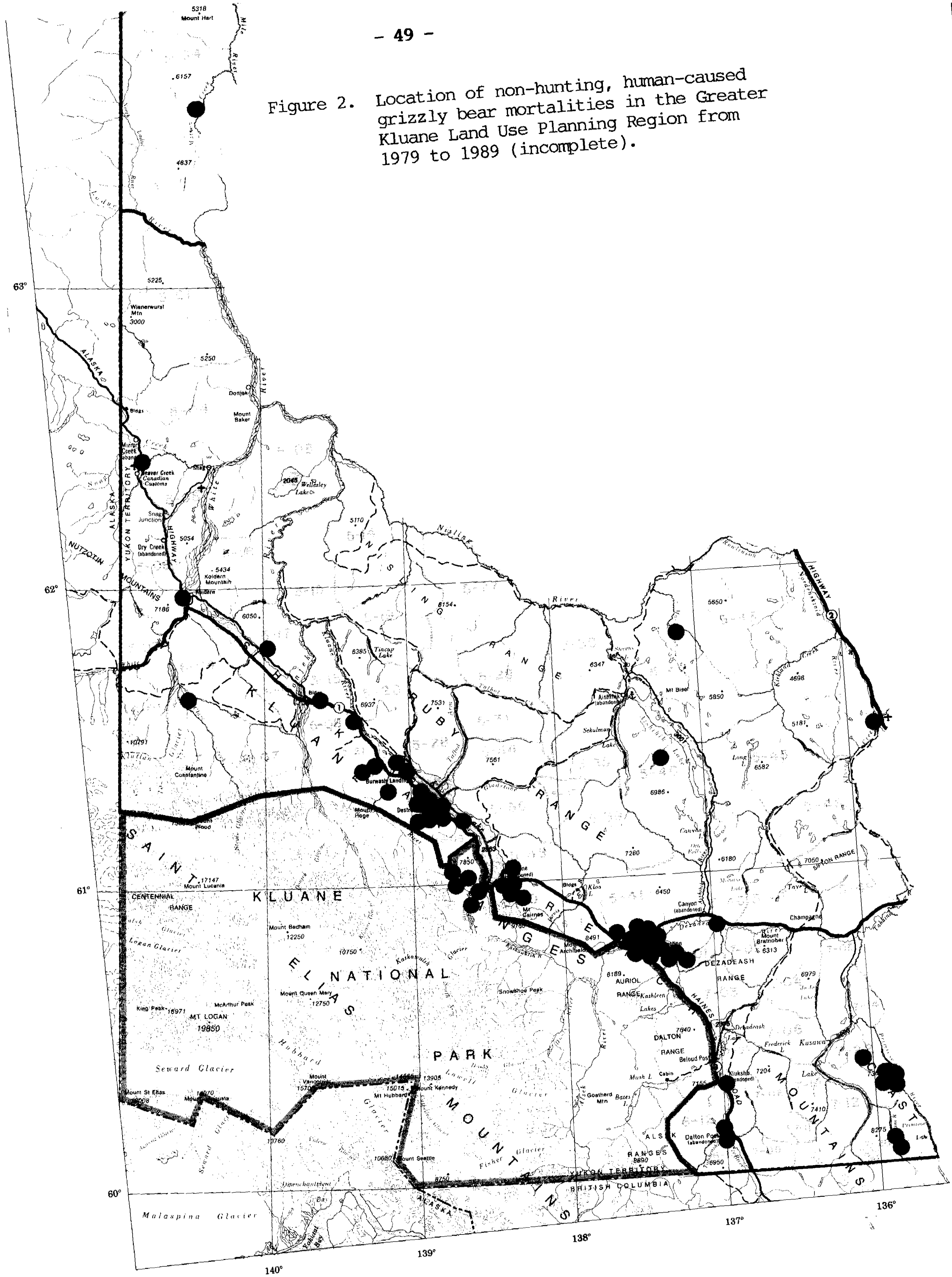


Figure 2. Location of non-hunting, human-caused grizzly bear mortalities in the Greater Kluane Land Use Planning Region from 1979 to 1989 (incomplete).

TABLE 3: Sources of grizzly bear mortality in the Greater Kluane Land Use Planning Region from 1979 to 1988.

The data in Table 3 was obtained from Yukon Biological Submission (YBS) forms which have been mandatory for grizzly bear kills since 1979. It is known that some grizzly bears are killed and not reported. YBS forms indicate that 19% of all known human-caused grizzly bear mortality in the Greater Kluane Land Use Planning Region, from 1979 to 1988, resulted from situations other than hunting: an average of 5 grizzly bears a year.

Table 3. Sources of grizzly bear mortality in the Greater Kluane Land Use Planning Region from 1979 to 1988.

Year	Hunting[1]	Non-Hunting[2]	Total
1979	15	1	16
1980	16	4	20
1981	25	2	27
1982	14	2	16
1983	18	-	18
1984	34	12	46
1985	25	7	32
1986	16	7	23
1987	31	10	41
1988	24	5	29
TOTAL	218	50	268

[1] includes resident and non-resident legal hunting kills.

[2] includes defense of life and property (DLP), research, confiscated roadkill, and other.

APPENDIX B

YUKON WILDLIFE ACT REGULATIONS:
KILLING WILDLIFE IN DEFENSE OF LIFE OR PROPERTY

Emergency hunting

63.(1) A person may hunt any wildlife where it is reasonably necessary for him to do so to prevent the loss of his own life or the life of another person through starvation.

(2) Every person shall take reasonable precautions to ensure that it does not become necessary, in order to prevent the loss of his own life through starvation, for him or any other person to hunt wildlife that he or the other person is not authorized to hunt under the provisions of this Act other than this section.

(3) This section applies with the necessary changes to the taking of the eggs of birds that are wild by nature.

Defence of life

64.(1) Subject to subsection (2), a person may kill wildlife in defence of his life or the life of another person where

(a) there is imminent or immediate threat of grievious bodily harm, and

(b) all other practical means of averting the threat of harm have been exhausted.

(2) Subsection (1) does not authorize the killing of any bird or any herbivore other than a moose.

Defence of property

65.(1) Subject to subsection (2), a person may kill wildlife in defence of property where

(a) there is imminent or immediate threat of irrecoverable and substantial damage to property, and

(b) all other practical means of averting the threat of damage have been exhausted.

(2) Subsection (1) does not authorize the killing of any herbivore or bird.

Report of emergency killing

66.(1) Where a person kills any big game animal, lynx, fox, wolverine or specially protected wildlife under section 63, 64 or 65 and he is not authorized to kill the animal under a provision of this Act other than those sections, he shall as soon as practicable after killing the animal report to a conservation officer the number and species or types of animals killed, and furnish such other information as reasonably may be required by the conservation officer.

(2) The Executive Council Member may, within 24 hours after a report is received under subsection (1), require delivery of all or part of the carcass to a conservation officer to be disposed of in accordance with the instructions of the Executive Council Member.

(3) A person who delivers all or part of a carcass to a conservation officer under subsection (2) may apply to the Executive Council Member for its return.

APPENDIX C

BEAR MANAGEMENT AGREEMENT BETWEEN KLUANE NATIONAL PARK AND DEPARTMENT OF RENEWABLE RESOURCES, GOVERNMENT OF YUKON, MAY 29, 1989

An Agreement in Respect to Bear Management Between Kluane National Park Reserve and Department of Renewable Resources, Government of Yukon.

Introduction

Bears in the Kluane ecosystem seasonally range over large areas, regardless of any jurisdictional boundaries. It is therefore logical that the agencies responsible for bear management in the Kluane ecosystem have a mutual agreement to ensure coordination of management programs and to ensure viable bear populations. This is particularly important in this area with respect to management of bear mortality and management of land uses that may jeopardize bear populations. As management issues regarding bears in this area become more complex, it is also now valuable to formalize the good working relationship that currently exists between the two agencies.

Goal

The goal of this agreement is to provide effective delivery of bear management programs in the Kluane ecosystem, that will ensure the viability of bear populations, by cooperating in the following areas:

- assistance in field operations
- exchange of information concerning bear population and habitat management.
- research on bears
- annual review of bear management programs

Field Operations

Mutual assistance would be provided in bear related operations, including the following:

- assistance in handling problem and research bears
- lending of equipment such as bear traps
- assisting in technical training
- assisting in enforcement of regulations that pertain to bear management, including garbage and litter-related regulations
- coordinated emergency responses

Bear population and habitat management information

Sharing information on land use and development activities, bear mortalities, and nuisance bear behaviors in this area is essential to co-ordinate management actions. In this regard, both agencies will undertake the following:

- Ensure that both parties are aware of any future development in order to alert appropriate agencies of any concerns which may impact bear populations.

- Coordinate recommendations to appropriate land use management authority.

- Ensure adjacent land uses under each agency's jurisdiction are compatible with bear management objectives.

- The main areas of concern are developments such as garbage dumps adjacent to the park especially near areas which receive high visitor use. Bears attracted to unnatural man-caused food source could lose their fear of man or identify human scent with food. This results in a public safety threat to visitors as well as destruction to nuisance bears.

Annual Report

A Kluane Ecosystem Bear Working Group will meet each year and prepare an annual work plan for approval by the respective agencies. As well, the Working Group will prepare annual reports summarizing bear management and research activities in the ecosystem, mortalities within 50 km of the Park boundary, problem bear behaviors, and management concerns. Every 5 years, beginning in 1990, the report will summarize bear population status.

General

Nothing in this agreement shall be construed as obligating either party to expend specific resources or to undertake any specific projects. It is essentially an agreement to assist each agency when possible or in areas of joint interest and to ensure dialogue takes place in regards to bear management.

Signed

Superintendent
Kluane Parks Reserve
Canadian Parks Service

Director
Fish and Wildlife Branch
Yukon Renewable Resources

APPENDIX D

GARBAGE INCINERATORS

There are a number of incinerator designs on the market. Included here are just some examples. The first is a small incinerator that can be made from locally available materials. The others are commercially designed forced-air, fuel-fired incinerators.

Further information can be obtained by contacting;

Bear Biologist
Yukon Department of Renewable Resources
Fish and Wildlife Branch
#10 Burns Road
Whitehorse, Yukon
Y1A 4Y9
(403) 667-5177 or 667-5721

GARBAGE INCINERATORS FOR SMALL CAMPS

Why incinerate garbage?

Garbage incinerators stop bear problems
- garbage bears cause 70% of bear problems
- you could be charged for 'spoiling' a bear or not reporting kills

Garbage incinerators save money
- bear damage to your camp can easily cost $1,000 to $10,000
- open pit fires can cause costly tent and forest fires
- garbage hauls to town can be costly in the long run

Garbage incinerators save time
- they can be located close to camp
- they do not have to be tended
- the limited ash does not require burial by a loader

Garbage incinerators save bears
- shooting bears attracted to garbage is no 'solution'
- wounded bears can cause serious problems
- garbage diets spoil bears. The bad habits they learn leads to their early death.

What to incinerate?

- Anything with a food odour: food waste, cooking grease, cans, bottles, and most kitchen garbage.

What not to incinerate?

- Anything that might explode or cause toxic fumes: kitchen cleaning powders and sprays, PWF lumber or aerosol cans.

Build your own

- A camp producing one full garbage bag a day can use a homebuilt incinerator made from fuel drums (see back).
- Larger camps can get by with similar homebuilt models, made from culverts, but should look to efficient forced-air, fuel-fired commercial incinerators (suppliers listed on back).

"Incineration" is complete burning

- Slow burning fuel and plenty of air in a contained fire generate enormous heat. This heat ensures that ashes have no food smell.
- Fast burning fuels and inadequate air, such as in a pit or a drum, result in scorched and smoldering garbage that attracts bears.

Burning in pits attracts bears

- The fuel drains into the dirt or into cans beneath your garbage so that garbage is only scorched
- The fire smolders for hours. Embers can be blown into the bush and start fires.
- Bears will dig up half burned garbage

Cost recovery

- The Yukon Government energy and Mines branch will pay 25% of camp development costs through the Mineral Exploration Incentives Program.

For more information contact:

District Conservation Officers In

Dawson	993–5492
Mayo	996–2202
Ross River	969–2202
Haines Junction	634–2247
Teslin	390–2685
Watson Lake	536–7363
Old Crow	966–3040
Whitehorse	667–5221
Land Use Specialist	667–5798
Bear Management	667–5177

Homebuilt incinerators - design considerations

- Garbage must get really hot before it will incinerate. The sizes of the vent and chimney are critical to get the airflow required to support a hot fire. If it doesn't burn well, raise the chimney.
- "Empty" fuel drums need to be steamed or washed out, or filled with water or exhaust before they are cut or welded. If not, explosions can be serious. Use oil drums rather than gas drums.
- Most garage is too wet to burn on its own. To prevent explosions, slow burning fuels like diesel or stove oil, wood or cardboard should be used rather than highly flammable fuels. A tiger torch may be used in the vent to start the fire.
- Suspending the garbage in a steel mesh basket or by a grill helps dry it out and ensure that the airflow is maintained. A removable basket greatly simplifies ash removal.
- Size the burn chamber for the garbage produced at one meal. Don't store garbage in your incinerator "until there is enough for a good burn".
- A sparkscreen is recommended in dry or windy areas to prevent embers flying into forests. Having a coarse screen below a fine screen stops clogging.

Let us know about cheap and effective homebuilt incinerators you design.

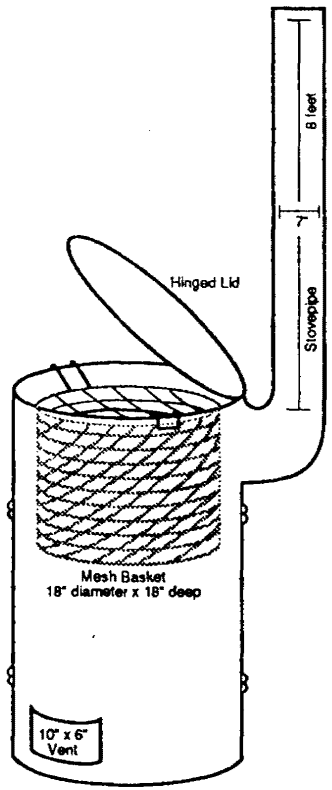
Yukon
Renewable Resources

*Important:

This is provided for your information only. The Government of Yukon does not guarantee nor warrant the design, effectiveness and/or safety of these devices under any circumstances.

Train personnel in the safe use of incinerators.

One design idea*



Operation: Fill the base with cardboard or wood, light with diesel or propane torch.

Manufacturers*

Commercial fuel-fired, forced-air incinerators built to various safety and emission standards are available for lease or purchase from the following suppliers:

ICG Liquid Gas Ltd.	
Whitehorse	667–6723
Watson Lake	536–7332
Northern Metallic Sales	
Whitehorse	667–4255
Ketec Industries	
Edmonton	403–477–5050
Westland Incinerator Co. Ltd.	
Winterburn, Alberta	403–447–5052
Inproheat Industries Ltd.	
Vancouver	604–254–0461
Morlee Industries Ltd.	
Prince George	604–563–0915

Fabricators*

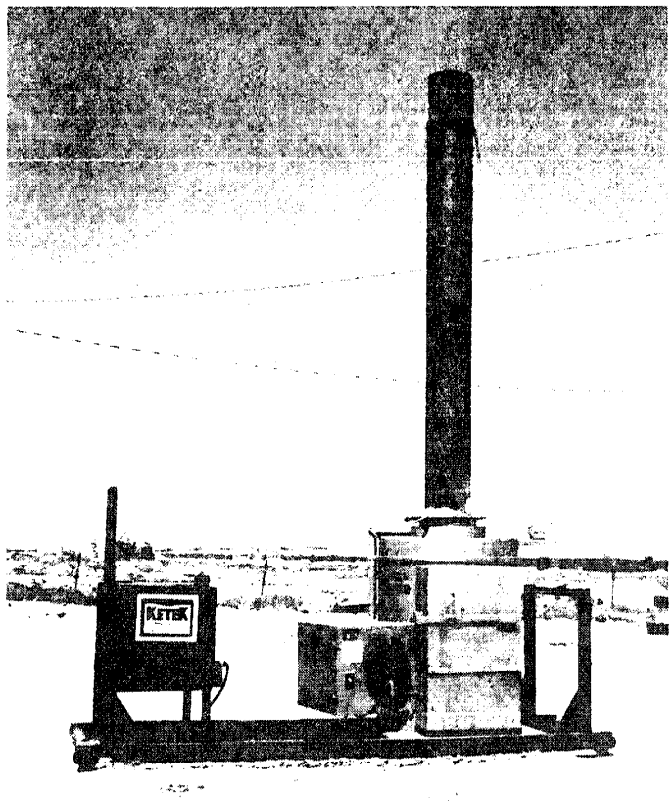
These Yukon businesses would be pleased to help you build an incinerator to your specifications.

Aquatic Diving Supplies and Services Co. Inc.	
Whitehorse	667–4568
Carmacks Industries	
Carmacks	863–6361
Cousins Enterprises Ltd.	
Whitehorse	668–4017
Cumming D. Welding Ltd.	
Whitehorse	667–2253
Duncan's Ltd.	
Whitehorse	667–6613
Griffiths Heating and Service Ltd.	
Whitehorse	667–2214
Ibex Contracting Ltd.	
Whitehorse	668–5617
Jacob's Industries Ltd.	
Whitehorse	667–7606
Mattel Plumbing and Heating	
Whitehorse	667–7410
Northland Services	
Whitehorse	668–2257
Northwest Heating and Electrical	
Whitehorse	668–7045
P & M Recycling	
Whitehorse	668–4338
Porter Creek Service	
Whitehorse	633–5377
Rostad Mechanical	
Whitehorse	667–6323
T.A. Mobile Welding	
Whitehorse	633–2704
Whitehorse Welding and Construction Ltd.	
Whitehorse	668–2877

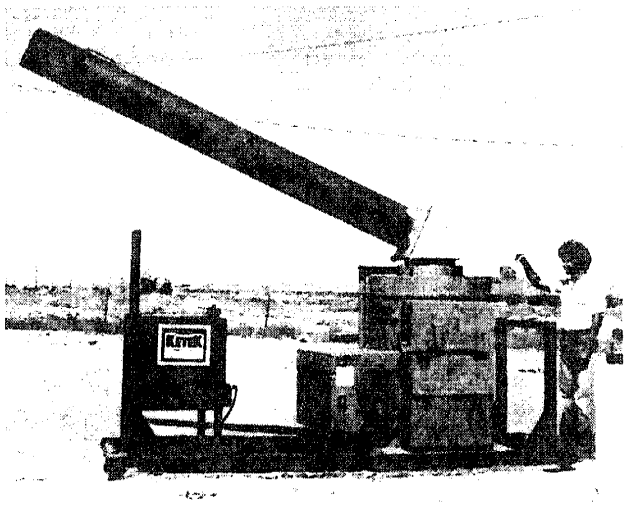
KETEK Industries Ltd.

OILFIELD EQUIPMENT RENTAL

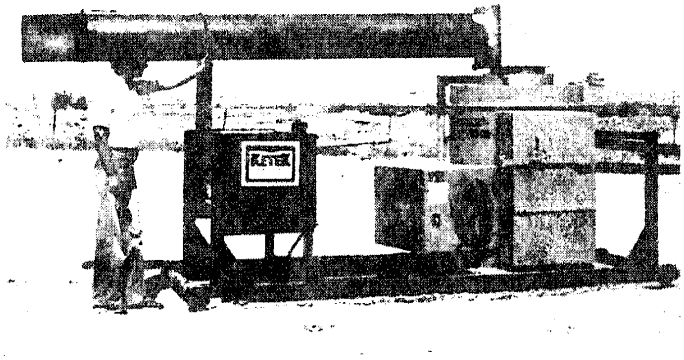
Portable Electric Cyclonator Incinerator



- Diesel Fired (Propane Optional)
- Consumes Approximately 3.5 Gal./Hr.
- Burns Approximately 140 Lbs./Hr.
- 120 Volt AC Power
- Dual Air Injection



Only requires stack to be raised into position before burning.



Ready for transportation to location

24 HOUR SERVICE

ENVIRONMENTALLY ACCEPTED FOR TYPE #1, #2 & #3 WASTES

Meets Alberta environmental standards. Professionally tested.

REFRACTORY CEMENT LINED

4" thick refractory capable of withstanding 2,600°F.

CONTROLLED BURNING

Safe elimination of industrial or residential garbage.

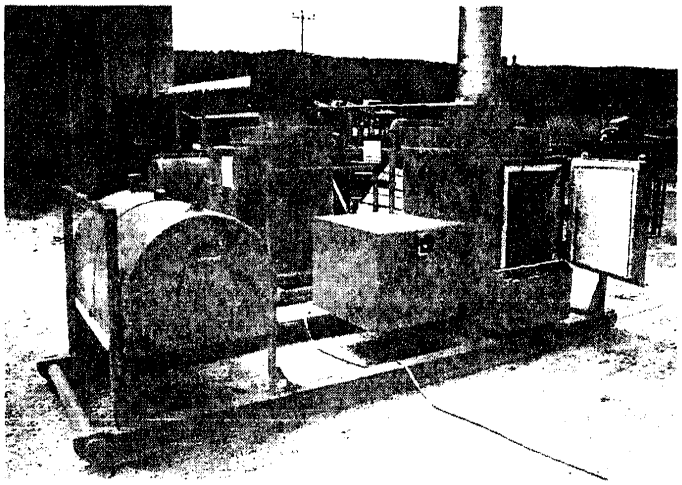
D-1020 MODEL
Single Chamber
Type 1, 2, 3 waste
(100-man+ camp)
Weight 4,600 lbs.

D-1050 MODEL
Single Chamber
Type 1, 2, 3 waste
(200-man+ camp)
Weight 8,420 lbs.

TERRITORIAL INCINERATOR

MANUFACTURED BY

MORFEE INDUSTRIES LTD.



AIR INDUCTION SYSTEM

Forced air fed into combustion chamber to assist burning and into the exhaust stack to assist in eliminating harmful gases.

EFFICIENT OPERATION

Easy to load and operate, economical to use.

LIGHTWEIGHT & STABLE FOR EASE OF TRANSPORTATION

Total weight 4,600 lbs. 4' wide and 12' long.

D-2020 MODEL
Double Chamber
Type 1, 2, 3, 4 waste
(100-man + camp)
Weight 5,140 lbs.

D-2050 MODEL
Double Chamber
Type 1, 2, 3, 4 waste
(200/300-man camp)
Weight 9,170 lbs.

SERIES TMF 1000 SINGLE CHAMBER

INCINERATOR

Available in Oil - Natural Gas - L.P.G. Gas

- *Clean Burning*
- *Economical Operation*
- *Readily Transportation*
- *Built-In Safety Features*

SPECIFICATIONS Single Chamber

Capacity:
140 pounds per hour - type #one waste

Power Requirements
115 volts 60 cycle single phase

Hearth
Refractory Hearth over 3/8" steel base

Doors
c/w adjustable latches
Charging: — 18"x24" clear opening
— Refractory lined over steel plate
Ash: — 18"x12" clear opening
— Refractory lined over steel plate

Air Supply:
Forced air fan c/w duct to primary air jets and to secondary and overfire air jets

Timers:
Cycle timers connected to air supply fan and gun type burner. Enclosed in protective plate steel cage

Stack:
Stainless Steel — 14 gauge - 13" diameter
10' high
c/w stainless steel spark screen top, and 3/4" hinge plates for moving

EACH MODEL COMPLETE WITH . . .
Source Emission Survey
Computer data output
Isokinetic variations
Velocity profiles
Field data sheets
Samples of equipment and methods

Burner:
500,000 B.T.U. gun type oil burner
Gun burner enclosed in protective plate steel cage.

Fuel Supply:
100 gal. fuel storage tank c/w filter and flexible hose type connection

Transporter:
Incinerator and fuel storage mounted on skid type frame 12' long x 4' wide. Height 7' tall, with stack folded.
Constructed of 6" I Beam c/w bumper posts.

Weight: 4,600 lbs.

Optionals:
- Double chamber TMF 2000 Series
- L.P.G. fired burner
- Natural gas fired burner

Casing:
10 gauge steel
Lining: High heat duty castable refractory over high temperature insulation.

MANUFACTURED UNDER LICENSE BY:

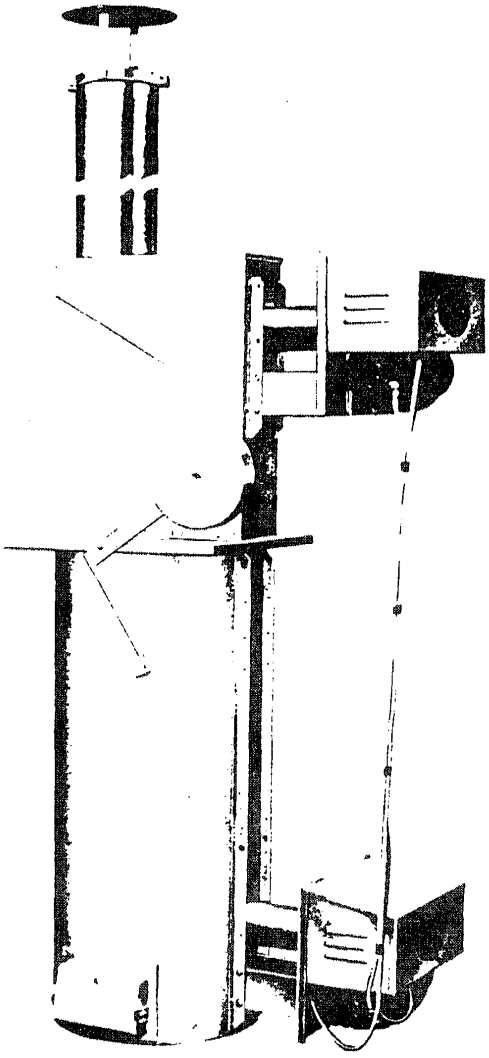
MORFEE INDUSTRIES LTD.

3955 - 22nd Avenue — PRINCE GEORGE, B.C. — Phone 563-0915 or 564-1220

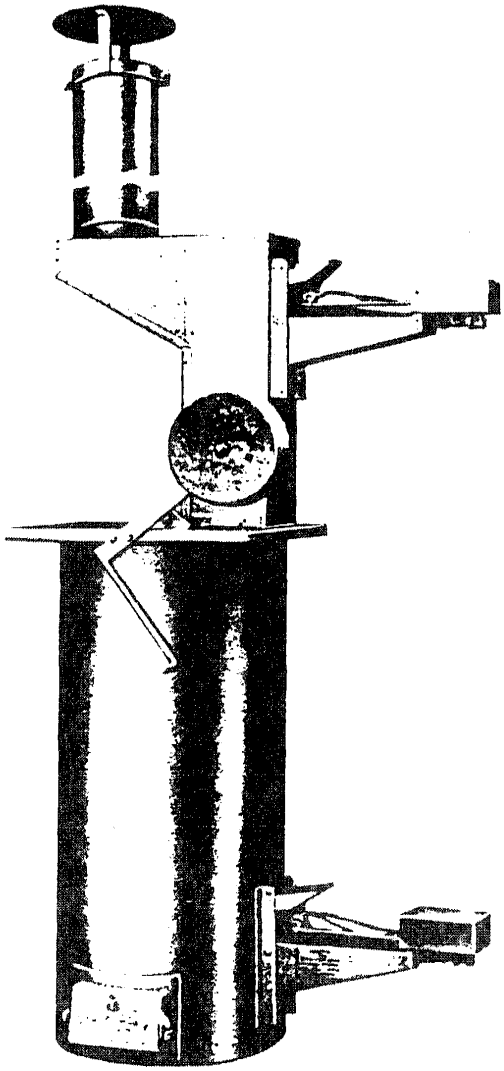
GAS AND OIL-FIRED INCINERATORS

FOR FARM APPLICATIONS

Designed to Control Smoke & Odor While Destroying Type IV Pathological Waste



Model A4-2O
(Formerly **Model I-64/TCO**)
Oil-fired Incinerator



Model A4-2G
(Formerly **Model G-64/TCO**)
Gas-fired Incinerator
Burner Patent No. 3,420,613
Piping and Electrical Solenoid/
Timer Not Shown

Shenandoah®

FEATURES, INSTALLATION & MAINTENANCE

Incineration is the solution to carcass disposal problems on modern farms.

INCINERATION IS:

Sanitary... Waste can be destroyed as fast as it accumulates; nothing left to decay and spread disease . . . nothing to attract rodents or flies. Destroys harmful germs.

Convenient...Fill the chamber and light the burner. No watching required since timer automatically cuts burner off.

Thorough . . . Leaves only sterile white ash and brittle bone fragments. Reduces 100 lbs. of animal carcasses to approximately 5 lbs. of sterile residue.

FEATURES & DESIGN

Maintenance-free aluminized steel jacket is refractory lined for maximum life. Primary refuse chamber is lined with 1¼" high temperature poured refractory cement.

Heavy-duty ceramic grate just above burner allows burning from the bottom. This method of burning induces faster incineration and increases daily capacity . . . improves efficiency. Refractory lined bottom serves as a hearth for liquids and small materials. This refuse is quickly incinerated by the intense heat below the grate. The TCO secondary burning chamber quickly develops and maintains hot temperatures for excellent after-burning of smoke and odors.

Automatic ignition burners are standard equipment on oil burners. Gas models come with match-lit burners and are controlled by an electrical solenoid timer for presetting length of burn and automatic shut off.

INSTALLATION & MAINTENANCE

Incinerator chambers are factory assembled. Simply mount transition chamber, burners and stack. Connect fuel lines and 115 V 60 cycle electrical service. LP gas, natural gas, or No. 1 fuel oil must be supplied.

Designed for outdoor installation on fire-resistant materials, subject to local codes and ordinances. Where emission regulations apply, they may be obtained from your local health board or air pollution authority.

For maximum life, a simple metal roof or three-sided metal shelter is recommended over the installation. Suggested sizes are shown in the Specifications section. Excellent ventilation is needed for efficient burning and proper cooling. Chamber and stack become hot from extended periods of operation.

Ash removal is important: Remove any accumulated ash before each firing. This assures proper performance and maximum life from the incinerator.

APPLICATIONS

AFTER-BURNER CHAMBERS

The TCO transition chamber is made of heavy aluminized steel—contains no refractory lining. It's the economical way to control smoke and odor . . . has been used for years on many poultry farms.

APPLICATIONS

These models are designed basically for Type IV waste.

Poultry: Thousands of incinerators are being used to dispose of poultry carcasses and other pathological waste. The ROUND MODELS have a 125 lbs. chamber capacity and are recommended for use in operations with up to 75,000 broilers or layers; 50,000 turkeys. The OVAL MODELS have a 250 lbs. chamber capacity and are recommended for larger operations. A full load incinerates in 4 to 5 hours, depending on size and condition of birds.

Expected rate of burning:

Baby chicks ..... slow
Broilers ..... average
Layers ..... fast

Small Farm Animal: These incinerators may also be used for small animals such as lambs, pigs, dogs and cats. Noncombustible materials such as tin cans and bottles, will not incinerate and must be removed or they will hinder performance.

ORDER AND SIZE SPECIFICATIONS

	Round Models A4 Series	Oval Models A8 Series
Burning Rate (approx.)	up to 25 lbs. per hr.	up to 30 lbs. per hr.
Chamber Capacity	3.2 bu., 4.0 cu. ft., approx. 125 lbs.	7.0 bu., 8.7 cu. ft., approx. 250 lbs.
Chamber Dimensions	27" high, 18" diameter	28" high, 18" wide, 35" long
Fill Door Opening	9" × 18"	16" × 18"
Height of Fill Door	4'	4'
Height of Top of Transition Chamber	6'3" with TCO	6'3" with TCO
Overall Dimensions (including stack)	13'8" high, 2'2" wide, 3'8" long	13'8" high, 2'5" wide, 5' long
Suggested Slab Size	5' wide, 5' long	5' wide, 6' long
Suggested Shelter Size	7' wide, 7' long, 8' high	7' wide, 8' long, 9' high

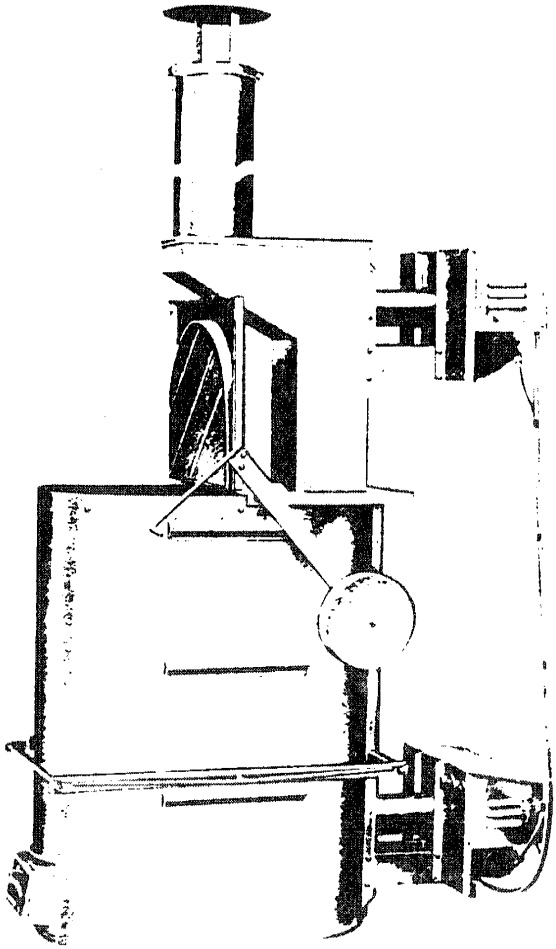
FUEL CONSUMPTION AND APPROXIMATE BTU:

Model	Formerly Model	Fuel	Weight	Top Burner	Lower Burner
A4-20	(I-64/TCO)	#1 Fuel Oil	660 lbs.	.85 GPH, 110,000 BTU	.65 GPH, 84,500 BTU
A8-20	(I-66/TCO)	#1 Fuel Oil	953 lbs.	.85 GPH, 110,000 BTU	1.0 GPH, 130,000 BTU
A4-2G	(G-64/TCO)	LP Gas	600 lbs.	1.3 GPH, 118,500 BTU	.95 GPH, 87,000 BTU
A8-2G	(G-66/TCO)	LP Gas	875 lbs.	1.3 GPH, 118,500 BTU	1.4 GPH, 129,000 BTU
A4-2GN	(G-64/TCON)	Nat. Gas	600 lbs.	112.5 CFH, 112,500 BTU	86.5 CFH, 86,500 BTU
A8-2GN	(G-66/TCON)	Nat. Gas	875 lbs.	112.5 CFH, 112,500 BTU	133 CFH, 133,000 BTU

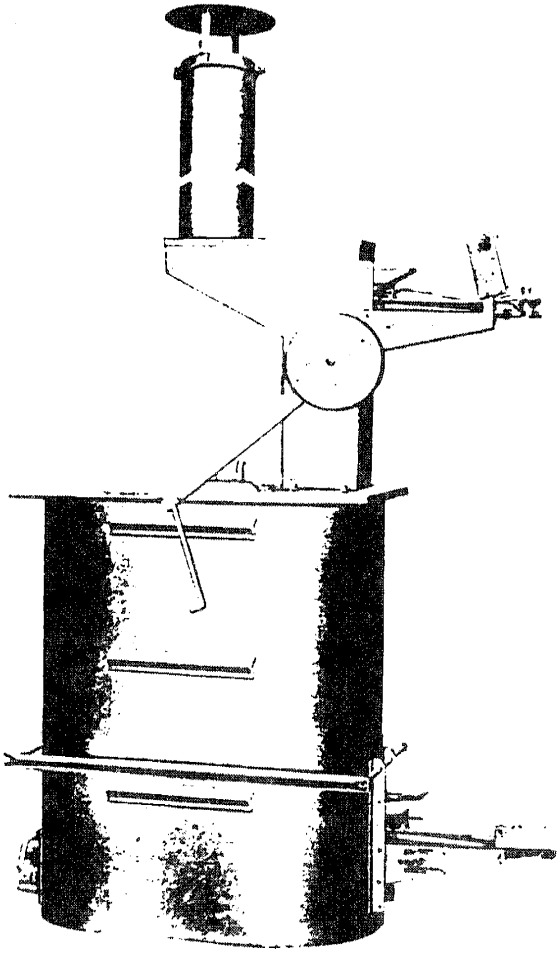
Other models available for veterinary & other applications.

OVAL INCINERATORS

High Quality Design for Low Cost Incineration



Model A8-2O
(Formerly **Model I-66/TCO**)
Oil-fired Incinerator



Model A8-2G
(Formerly **Model G-66/TCO**)
Gas-fired Incinerator
Burner Patent No. 3,420,613
Piping and Electrical Solenoid/Timer
Not Shown

Shenandoah®

SHENANDOAH MANUFACTURING CO., INC., P. O. Box 839, Harrisonburg, VA 22801
703/434-3838, TLX 710-839-1395

APPENDIX E

REFUSE DISPOSAL REQUIREMENTS FOR REMOTE CAMPS
ON VANCOUVER ISLAND, BRITISH COLUMBIA.

Province of
British Columbia

Ministry of
Environment
and Parks

Vancouver Island Region 1
Regional Headquarters
2569 Kenworth Road
Nanaimo
British Columbia
V9T 4P7
Phone: (604) 758-3951

Operational Procedures for Refuse Disposal at Remote Camps to Eliminate Bear Problems

Industrial and recreational camps in remote areas have historically disposed of their refuse by landfilling. This method has been shown to be ineffective in stopping bear attraction, even at well operated sites that provide regular compaction and covering. Bears become dependent on refuse as their primary food source, and this results in an alteration of their normal feeding habits and activity patterns. This can lead to a loss of fear of humans, poor health of the animals, and an increase in the frequency and hazard of bear/human confrontations.

Conservation Officers of the Ministry of Environment and Parks respond to numerous nuisance bear complaints annually, and inevitably have to destroy a number of bears in order to reduce the hazards they present. The continuous destruction of this valuable resource is not acceptable and can be avoided if proper refuse and disposal practices are implemented.

INCINERATION AS A MANAGEMENT TOOL

The most effective means of reducing bear attraction to refuse sites and camps is by daily incineration of camp refuse. This has been demonstrated in other areas inhabited by bears, such as Alaska and northern British Columbia.

The Ministry of Environment and Parks, Vancouver Island Region, requires all camps with a population of less than 100 people, located in bear habitat areas and without access to an authorized municipal landfill site, to incinerate their refuse on a daily basis.

A Waste Management permit is not required to operate these facilities as they will be administered by Waste Management Regulation. An adequately designed, refractory-lined, auxiliary fuel-fired, forced air unit is required for refuse incineration. Proper operation and maintenance of the unit are essential to attain the desired results. There are a number of incinerators specifically designed for camps with less than 100 people on the market, many of them manufactured in British Columbia.

EXISTING REMOTE CAMPS

All existing remote camps in bear habitat areas will be required to provide incineration for refuse disposal, but the implementation of this requirement will be on a priority basis. Initially, camps in grizzly bear habitat and those with existing bear problems will have to install incinerators. Over a period of time, the remaining camps will be required to phase in incineration.

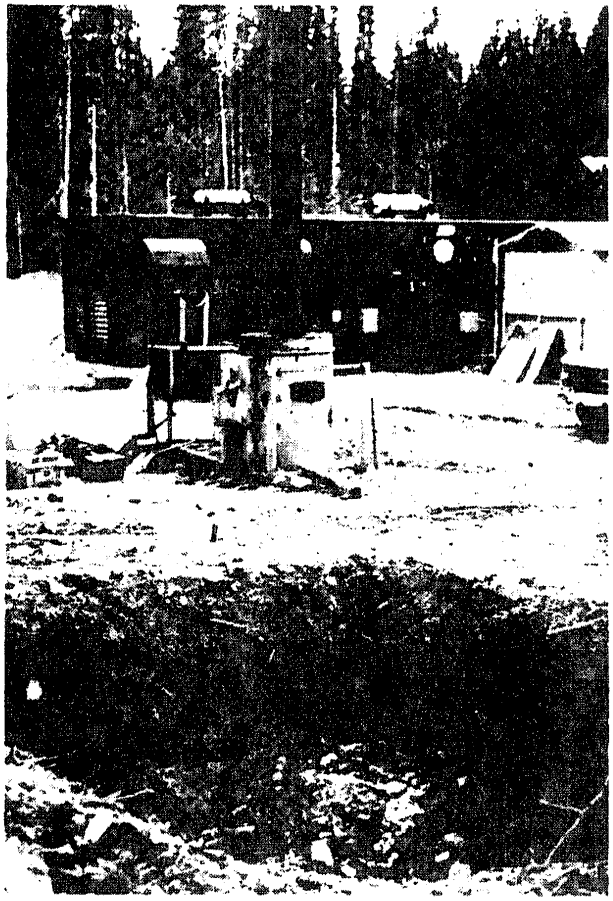
PROPOSED REMOTE CAMPS

All new remote camps in bear habitat areas will be required to provide incineration for refuse disposal.

BENEFITS OF INCINERATION

There are many benefits associated with the use of incinerators which make them an attractive alternative to landfills.

1. Properly incinerated refuse will not attract bears to disposal sites or camps, thus minimizing the chances of bear/human encounters. An added benefit is a decrease in the number of bears being shot because of the nuisance and/or hazard they present.
2. Burning garbage in landfill sites, whether started by man or spontaneous combustion, has the potential of starting costly forest fires. Incineration destroys combustible material before the refuse is landfilled.
3. There is a saving of time and money as refuse need no longer be transported to a refuse site, usually located several kilometres from camp. The incinerator should be set up in camp, preferably adjacent to the cookhouse.
4. Valuable equipment need not be tied up doing required refuse site maintenance, as one small pit will contain several months worth of incinerator residue.



5. The residue of incinerated refuse has less potential for creating leachate which can be a serious environmental problem.
6. Problems associated with locating a suitable landfill site are avoided.
7. Incinerators are mobile units and can be moved easily when a camp is relocated.

Incineration of refuse at isolated camps is the best known method of waste management at this time and is necessary to allow effective management of our wildlife resources as well as to preserve the pristine nature of our wilderness area.

APPENDIX F

ELECTRIC FENCES

First Reproduction:

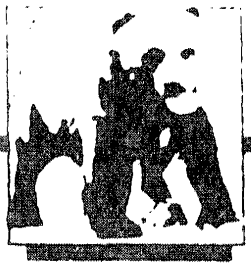
The Northwest Territories publication, Safety in Bear Country: A Reference Manual (Bromley 1985), describes effective bear deterrent fences designed for specific problem situations.

Second Reproduction:

The Yukon Department of Renewable Resources publication, "Bear Problems? Try Electric Fencing", describes a high voltage, low amperage electric fence tested at a remote mining camp near Dawson, Yukon.

Further information can be obtained by contacting;

Bear Biologist
Yukon Department of Renewable Resources
Fish and Wildlife Branch
#10 Burns Road
Whitehorse, Yukon
Y1A 4Y9
(403) 667-5177 or 667-5721



APPENDIX K

Recommended Specifications and Examples of Electric Fences Used for Deterring Bears

Charging the Fence

Use only commercially available chargers. AC and DC chargers are available. AC chargers reduce maintenance but may not be suitable if power failures are common. A DC charger using 12 V batteries requires more maintenance, but has greater flexibility. For camps with 110 AC power, a good solution is to use DC chargers with 12 V batteries which can be charged with AC line voltage.

Electric fences designed to deter bears, and increase safety, have used several voltage/current combinations:

1) High voltage (5000-12,000 V) and low amperage (0.015 to 0.1 amp). Voltages of at least 10,000 V are effective against bears, especially grizzlies, but must be used with low amperage (milliamp range) to ensure safety.

2) High voltage, high amperage and short pulse width. The Baker Engineering charger (Appendix D) operates at 5000 V and 1 amp but uses a short pulse (75 to 250 microseconds). The duration of charge on the body is extremely short. The high charge is effective against bears and the short pulse allows safe operation.

A pulse rate of about 60/min is suggested.

Gates

Camps with heavy traffic through an electric fence should give careful consideration to gate design. Either a single-unit sliding gate or two-leaf swinging gate should be used.

Gates should be operated manually by a gate attendant unless a reliable remote control mechanism is available.

Clearance beneath the gate should not exceed 10 cm (4 in). Extra maintenance may be required to keep the gate clear of snow.

A sill (preferably a 30 cm (12 in) square timber) should be buried at ground level between the gate posts. A 1.2 m (4 ft) chain link mesh should be attached to the lower edge of the sill, extending outward 1 m (at least 3 ft) and buried to a depth of 0.6 m (2 ft) at the outer edge. The combination of sill and buried mesh should prevent a bear from digging under the gate.

It is not necessary to place electric wire across the main gate if it is monitored by a gate attendant. If the gate is not monitored, electrical wires should be strung across it using plastic gate openers.

Examples of Electric Fences for Deterring Bears: Recommended Specifications

The following are examples of effective bear deterrent fences. Each fence was designed for a specific problem situation. These specifications should not be used without first assessing your bear problems and determining whether the fence described meets your needs. For the specifications described, the assumptions are made that a) the camp will be maintained to reduce or eliminate attractants, and b) standard fencing techniques will be used (braces or truss rods at corners and pull posts, stretching fence on posts).

1) A Portable Electric Fence for Deterring Black Bears[1].

This fence was designed by the Alberta Fish and Wildlife Division and was successful in deterring black bears from beehives. In field tests of 14 such fences, visited at least 16 times by bears, there were no penetrations. The fence can be built in a few hours by two people. One person can dismantle it in less than an hour. It should be used in situations where portability is important. It was designed for this purpose and has no other advantages over a permanent fence. This fence should not be used where grizzly bears are a problem.

(a) Materials needed:
- 30 posts 1.2 m (4 ft), 2.5 cm (1 in) PVC (Sch 80) pipe,
- 330 m (1000 ft) 1/16 in wire rope (cable),

[1]W.P. Wynnk and J.R. Gunson. 1977. Design and effectiveness of a portable electric fence for apiaries. Alberta Recreation, Parks and Wildlife; Fish and Wildlife Division. Mimeo. OR See Footnote No. 2.

- 30 rebar stakes 1.25 cm (½ in) wide, 45 cm (18 in) long,
- 30 1.25 cm (½ in) washers,
- one electronic charger (12 volt),
- one storage battery (12 volt),
- 1.5 m (5 ft) 12 gauge automotive wire,
- haywire or rope (guys).

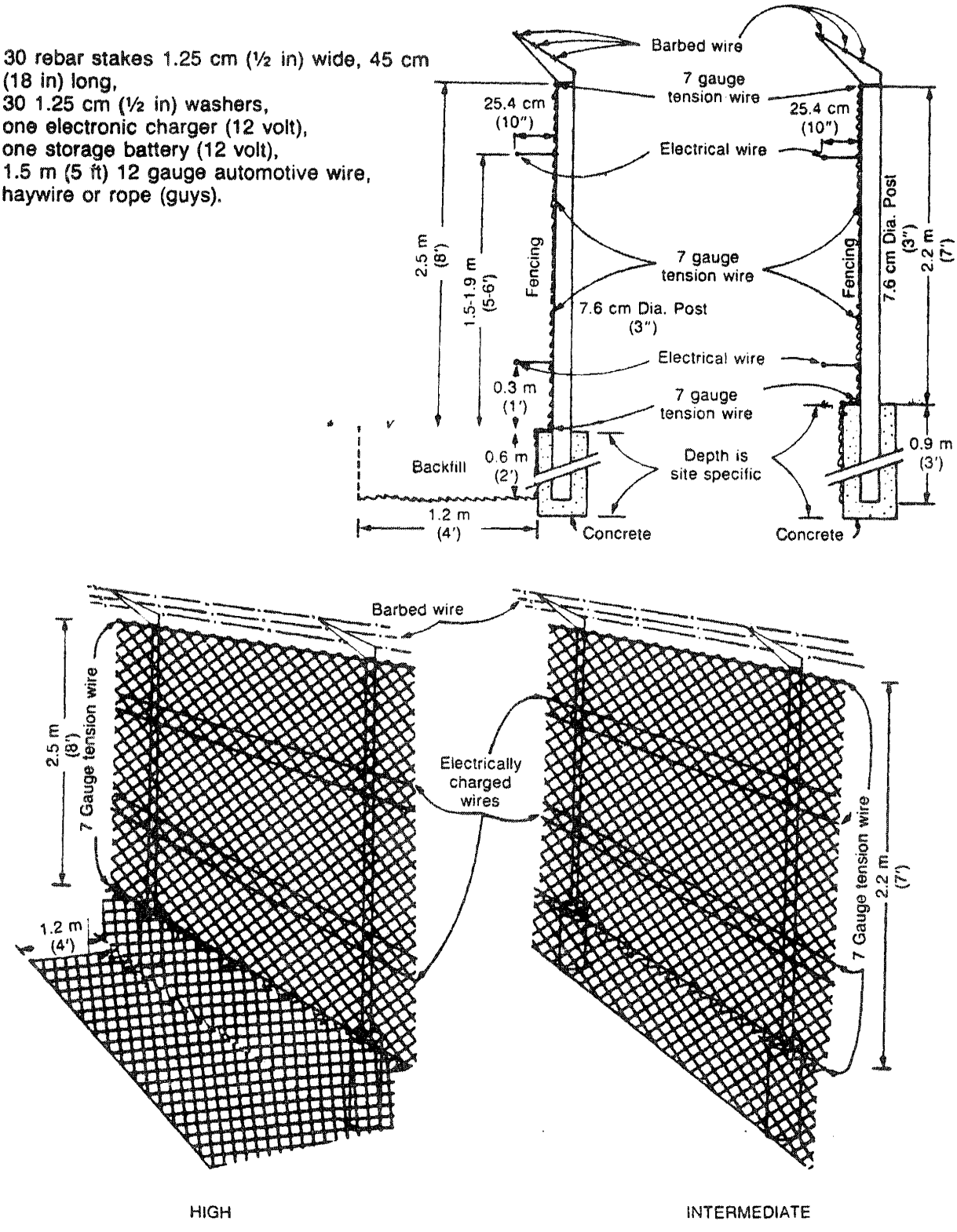


Figure K-1. Intermediate and high grade electric fences for black and grizzly bears.

(b) Preparation of materials: Cut rebar into 45 cm (18 in) lengths. Weld one flat washer on each stake 17.5 cm (7 in) from one end. Cut plastic pipe into 1.2 m (4 ft) lengths. Drill five 8 mm (5/16 in) holes into each pipe, the first hole 20 cm (8 in) from one end, the remainder 15 cm (6 in) apart.

(c) Construction: Drive rebar stakes into ground, approximately 3 m (10 ft) apart, until washer is flush with ground level and the 17.5 cm (7 in) end is above ground. Place plastic posts over rebar with 20 cm (8 in) hole spacing down. This leaves a 2.5 cm (1 in) space between tip of rebar and first wire to prevent shorting. Thread wire rope through holes in plastic pipe with large darning needle. Drive a rebar stake 15-20 cm (6-8 in) from the stationary gate post, to be used for opening the gate. Tighten wires around fence by hand and tie each strand solidly to a post at the width of the gate required. Tie the length of cable across the width of the gate to the movable gate post. Guy wire corner posts to a stake. Connect fence wires with automotive wire; wrap automotive wire around each strand of cable several times to ensure adequate connection. Drive a 1.2-1.5 m (4-5 ft) section of rebar into the ground near the fencer (charger) for a grounding rod. Connect fencer to fence wire and grounding rod and connect to power source.

2) **A Permanent Electric Fence for Deterring Black Bears**[2].

This fence, designed by the Alberta Fish and Wildlife Division, has been used with excellent results to keep black bears from bee yards. In 221 bear visits during a trial period of three years, 44 penetrations occurred, giving an 80% success rate.

(a) Materials required (for a 50-hive fence):
- Electric fencer; battery (preferably 12-volt automotive or recreational vehicle type),
- 24 fence posts 2 m (7 ft) long (preferably steel T-bar),
- 16 corner insulators,
- 120 regular insulators,
- one spool of two-stranded barbed wire,
- four rubber gate adaptors,
- four corner pegs, and
- haywire.

(b) Specifications:
- insulators on all posts,
- distance from ground to top wire at least 0.9 m (3 ft),
- minimum of four strands,
- steel posts preferred,
- commercial fencer, and
- maximum distance between wires 25 cm (10 in).

3) **An Intermediate Grade Electric Fence**[3]. (Fig. K-1)

The following specifications are for a fence recommended for pipeline camps and compressor stations in Alaska where significant to moderate bear problems (black and grizzly) are expected:
- 3 m (10 ft) 5 cm (2 in) mesh chain link fence with 1 m (3 ft) buried vertically; place on outside side of posts,
- 9-gauge chain link material,
- 7.5 cm (3 in) diameter fence posts spaced at 3 m (10 ft) maximum intervals; corner posts 10 cm (4 in) in diameter and gate posts at least 17.5 cm (7 in) in diameter; posts can be set in concrete or in other ways that ensure strength and stability,
- 3 strands of barbed wire (double strand 12-1/2 gauge; 4-point barbs on 12.5 cm (5 in) centres) at top of fence angled outward,
- 7-gauge top, bottom and two intermediate tension wires,
- 1 cm (3/8 in) truss rod,
- all tension bars, fasteners, etc. should be of steel, not aluminum,
- at 0.3 m (1 ft) and 1.5-2 m (5-6 ft) above ground level, bracket one strand of electrically charged wire to the outside of the fence about 25 cm (10 in) from the chain link fence,

[2] L.P. Horstman and J.R. Gunson (Compilers), 1983. Prevention and control of wildlife damage in Alberta: Manual for investigating officers. Section 1. Alberta Energy and Natural Resources. ENR Report No. Dept. 52.

[3] E.H. Follman, R.A. Dieterich and J.L. Hechtel. 1980. Recommended carnivore control program for the Northwest Alaskan Pipeline Project including a review of human-carnivore encounter problems and animal deterrent methodology. Final report prepared for Northwest Alaskan Pipeline Company by the Institute of Arctic Biology, University of Alaska.

- charge the two electrical wires independently with chargers yielding high voltage and low amperage (see recommended specifications below),
- electrical wires should be charged (+) and the chain link grounded (−).

4) **A High Grade Electric Fence**[4]. (Fig. K-1)

The following specifications are for a fence recommended for use at pipeline camps and compressor stations in Alaska where serious bear problems (black and grizzly) are expected.

- 3 m (10 ft) 5 cm (2 in) mesh chain link fence with 0.6 m (2 ft) buried vertically; place on outside side of posts,
- 1.2 m (4 ft) width of the same grade chain link fence laid horizontally on the outside of the fence at a depth of 0.6 m (2 ft) and hog-ringed to the bottom of the vertical fence; backfilled with pad material,
- 9-gauge chain link material,
- 7.5 cm (3 in) fence posts spaced at 3 m (10 ft) maximum intervals; corner posts 10 cm (4 in) in diameter and gate posts at least 17.5 cm (7 in) in diameter; posts can be set in concrete or in other ways that ensure strength and stability.
- 3 strands of barbed wire (double strand 12-1/2 gauge; 4-point barbs on 12.5 cm (5 in) centers) at top of fence angled outward,
- 7-gauge top, bottom and two intermediate tension wires,
- 6-gauge hog-rings (not aluminum) spaced at 0.3 m (1 ft) intervals to connect horizontal and vertical fence materials,
- 1 cm (3/8 in) truss rods,
- all tension bars, fasteners, etc. should be of steel, not aluminum,
- at 0.3 m (1 ft) and at 1.5-2 m (5-6 ft) above ground level, bracket one strand of electrically charged wire to the outside of the fence about 25 cm (10 in) away from the chain link fence,
- charge the two electrical wires independently by chargers yielding high voltage and low amperage,
- electrical wires should be charged (+) and the chain link grounded (−).

[4] See footnote No. 3.

ELECTRIC FENCES:

Condition Bears

- bears learn by trial and error. As long as your camp is clean they will be discouraged from entering
- wounding a bear can cause you serious problems

Save Money

- portable fences are relatively inexpensive and durable
- bears can cause up to $10,000 damage to just one camp
- shooting bears in camp is not an effective solution to protect your camp

Save Time

- portable fences are easy and quick to install
- minimal maintenance is required

Provide Security

- camp personnel can be warned of bears close by and avoid a surprise encounter

Did You Know?

Even a heavy duty electric fence may not keep out bears that are attracted to garbage and camp odours. Electric fences are no excuse for a messy camp. Burn all combustible material and keep intriguing smells to a minimum.

Cost Recovery

The Yukon Government Energy and Mines branch will pay 25% of camp development costs through the Mineral Exploration Incentives Program.

Yukon Conservation Strategy

The Department of Renewable Resources encourages projects such as this which further the goals of both industry and government. The sustainable use of our renewable resources is the aim of the Yukon Conservation Strategy.

More Information

A variety of educational materials relating to bears, such as videos, slideshows and presentations, are available to individuals and groups by contacting:

Land Use Specialist	667-5798
Bear Management	667-5177
Information Education	667-5237

For more information on preventing bear problems or to provide design suggestions contact:
District Conservation Officers

Dawson	993-5492
Mayo	996-2202
Ross River	969-2202
Haines Junction	634-2247
Teslin	390-2685
Watson Lake	536-7363
Old Crow	966-3040
Whitehorse	667-5221

ISBN 1-55018-076-2

BEAR PROBLEMS?

Try ELECTRIC FENCING

Yukon
Renewable Resources

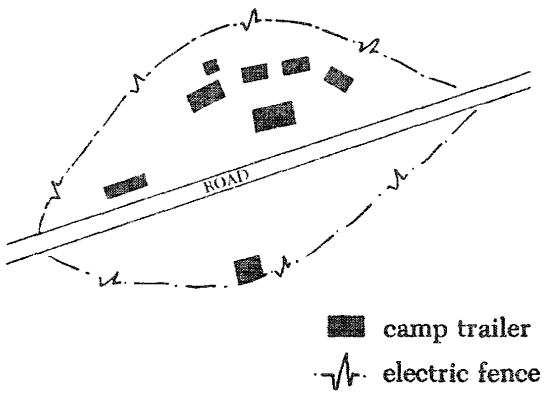
Who Uses Electric Fences?

During 1988, the Yukon Department of Renewable Resources tested this high voltage, low amperage electric fence design at a remote camp in the Dawson area. The camp manager was happy with the results:

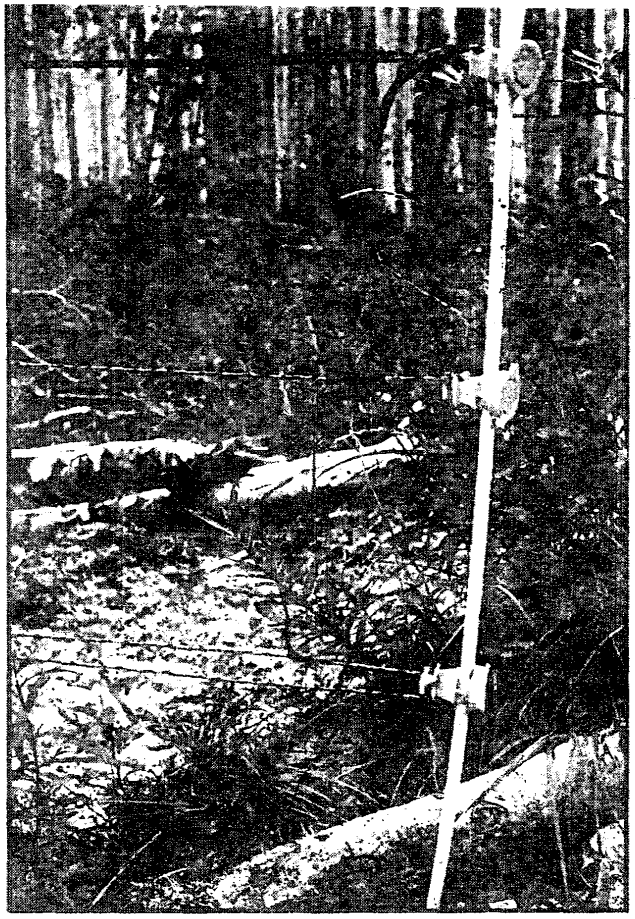
In 1987 we had to shoot two black bears and relocate eight others over the course of two months. We were concerned for the safety of our men and families as well as the security of our camp. So the next year we installed a portable electric fence around the camp, enclosing about two hectares. No bears came into the camp all season. We could see them around the perimeter and they broke the bottom wire twice but never came into camp. They learn fast. The whole fence cost about $700 and we'll use it every year now.

Gerald Klein
Teck Mines, Gold Run Creek

Fence Location: An Example



The camp on Gold Run Creek was situated in a natural movement corridor for bears. A drift fence was placed surrounding the camp to deflect bear movement away from the trailers. A slight break was made for easy access to the camp although gates can be installed.



Installation

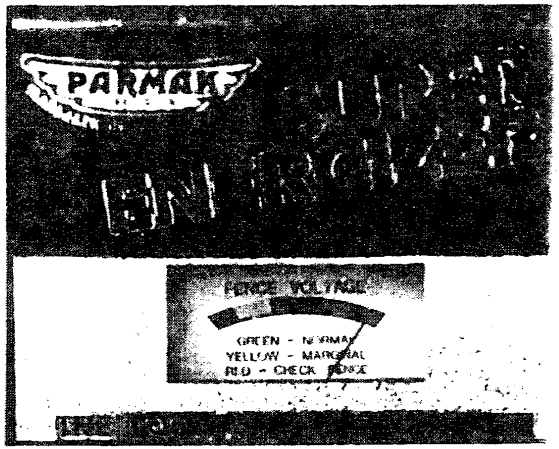
Materials:

- power source (battery, 110v AC or solar)
- high visibility electric tape
- electric fence wire
- fibreglass posts
- polypropylene insulators (heavy duty and spin on)
- ground rod
- double headed nails
- covered 14 or 16 gauge wire
- electrician tape

A video demonstrating correct installation of a portable electric fence is available through the Yukon Department of Renewable Resources.

Use and Maintenance

- the grounding rod must be buried moist soil at least three feet deep. possible cover with soil rich in clay
- shock intensity is greatest when t ground surface is damp. To reta moisture during hot dry spells, t area should be frequently watere Salt spread on the ground also hel to retain moisture.
- vegetation underneath the fen should be cleared so as not to sho circuit the fence.
- three to four conducting wires shou be strung at a minimum of 25c (10") apart and should reach at lea .9 meters (3') above the ground.
- baiting the electric wire with fo e.g. a can of sardines, may reinfor the negative stimulus a bear receiv
- an air horn can be linked to a trigg on the fence. This intensifies t negative stimulus and warns crew a nearby bear.



This CSA approved super energi power source produces 8,000 volts. variety of power sources can be used i cluding solar power rechargers.

APPENDIX G

BEAR-RESISTANT FOOD AND GARBAGE CONTAINERS

Various methods and devices can be used to secure food and garbage from bears. Odours should always be minimized by storing items in plastic bags. Food and garbage can then be secured from bears by;

1) Storing food in fridges or freezers that can be locked.

2) Stringing food up between two trees (see insert).

3) Storing food and/or garbage in a food cache (see insert).

4) Using commercially made bear-resistant food containers (see insert).

5) Storing food or garbage in metal drums that have a secure lid.

6) Storing garbage in bear-proof garbage containers (see insert). These are being used in Kluane National Park and in many Yukon Territory Parks throughout the Greater Kluane Land Use Planning Region.

GARCIA MACHINE 14097 Avenue 272, Visalia, CA 93277

(209) 732-3785

PRICE LIST JULY 4, 1989

MODEL NUMBER	DESCRIPTION	PRICE
MODEL 812	- BEAR RESISTANT CONTAINER (8" dia. x 12" long)	$73.50 ea.
MODEL 818	- BEAR RESISTANT CONTAINER (8" dia. x 18" long)	83.50 ea.
ACCESSORIES		
MODEL L-812	- LINER BAG W/TIE 6 ea. per pack	5.00/pack *
MODEL L-818	- " " " " " " "	5.50/pack *
MODEL C-812	- CARRIER W/THROW LINE	16.00 ea.
MODEL C-818	- " " "	18.00 ea.

* Quantity prices available

ALL PRICES F.O.B. Visalia, California

EXPLORE Magazine, May/June 1989 - Outdoor Products Review

BEAR-PROOF CONTAINERS

BY KEITH MORTON

The bear-resistant food containers mentioned in the "Bearproofing your backcountry food supplies" article in EXPLORE (March/April, 1988) are now available.

These are a production version of containers successfully tested by Rangers and the public in Denali and Sequoia Parks in the U.S. (actually the bears did the testing!). The containers can be used to increase safety and security in 'problem bear' areas or places where other methods of caching food are impractical.

The container is made of a smooth hard plastic, sized and shaped such that the bear cannot obtain a crushing grip with its jaws or hold the container with its claws. The lid locking arrangement is simple, requiring a coin to turn the two flush-fitting catches. Even park bears don't carry money yet!

Fears have been expressed that bears thwarted in their attempts to obtain food would turn their frustration onto people or other items of their equipment. However, initial data from Denali Park indicated an overall reduction in aggressiveness towards people and their food.

The containers are 21 cm in diameter, 30 cm long and weigh 1.8 kg. Volume is 9.6 L—room for 38 cups of granola, rice or whatever. That translates into 4.2 kg of granola, or 7.6 kg of rice, so depending on what is in the container, the 1.8 kg of container weight becomes a more or less significant proportion of the total. If the container is not tightly packed the container weight would be a very high proportion of the total, so careful planning and packing are required to use it efficiently. Food which has a high density should be chosen, and food bags should be only partly filled so that they mold easily to the shape of the container without leaving empty space. Depending on type of food and on packing skill, it should hold approximately 7 person-days of food.

Bear-resistant container by Garcia Machine, California. All of the items shown fit into the container

If container weight precludes packing all the food in these containers, emergency rations could be packed in one to allow completion of a trip without starving if a bear obtained the rest of the food. However, you would be gambling not only on going hungrier than you would like, but also on a bear being rewarded in its human food-seeking behaviour and taking another big step towards becoming a confirmed nuisance bear. This would be undesirable, especially in an area where bear encounters are highly probable.

A nylon cover and harness is available for the container in order to facilitate hoisting, carrying, or attaching externally to a pack. However, if well filled, the container would be rather heavy to carry externally on the upper or lower part of an external frame pack, and could cause poor weight distribution. The problem would be worse with internal frame packs, so it would appear to be best carried inside both external or internal frame packs. In fact, though, many of the users in public acceptance trials attached them externally to their packs.

A throw-line with breakaway weight bag is also supplied with the fabric cover, to facilitate hoisting into trees. If the weight bag snags, the line breaks away and can still be retrieved.

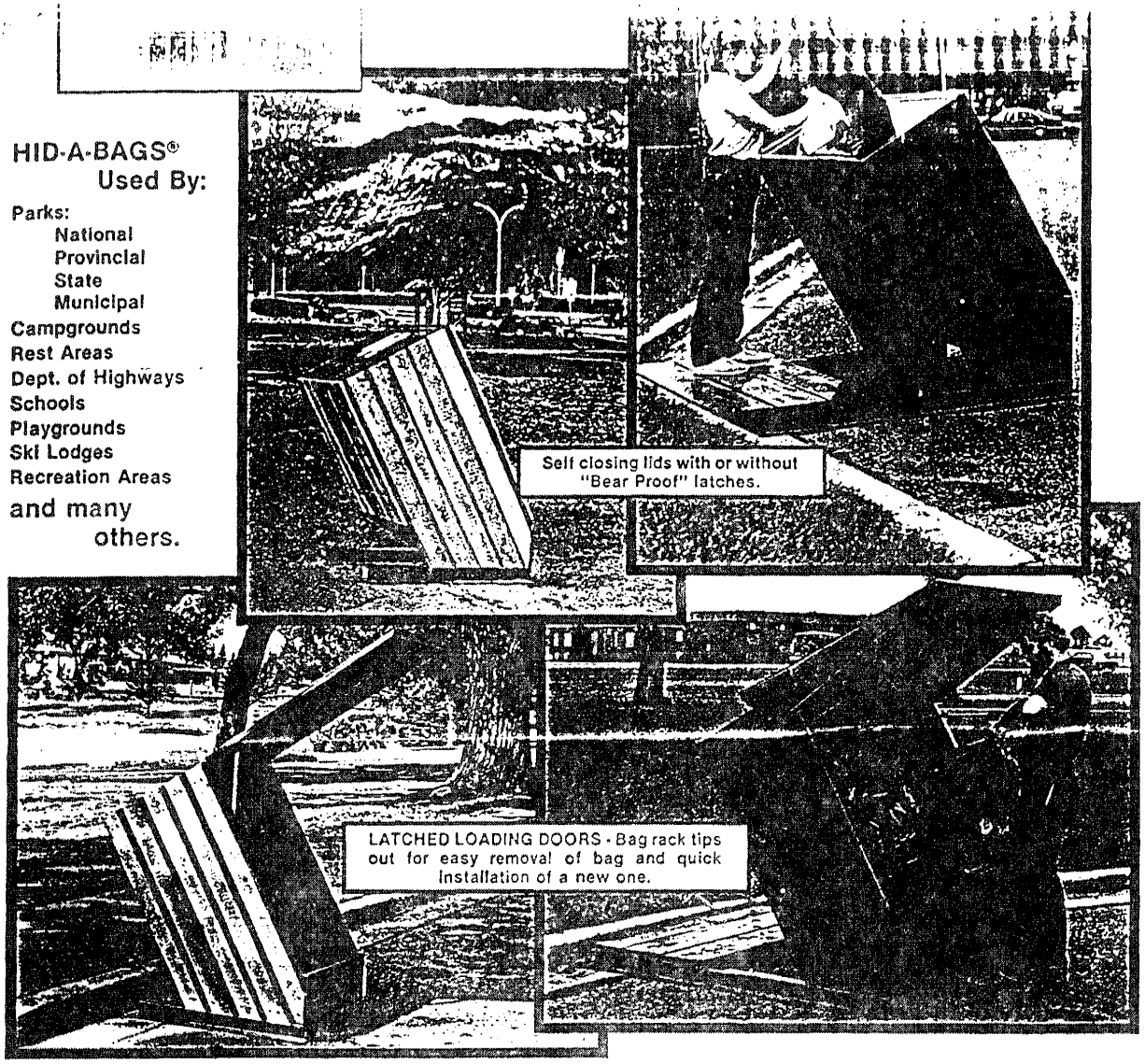
This product is well worth considering if you are planning trips into areas where bear problems are a major risk. Cost is approx $75 U.S., $16 for the carrying bag. They are available from the manufacturer, Garcia Machine, 14097 Avenue 272, Visalia, California 93277.

HID-A-BAGS® Used By:

Parks:
- National
- Provincial
- State
- Municipal

Campgrounds
Rest Areas
Dept. of Highways
Schools
Playgrounds
Ski Lodges
Recreation Areas

and many others.



HID-A-BAG® I & II containers are manufactured from steel materials, undercoated prior to manufacture and painted with a durable urethane colored to blend in with the environment. Aesthetically designed, HID-A-BAG® containers come with permanent mounting provisions and each unit is serial numbered for your asset control.

		HID-A-BAG® I	HID-A-BAG® II
CAPACITY		70 Gal. (260 l)	130 Gal. (500 l)
DIMENSIONS:	Width	26" (660)	48" (1 220)
	Depth	42" (1 070)	42" (1 070)
	Height	48" (1 220)	48" (1 220)
		[illegible]	[illegible]
	w. Platform	265 lbs (120 kg)	360 lbs (163 kg)
	with Cedar	260 lbs (118 kg)	n/a

BAG REQUIREMENTS: 2.5 mil - 42" x 50" (1 070 x 1 270)

OPTIONS AVAILABLE: Bear Proof Latches — User Platform — Keylock Unloading Door

HAUL-ALL

reaches you through a network of [illegible] product knowledge qualifies them to assist you of your Haul-All requirements.

Haul-All and HID-A-BAG are registered [illegible]

DISTRIBUTOR

APPENDIX H

BEAR DETERRENTS

Deterrents should not be used as an alternative for proper food storage, garbage disposal and camp maintenance. Preventing the attraction of bears to areas of human activity is the most economical and effective way to reduce bear problems (Bromley 1985). When preventative measures are ineffective then deterrents should be used to scare the bear away.

Effective deterrents can protect people and their property from immediate danger and reduce the need to kill bears. As well, deterrents can be used to teach a bear not to frequent areas of human activity by having the bear associate humans with an unpleasant experience (Bromley 1985). Bears which have obtained food from human sources may need to be deterred several times while a bear which is unfamiliar with humans and their food may only need to be deterred once. Deterrent methods and devices used to scare away bears are listed in Table 4.

TABLE 4: Deterrent methods and devices used to scare away bears.

Precaution:

Do not let the fact that you have a deterrent make you less careful to avoid bears. Use deterrents only when preventative measures fail. Make sure you are comfortable with the deterrent you use and are able to operate it safely and competently. Obtain training, if possible, and practice regularly. The more familiar you are with the deterrent you use the less likely you are to make mistakes when under pressure. Everything mentioned above also applies to the use of firearms.

Each bear encounter is a unique situation. There is no one deterrent that will work effectively in every situation. What works on one bear may not work on another, and some deterrents may lose their effectiveness on a bear if used repeatedly (e.g. warning shots, cracker shells). No deterrent should be considered 100% effective or should be relied on for personal protection. Whenever possible, operate deterrents from, or near, the safety of a building or vehicle. Always have a back-up weapon (rifle or shotgun), or someone with a back-up weapon, to protect you should the deterrent fail.

The information provided in Table 4 was obtained mainly from the Northwest Territories publication, Safety in Bear Country: A Reference Manual (Bromley 1985). Readers who desire further information on any of the devices mentioned should consult the above publication or contact;

Bear Biologist
Yukon Department of Renewable Resources
Fish and Wildlife Branch
#10 Burns Road
Whitehorse, Yukon
Y1A 4Y9
(403) 667-5177 or 667-5721

Table 4. Deterrent methods and devices used to scare away bears[1].

METHODS	EFFECTIVENESS	PRACTICALITY	ADVANTAGES	LIMITATIONS
Warning shots	- sometimes effective - effectiveness may decrease with repetition	- practical for most situations	- readily available - easy - inexpensive	- may injure
Cracker shells/ (Twinshots) (Teleshots) Pencil flare guns	- same as for warning shots - should not be relied on for personal protection	- same as for warning shots	- same as for warning shots	- shells can misfire or fail to explode - limited to open areas - may be a fire hazard
Airhorns (Boat horns)	- same as for warning shots - may be used as noise-maker to prevent surprise encounter - should not be relied on for personal protection	- same as for warning shots	- same as for warning shots	- may provoke aggressive or curious reactions from some bears
Vehicles (snowmachines 3-wheeled vehicles, helicopters)	- engine noise often frightens bears away - chasing bears for a short distance is quite effective	- useful while travelling or in small camps	- easy if vehicle is accessible	- may be hazardous to person and bear if not used properly
Relocation	- usually ineffective	- may be short-term solution to immediate problem - personnel and means for trapping must be available	- bear is removed from area at least temporarily	- expensive - time-consuming - temporary

Table 4 continued

METHODS	EFFECTIVENESS	PRACTICALITY	ADVANTAGES	LIMITATIONS
				- limited by road access or helicopter expense
Rubber bullet	- very effective	- available only to Renewable Resource Officers & R.C.M.P.	- may cause behavioural changes resulting in long-term deterrence	- restricted to Renewable Resource Officers and R.C.M.P - intensive training and practice necessary - need special rifle - expensive
Birdscaring flare cartridge	- more effective than cracker shells	- same as for warning shots	- same as for warning shots - flare component useful in darkness	- limited to open areas - may be a fire hazard
Electric fences	- fence built to proper specifications will keep out grizzly and black bears	- suitable for semi-permanent or permanent installations	- 24 hour protection	- expensive - regular maintenance required - can be hazardous to people

Table 4 continued

METHODS	EFFECTIVENESS	PRACTICALITY	ADVANTAGES	LIMITATIONS
12-gauge plastic/ slugs[2]	- still in experimental stages - has been effective at deterring polar bears	- when perfected, should be suitable for most bear problems	- use is not restricted - accurate - can be fired from a shotgun, which is easy to use - portable - inexpensive - shotgun can be used for both deterrent and destroying bears	- still in experimental stages
Dogs	- specially trained dogs may be effective in some cases	- suitable for semi-permanent and permanent camps of all sizes	- inexpensive - easy - eat leftovers	- not reliable - poorly trained dogs can aggravate a bear and/or lead it back to camp - dogs can be killed - require a responsible handler

Table 4 continued

METHODS	EFFECTIVENESS	PRACTICALITY	ADVANTAGES	LIMITATIONS
Chemical repellent sprays	- extensive field testing has not been done. Preliminary data suggest they are effective when used properly.		- may be used in areas where firearms are prohibited - lightweight	- extremely dangerous if spray goes off inside aircraft (pilot will be blinded for 20 minutes). - ineffective if windy
Acoustic deterrents	- still in experimental stages, but some frequencies (0.1 - 9 khz) have good potential			

[1] Adapted from Bromley 1985

[2] Clarkson 1989