

WORKING SESSION

Dealing with Unprecedented Levels of Aircraft-Supported Commercial Activities

MODERATOR: Jeff Denton

Panel Members: Alasdair Veitch, Northwest Territories
Kirby Smith, Alberta
Jon Jorgenson, Alberta
Bob Forbes, British Columbia
Jean Carey, Yukon Territory
Jeff Denton, Alaska

At the 12th Northern Wild Sheep and Goat Council symposium held in Whitehorse June 2000, a special workshop devoted to the topic of disturbance effects on wild sheep and goats was conducted. This workshop was hosted by Jeff Denton, an Alaskan biologist. The following is a collection of pre conference agency responses, panel presentations and notes taken by Alasdair Veitch, Jeff Denton, and several other attendees.

Many pristine northern wild sheep and goat populations and their habitats have experienced an unprecedented increase of aircraft-related activities in the last 15 years. Management agencies must deal with a wide array of permitting processes to deal with an ever-increasing number of applications for these activities. Research about the short-term physiological and behavioral response of wild sheep and goats is insufficient to evaluate current types and levels of aircraft activities. Long-term effects relative to habitat fidelity, population stability, and productivity are largely unknown when considering the permanent nature of many of the high volume long term aircraft operations being experienced today. Research studies of 1-3 year duration have been completed to evaluate short-term disturbance actions. However, few deal with the cumulative effects of long-term annually recurring high volume helicopter tourism, heli-skiing, and heli-hiking in addition to ongoing helicopter-supported mineral exploration and development, military missions and forest harvest.

Purpose

This workshop was convened to:

- Assess the status and scope of aircraft-related disturbances on North American sheep and mountain goats and the effectiveness of current mitigation and guidelines;
- Initiate a process to establish interim guidelines until further research can be done; and
- Initiate discussion about research needed to evaluate and develop consistent and adequate guidelines for permitting and regulating aircraft activities in sheep and goat habitats.

Regional Overview

Information was solicited from key personnel by questionnaire and telephone contact prior to the conference. Phone contacts were also made to give biologists the opportunity to prepare information and bring it to this session or forward it to the moderator for brief presentation. This was not meant to be a comprehensive account of the issue, but a representative sample to generate discussion. Questions asked were:

- What types of aircraft operations, intensity, geographic distribution, and temporal activity that occur in or near your sheep and goat habitats?
- Is there any ongoing or completed research investigating behavioral, physiological, habitat fidelity, short and long term productivity parameters in relation to aircraft activities?
- What is the prognosis for the future expansion or increase in aircraft operations or types of operations in the future? For example, Alaska has experienced rapid growth in activities aimed at the tour ship market (helicopter flight seeing and glacier landing operations, heli-skiing/snow-boarding, heli-hiking, heli-floating, para-gliding, ultra-light aircraft, etc.). Some of these activities are seasonal, others are year round and some are long term as well as short term, and of varying intensity.
- Are there any permitting requirements? If so, are there standards or stipulations for aircraft operators relative to distances, types of aircraft, noise levels, seasonal restrictions, etc.?
- In your region is there merit to having consistent and effective guidelines or stipulations for various aircraft activities whether it be mining logging, tourism or personal use related or of high intensity or limited in intensity frequency, and duration?
- Do you consider current or anticipated effects of aircraft operations on sheep and goat populations significant enough for the Northern Wild Sheep and Goat Council, as a professional group, to formulate interim and/or other more permanent management guidelines to deal with minimizing aircraft impacts, or do you consider each local situation as a separate issue to be addressed on a local basis?
- Are you satisfied with current management and see potential aircraft impacts as an issue that is already being adequately addressed?

Responses generally indicated that the potential conflicts in most of the western United States are not as intense as in Alaska, or are handled through special designations of land uses (such a wilderness areas), state wildlife agencies permitting, land use designations that limit helicopter use, or state statutes dealing with harassment. The degree to which the issue is addressed varies by state.

Submitted responses

Arizona

- Aircraft and stress in sheep is the most important area for study. The effects of stress on sheep demographics is a diffuse effect and difficult to study.
- Arizona has harassment provisions in a preliminary published form. There are no current codes or law structures that deal with general harassment.
- Currently special designations in some areas restrict aircraft uses and give some protection to sheep.

- Guidelines would be valuable for management agencies.

California

- California Fish and Game does not permit actions such as flying to set up hunts, or surveys, and requires FAA regulations to be followed. Flight seeing is allowed but not for the purpose of wildlife viewing.
- Many areas are federally designated national parks, monuments, refuges, or wilderness where helicopter uses are restricted by FAA designations and specific restrictions.
- There are no particular regulations or known conflicts with helicopters, ultra light aircraft or hang- and para- gliders.
- State wildlife harassment laws indicate flying within 60 m of wildlife constitutes harassment.

Colorado

- The only state regulations regarding helicopter use relate to the hunting, harassment or taking of wildlife with aircraft.
- Federally designated special areas such as National Parks, wilderness areas etc. and FAA regulations appear to be effective in most sheep and goat areas.

Idaho

- There are no state-applied guidelines.
- Specific research into military overflights in the California bighorn areas of southwestern Idaho has resulted in several resolutions and guidelines:
 - flight lines are to cross canyons at right angles and at a minimum of 1000 feet above canyon rims;
 - no flying in canyons;
 - 1000 foot flight limits over sheep habitat; but 10,000-foot flight limits for supersonic aircraft.
 - The degree to which these guidelines are adhered to in practice is unknown.
- The Sawtooth National Recreation Area deals with heli-skiing in a very controlled manner, based on very close cooperation among heli-ski operators, state, and federal agencies. Helicopters are required to stay 1000 feet above and one half mile away from goats and elk while transporting skiers to ski sites. Some areas are completely closed to all operations if Idaho Department of Fish and Game surveys indicate goats are present. Some areas are seasonally closed for wolverine natal denning after February 15. There is a reliance on the trust for the operator to comply, but some disturbance still occurs and monitoring is necessary. Permits are changed based on the monitoring and observations made over the previous 5 years.

Montana

- Guidelines were established primarily in response to oil and gas exploration activities and might be considered out of date.
- The Montana Chapter of the Wildlife Society completed a review of the effects of recreation on Rocky Mountain Wildlife in 1999; however aircraft based recreation was not evaluated.
- There is some heli-skiing near Glacier National Park. Helicopter related recreation may be occurring in other areas but has not become an issue or has not come to the attention of the

state wildlife agency.

- Interagency guidelines were developed during 1980-1987 for the Rocky Mountain Front to meet a number of objectives, including mountain goat and bighorn sheep management.
- Specific guidelines for mountain goats and sheep relative to helicopters and aircraft in Montana:
 - Seasonally avoid areas:

Kidding-nursery areas - mountain goat	May 1- July 15
Lambing areas - sheep	April 15-June 30
Breeding areas - mountain goat	November1- December 31
Winter Range - mountain goats	October 15 - May 15
Winter ranges and breeding areas - sheep	September 1 - May 15
 - Survey suitable habitats and classify as yearlong or transitional habitat. Year long habitats will have the seasonal guidelines apply and transitional habitat will have human use restrictions May 1 - June 30 and October 15 - December 31.
 - Mineral licks should have a no surface occupancy for a 1-mile radius around the site and helicopter flight patterns should be established at least one mile from mineral licks May 1- July 31.
 - Establish flight patterns when helicopter activities are required. Flight patterns should avoid seasonally important mountain goat habitat during the period noted above.
- These guidelines are for consideration when dealing with various activities and are not mandatory. They are often included in mitigation or stipulation packages dealing with various permits or authorizations. Monitoring of these guidelines was identified as an important test and validation of their effectiveness and applicability.

New Mexico

- State regulations are referenced to hunting statutes only.
- Federal land use designations protect many of the at-risk wildlife populations .

North Dakota

- Aircraft-caused disturbance within bighorn sheep range in North Dakota is currently at a minimal level.
- The United States Air Force (U.S.A.F) used to conduct low-level training flights with bombers and fighter jets over an area used by bighorn sheep. Flights were approximately weekly during the summer 1992-1994 (Sayre 1997). Sheep response varied from no reaction to increasing time spent alert to fleeing up to 1000 m away from the disturbance. Currently, the U.S.A.F. does not conduct these flight exercises.
- The North Dakota Game and Fish department conducts low-level aerial surveys of designated study areas during the spring and fall of each year. A single fixed-wing plane is used to survey 10-15-mi² study areas (60-90 minutes for each area). Mule deer and bighorn sheep are counted and classified during these aerial surveys. Big game biologists opportunistically aerially monitor bighorn sheep areas throughout the year. No other aircraft disturbance appears to be impacting bighorn sheep in North Dakota.

Sayre, R. W. 1996. Ecology of bighorn sheep in relation to habitat and oil development in the Little Missouri Badlands. Ph.D. Dissertation. University of North Dakota, Grand Forks, North Dakota, U.S.A.

Oregon

- In most cases wilderness designation precludes the type of aircraft operations that would potentially impact sheep and goats.
- Interim guidelines and longer term, research-based guidelines from a professional sheep and goat biologist/manager group would be useful in potential conflict areas.
- State regulations deal mostly with hunting and transport via helicopters for illegal taking of wildlife.

Washington

- Echoed for the most part, the Oregon response. State law also relates to the issues of same day airborne hunting.
- Research in the areas of intensive recreation and tourism impacts (on the ground and in the air) should be among the top priorities in sheep and goat management.

Presented responses:

Alaska (Jeff Denton)

- Aircraft related activities have experienced unprecedented expansion into previously pristine mountain goat and sheep habitats over the last 10-15 years. This expansion also includes increased intensity, duration, frequency, variety and long-term permanency of a variety of aircraft-related activities.
- The most prolific and visible increase comes from the high-volume tourism industry. This industry utilizes multiple-transit tours starting with the tour ships and uses buses, trains and commercial airlines to complete various tour circuit packages that include Ketchikan, Sitka, Juneau, Haines, Skagway, Glacier Bay, Valdez, Cordova, Seward, Anchorage, Denali, etc.
- Helicopter-supported skiing, snowboarding, hiking, rafting, kayaking, dogsled glacier tours; para-gliding, and ultra-light aircraft are currently experiencing an increasing demand for use. These activities are additive to the more traditional individual fixed-wing recreational flights for hunt scouting trips, helicopter-based logging, mineral exploration and development. All activities include wildlife viewing as an added benefit. They occur primarily along the coastal mountains in southeast Alaska, mainly on the Tongass National Forest with operations also occurring on State of Alaska and Bureau of Land Management (B.L.M.) lands in the Haines/Skogway and Anchorage areas. Operations in and around Denali, Glacier Bay and Kenai Fjords National Parks are also popular.
- Timber, oil, and gas-related activities are also increasing, but historically activity levels fluctuate with the economy.
- There are conflicting views among the outfitter community and the research community about the impacts of the Alaska pipeline.
- Long-term outfitters and guides have strong feelings that helicopter flight-seeing and other operations have had significant impacts on Dall sheep in their areas. These impacts are frequently related to sheep distribution and seasonal habitat fidelity, abandonment of habitats, significant impact on hunter success and sheep population stability.

- Intensive helicopter logging has been implicated in the loss of local goat populations in the Cordova and south-central Alaska regions. This is directly related to crucial habitat alteration and elimination. How much of the impact related to helicopter operations is not known.

Permitting

- The State of Alaska Department of Natural Resources has no permitting process for or monitoring of these activities. Distribution, intensity, and seasonality of these activities are largely unknown on state sheep and goat habitats. Monitoring these activities is difficult; some of these activities occur or expand into new areas without the knowledge or authorizations required by agencies on their respective lands.
- The number of permit applications is increasing rapidly each year – most are for flight seeing and include glacier landings, wilderness education, and skiing. Most are helicopter- supported and active primarily May through September. Increasingly, there are late winter seasons of activity in March-May for heli-skiing and other helicopter-related activities in many of the same areas mentioned above, as well as around Cordova, Valdez, and Kenai Peninsula state lands, B.L.M. lands, and Chugach National Forest lands.
- The Tongass National Forest currently permits up to 31,000 flights and landings per year on the Juneau Icefields, with an approximately additional 10% more flights for just point-to-point tours. Similar intensities are experienced in Ketchikan, Sitka, and other areas in southeast Alaska.
- Permit applicants indicate a demand in the Juneau Icefield alone for up to 40,000 flights and landings. Between B.L.M. and Tongass National Forest the Haines/Skagway area has about 7,000 glacier takeoffs and landings in a 150-day season from May 10 to September 30, plus an unknown number on state-owned lands and for winter heli-skiing activity. I do not have figures for other regions of the state where these activities occur, but they are probably significant in number and growing but not yet to the levels being experienced in the southeast.
- There appears to be a high interest and use in south central Alaska for heli-skiing.
- The tourism industry engages in, promotes, and vigorously protects aircraft-based tourism in the interior of Alaska and at major tour stops. The prognosis is that these types of tourism and recreation will increase and expand readily into new areas in the future.
- There has been research of at least one population of sheep with considerable exposure to aircraft operations and other intrusions. No specific research has been directed at the issue, but some experts indicate that aircraft impacts on this population of sheep may not be significant and that sheep can habituate or tolerate intense air operations in their habitats.

Monitoring

- U.S. Forest Service has no monitoring.
- Alaska Fish and Game only monitors at the levels needed to meet the needs of harvest management.
- The Park Service is not doing monitoring related to aircraft operational areas.
- B.L.M receives 3% of the fees associated with helicopter operation permits for monitoring. B.L.M has been monitoring mountain goats in the Skagway/Haines area since 1995. Monitoring occurs in an area where goats are exposed to helicopter activity and in a control area that is about 3 times the size of the exposure area. Major objectives are to monitor habitat seasonal use, area fidelity, productivity, population stability, and response behavior. This is not research-intensity monitoring, but is of sufficient intensity to detect developing

“red flag” situations that hopefully would trigger more intensive research efforts or modification of current permitted operations. The constant expansion of activities and types of uses into the control areas partially compromises the control area, but also allows for before, during and after comparisons of test areas. The data have not yet been analyzed, but some preliminary information is available:

- 1995-1998: exposure areas and control areas have population demographics that were very similar from year to year. Long term (since 1985) exposure areas had stable, but very low and inconsistent productivity.
- 1999: severe winter weather. Helicopter tourism/glacier landing exposure area suffered significant failure of reproduction and population decline whereas control areas stayed about the same as the previous 4 years. There is a possibility of cumulative stress from pre-winter tourism activities resulting in enough of a body condition deficit that harsh winter stresses resulted in at least a one season reproductive failure and adult mortality above that experienced in control areas. There appears to be declines or abandonment in use of kidding areas adjacent to landing sites in at least one situation. There are many possible explanations; analysis and probably more intense research is needed.
- On lands managed by Alaska Department of Natural Resources only FAA rules and State wildlife harassment laws are in effect.
- Compliance is, at best, expensive and difficult to enforce due to lack of manpower; non-compliance with permit stipulations, flight corridors, and landing sites is commonplace. Human flight safety takes precedence over wildlife stipulations whenever conditions are considered necessary. This allows a convenient scapegoat for deviation from established flight patterns, use areas, and so on.
- Since 1995, B.L.M. has required 1500-foot horizontal and vertical distances from wildlife habitat, based on limited research and general consensus of state and federal biologists at the time.
- FAA regulation and designations over special areas of Parks and Refuges, National Forests are available but largely disregarded in Alaska. The current feeling is that these are not adequate stipulations to protect mountain goats.
- The heli-tour industry is a well-connected “big-dollar” industry. Stipulations for seasonally protected kidding areas were eliminated via political routes.
- Agency decision-makers are often reluctant to apply mitigation or stipulations without multi-agency consensus and adequate research findings. The lack of comprehensive research, the political and economic climate, and the lack of interagency agreements or guidelines make effective and consistent decision making difficult.

Northwest Territories (Alasdair Veitch)

- In the northern part of sheep range (Richardson and Mackenzie mountain ranges) there are no year-round roads, although some areas are accessible by seasonal roads. There are no human settlements and currently no operating mines or forestry activities.
- Potential sources of disturbance are hunters (up to 350 per year and active from 15 July to the end of September), backpackers, river rafters, canoeists, kayakers, and, along major waterways, jet boats. There is 140,000-km² total area, but there are ‘hot spots’ for human activity.

- Outfitters in the Ft. Liard area near the British Columbia border expressed concern in 1999 about helicopters (212s) flying low over lambing and post-lambing areas and blasting for seismic work occurring right at base of lambing cliffs. In 2000 Department of Natural Resources and Economic Development will survey to see if sheep are present in areas proposed for seismic activity. Seismic activity is currently only in the summer.
- Proposals for seismic work in areas with no settled land claim have to be screened by the federal National Energy Board (NEB). Applicants need a Geophysical Operations Permit issued under Canada's *Oil and Gas Operation Act*. The Government of Northwest Territories (Department of Resources, Wildlife & Economic Development – divisions Wildlife and Fisheries; Environmental Protection; Forest Management; Minerals, Oil, and Gas; Parks and Tourism) provides input during screening along with other stakeholders such as aboriginal organizations. The screening report goes to the Mackenzie Valley Impact Review Board and they decide if a permit is issued or if an environmental impact assessment needs to be done.
- In areas with settled land claims, Land and Water Boards issue land use permits and water licences for all lands, both private and crown. The Department of Indian and Northern Affairs Canada also looks at proposals.
- No disturbance studies are underway but the Gwich'in Renewable Resources Board may initiate studies to look at the impact of snowmobile disturbance on Dall's sheep in the Richardson Mountains.
- There are no federal or territorial minimum flight height guidelines. The only area where there are guidelines is the Inuvialuit Settlement Region in northern NWT; these guidelines are for caribou: 300 m above ground level for ferry flights; 100 m above ground level for survey flights. The NWT Department of Natural Resources recommends 300 m for Dall sheep overflights and 100 m for survey work.

Alberta (Kirby Smith)

- There are two main disturbance issues or problems: domestic dogs and overflights.
- Disturbance studies began with Val Geist, who had heart rate monitors in bighorn sheep. An article was published in the *Journal of Wildlife Management* in 1982. In 1995 Steve Cote looked at helicopter based seismic line activity and mountain goats (single line seismic activity with 206s and 212s) and published a paper in the *Wildlife Society Bulletin* in 1996. He detected disturbance to goats at 1500 m and recommended a buffer of 2000 m (i.e. 2 km) for helicopter activity in vicinity of mountain goats.
- Wild sheep seem to habituate to disturbance more than goats.
- Sheep hunters in Alberta complain about helicopter harassment. There is some talk about them suing government because of this.
- 1 seismic line = 120 overflights by helicopters; a project usually will have many lines.
- When 3D work is involved – lines are spaced at 400-m intervals.
- Seismic exploration using 3D methodology is very difficult to plan for because everything is kept confidential. Sharing information is not encouraged. In Alberta, if a company wants a 6000-m deep hole, then they also want 6000-m radius area around the hole.
- In April 2000 a meeting was held to discuss ungulates and seismic activity work. A 2-km buffer around mountain goat habitats was recommended to industry/government.
 - Guidelines were circulated within the Department. Industry was consulted. Staff met

with industry and showed them the recommended guidelines (contact Kirby Smith for copy of: *Operating Guidelines for Industrial Helicopter Activity in Mountain Goat and Bighorn Sheep Ranges in Alberta.*)

- Key principles:
 - These guidelines are ok for geophysical work but make every attempt to avoid heli-portable operations if at all possible.
 - Overflights are restricted to no more than 2 flights/day
 - Apply a 2000 m 'no fly zone' around identified mountain goat and bighorn sheep range
 - Use ground-based techniques wherever possible
 - Transport geophones by backpack or horse wherever possible
 - Start after 01 July and go to 22 Aug (7 days before hunting season). This gives companies 7 weeks to work
 - Overflights to stay over 200 m above ground level above alpine areas
- Industry response: "we agree with everything but want to still use helicopters." Prognosis on effectiveness of implementation is an expectation of non-compliance. Bottom line is we will have to use the *Wildlife Act*: essentially give them a permit, and then charge them with harassment when they start work!
- Goat monitoring research is ongoing at Caw Ridge. Data regarding yearly weights, reproductive performance, numbers of goats, sex of known-age goats is collected. We use the same categories as Steve Cote did with his work. GPS transmitters on helicopters provide information on where the machine is relative to sheep and goat habitats every 5 minutes. We can then quantify disturbance.

Alberta (Jon Jorgenson)

- The problem of disturbance is recognized in Alberta. It is growing from 2 sources: commercial tourism use of helicopters and oil/gas exploration activities.
- Except for some protected areas (National Parks, Provincial Parks, etc.) where there is legislation governing landings, there is nothing to prohibit overflights or to deal with landings. We therefore have to deal with guidelines and develop these in association with industry. We have done this for some areas in the province.
- Helicopter-based tourism has rapidly increased since 1988, but is localized primarily in the Canmore area near Banff National Park.
 - Helicopter-based tourism industry started in the late 1970s.
 - Canmore heliport was built 1989. There are 7-8 helicopters based in Canmore all summer (A-stars and Bell 207s).
 - May to early September is the current operating season; about 6000 helicopter overflights occur during this period.
 - The main concern is mountain goats – we have small populations in restricted ranges. These small isolated populations are now easily accessible islands exposed to heli-hiking, heli-biking, and heli-barbecuing, among other things. Lots of people are going into goat range. There doesn't seem to be much of a concern elsewhere right now, but this could easily change as applications for other areas and for different seasons of use such as heli-skiing are increasing.

- Success currently is due to naive applicants; guidelines and education are reasonably successful, but there is a need to get and keep on top of it. The problem is that there are few legal options because wildlife management agencies have no control of airspace. There is only one case noted where an area was closed – that being during 1988 Winter Olympics and was more for security reasons during the Olympics than wildlife related issues.
- We have had meetings with helicopter companies to attempt development of voluntary guidelines. The resulting guidelines were primarily based on Steve Cote's work:
 - fly a minimum of 2000 m from occupied goat habitat; 1300 m from sheep habitat
 - identify sheep and goat seasonal and sensitive habitats (includes obtaining good data on seasonal ranges, kidding and lambing habitat areas, etc.) within the sphere of operations for helicopters. Put seasonal constraints around sensitive habitats and some year-round constraints. Kidding periods are considered critical habitats for protection.
 - these guidelines came into effect in 1999. We are now are monitoring to see how well (or if?!) they are working
- Goat populations have been reduced within areas being overflown, but we cannot conclusively say it is due to helicopter-related disturbance. Also, elk have vacated the overflown areas.

British Columbia (Bob Forbes)

- There are concerns about snowmobiles, quads, four wheelers, tracked vehicles etc., but most concerns center around helicopter tourism operations, specifically heli-hiking and heli-skiing in Southeastern British Columbia.
- The activity is growing very rapidly and it is a new realm for us, as we have never before considered the impacts and stresses of recreational activities. Past research has not focused on impacts of tourism and the many forms that tourism and recreation can take.
- Industrial helicopter operations are an issue but a lesser one.
 - In 1996 the British Columbia government implemented a backcountry use policy. Once companies had to apply for a licence, the Wildlife Branch was alerted to the number of licences being applied for and recognized that a year-round problem existed on a widespread scale. The issue is a hot topic now.
 - Companies believed they were being eco-friendly by being tourism-based and advertised themselves as such. However, they were not sensitive to sheep and goat habitats and protection needs. The Wildlife Branch tried, unsuccessfully, to educate companies about the real impacts of such activities.
 - 85% of Crown land in southeastern British Columbia is being sought by heli-hiking/heli-skiing companies.
 - When maps of heli-tourism operations were overlaid with sheep and goat population distribution maps, 'soft' correlations were observed with goat declines; however there are lots of other issues and potential impacts.
- The Wildlife Branch started a review of disturbance impacts, pulled the literature, contacted other management jurisdictions and arrived at the following common ground conclusions:
 - most jurisdictions are concerned about heli-based recreation and tourism operational impacts
 - There are no management guidelines in place in other jurisdictions

- There is little ongoing research that addresses the specifics of the issues
- Others were waiting for the Wildlife Branch to do something and said, “when you get some guidelines, let us know because we’d like to implement some guidelines too...”
- In 1997-98 the first regulatory policy and management guidelines were established based on work in Alberta by Steve Cote. These include:
 - Mountain Goats- 2000 m no-fly/no-land buffer around designated goat habitats
 - The 2000-m zone guidelines caused a fight with operators because this reduced flying areas to as little as one-quarter of the area they formerly used. This conflict led to draft guidelines to be applied to operations in 2000 that include the following:
 - Mountain Goats: 2000 m horizontal and vertical distance no fly/no land buffer around designated mountain goat habitat
 - Mountain Sheep: 1000 m horizontal and 500 m vertical distance avoidance buffer around designated sheep habitat
 - Designated goat and sheep habitat is identified by Wildlife Branch.
 - Timing restrictions for critical life cycle habitats such as lambing/kidding. Timing restrictions appear not to be nearly as controversial as avoidance restrictions.
- Many operators are illegal relative to these guidelines.

Yukon Territory (Jean Carey)

- Currently helicopter tourism use levels are incidental. The Yukon doesn’t have nearly the volume of tourism flights as southeast Alaska.
- The Yukon Department of Renewable Resources encourages helicopter access for mineral exploration so that we don’t see a greater push to build more roads. Most types of exploration activity do not require permits.
- When permits are required, we appear to have ‘won the battle’ to restrict flying near lambing cliffs 1 May – 15 June. Currently use a 1500-m setback distance, but recent research suggests that this should be increased.
- We are counting on corporate goodwill – that companies want to be seen to be doing the right thing. It is a risk management situation at this time.
- There is insufficient information and a pressing need for real data to establish adequate guidelines. In 1996 a literature review was done, a study design was developed, and a research project was initiated. Results of 2 of these studies are included in these proceedings.

Summary

It appears that the potential impact of helicopter-based commercial recreation is recognized as a management issue primarily in Canada and Alaska. It is apparent that each jurisdiction and agency is making some attempt to address the issues. There is a lack of consistency between state agencies and federal agencies within the same geographic areas although there appears to be some cooperative effort. The lack of sufficient short- and long-term research findings and true tests of existing guidelines hinders the development of solid guidelines. Guideline compliance by commercial operators is based on good faith because of the difficulties and expense of monitoring activities. Overall, compliance appears to be inadequate except where extensive cooperative efforts are made.

It appears that mountain goats are more sensitive than sheep to helicopter-supported operations. However, much is not known and the variations among populations and habitats are not well understood. To direct research and develop guidelines of merit, it is imperative that we thoroughly review what is known, determine what specific research is needed, and develop and implement conservative general guidelines and specific considerations for managers. When research yields the data, specific and adequate guidelines can be drafted to guide this expanding industry. It appears that British Columbia, Alberta, and Montana have taken great strides in establishing initial guidelines. All jurisdictions have considered the issue and can contribute to adaptive management guidelines and advance the research base from which to make valid long-term guidelines.

Comments and Discussion

Wayne Heimer (Alaska)

Dry Creek study area about 60 mi. from Denali National Park

- Helicopter tourism activity.
- High-density sheep population w/ low reproductive rate.
- Geological drilling/prospecting supported by helicopters.
- Fixed-wing aerial surveys by Alaska Dept. Fish and Game.
- Also snowmobile activity and high density wolf predation.
- No heli-skiing or heli-hiking.
- Compare demographic data from here with Dall's sheep in Denali National Park. – no differences.

Mr. Heimer suggests that biologists have to examine their assumptions and biases – we biologists don't like to see people in 'our country'

Dale Toweill (Idaho)

- They "studied sheep to death" and there is a need to evaluate the cost to the resource in order to validate our position.
- In Idaho, military ranges are good for sheep because they keep out cabins and so on.
- Should we have 'sacrifice areas' where snowmobile or heli-tourism or other activity is ok in order to have other areas 'off limits' to these activities?

Charles Jurasz (Faro, Yukon)

- There is tremendous amount of information available on this issue.
- Sound frequency is important and significant. We need to know the frequency at which a lamb responds to noise versus that which a ram responds, as they are not necessarily the same. Look at the body of literature available for marine mammals and interference frequencies.
- Need to look for the weaknesses in the models we create.
- Harassment equals taking.

Steve Gordon (British Columbia)

- Cote recommendations rejected by B.C. Forest Service.
- 500-m horizontal distance now used instead.
- 01 May to 31 October – window during which activity is allowed to occur.

- Weather precludes activity for most of the year except summer.
- Helicopter logging goes against even the recommended 500-m distances.
- B.C. is looking for a position paper from the Northern Wild Sheep and Goat Council.

Kevin Hurley (Wyoming)

- Heli tourism picking up in the Tetons but is not as bad as in other areas.
- Oil and gas activity has increased substantially over the last 5-8 years.
- Heli-portable seismic activity is the main concern.
- Recommended that this activity occur in summer so that public can see what is happening.

Glenn Erickson (Montana)

- Montana has guidelines, but they are now out of date .

Michelle Bourassa (South Dakota)

- Badlands National Park gets helicopter overflights.
- No recommendations for tourism. Companies usually fly 700-1200', using 4 flight routes.
- Has been monitoring sheep for 3 years, and has not noted any visible reaction to helicopter overflights.

Jeff Denton (Alaska)

- There seems to be a difference among populations in terms of habituation.
- In most agencies the people who make the decisions are not biologists.
- There needs to be more than just one biologist telling the decision-makers what needs to be done. Looking for interim guidelines from NWSGC to take back to his agency.
- reiterated need for NWSGC to develop guidelines and need to address those to policy makers

Jim Karpowitz (Utah)

- In the Moab area the movie industry is a bit of a problem. B.L.M is trying to control the industry a little, but movie folks then just move onto private and state lands.
- Tried to transplant some sheep adjacent to a bombing range – they were turned down.
- Disease problems attributable to disturbance-related stress? Don't know, but are concerned.

Alasdair Veitch (NWT)

- Did experimental study of effects of jet fighter and fighter/bomber low-level flights on woodland and barren-ground caribou in Labrador for 3 years. Exposed cow caribou had decreased calf survival, but mechanisms are unknown. In terms of short-term behavioral responses – low flying helicopters caused caribou to react much more than low flying military jets. Did not see movement of collared cow caribou out of flight corridors approved for military low-level flying. Has 2 papers published on the results of this experimental study. People interested should contact Alasdair and he will send reprints.

Jean Carey (Yukon)

- We need to look carefully at what any NWSGC guidelines will be based on. Need to document guidelines with research. Do we have the data to make a generalized model?

Dale Toweill (Idaho)

- We had a 10-year negotiation with Pentagon. If we spend time documenting research – industry wins. Need general guidelines for all situations and then generate specifics for each particular situation.

Kirby Smith (Alberta)

- we need a literature review initially for both sheep and goats

Wayne Heimer

- Near a semantic quagmire. What is a guideline versus what is a stipulation? Has no problem with guidelines. Stipulations lead to regulations, permits, etc.
- Gradual is better than sudden.

Don Whittaker (Washington)

- Mule deer group has a model for predation. First did a literature review to pull all the information together – lots of stuff with agencies.
- We should have someone pull all the info in this area together into a synthesis of what we currently know.

Jeff Denton

- Have a committee to synthesize this information.
- Will be putting a paper together for the proceedings of this conference

Kevin Hurley

- 3 steps:
 - capture all the information on what's going on with a literature review
 - generate some generalities that we can all agree on
 - identify research that is needed

Jean Carey

- Yukon Territory Government has sheep/disturbance literature review that was up-to-date as of 2-3 years ago. Have the same for mountain goats done by Kluane National Park.

Dale Toweill

- has some classified stuff from the Pentagon

Michelle Bourassa

- Is interested in disturbance along roads. Is anyone else interested in this?

Participants interested in being on a committee:

Michelle Bourassa

Mari Wood (BC)

Dale Towell

Jean Carey

Charles Jurasz

Kathreen Ruckstuhl (Alberta)

Lydden Polley (University of Saskatchewan)

- In the review article that this committee is planning/proposing to put together, it is imperative that it be very careful in judging the quality of the research. This is not a trivial matter.

At this point a committee was struck. Jeff Denton will coordinate things and prepare a document for proceedings.

End of Workshop