HELICOPTER SKIING
OPERATIONS AND AGENCY ADMINISTRATION

H. Peter Wingle

Abstract.—Helicopter skiing has become a small, but desired adventure sport in North America. The degree of control by the land manager varies, but operators are responsible for client safety and meeting land use permit terms. Operating plans are required on National Forest lands and are monitored. Permits can be revoked for good cause.

INTRODUCTION

Helicopter skiing is one of many adventure sports that occur on public lands of Canada and the U.S. It is possible for a helicopter to lift skiers more than a dozen times a day so they can experience skiing on undeveloped and untracked ski slopes. Unlike most sports, virtually all heliskiers are led by professional guides. The scope and arrangements for heli-skiing differ between these countries, but operations, with some administrative differences, are similar. The founder of the world's largest heli-skiing operation is attending this workshop, along with others from Canada and several states. The slides are mostly of this Canadian Mountain Holidays operation, which I am presenting today. Prior speakers have presented facts about snow and avalanche technology. This presentation is an orientation to the sport, what it is, when it started, why it attracts people, safety and operating procedures, standards developed by some of these operators, agency expectations and requirements, as well as operator responsibilities. I'll also ask you for helpful action.

It is an expensive sport and it has its addicts. For most, the quest for powder snow (fig. 2) alone can't be the driving force, because powder can be found for less money. When you consider the scenery, the mountain atmosphere and isolation, the unique terrain, the challenge of steep powder slopes, the pull of gravity which allows you to merely guide your skis instead of forcing turns, the open treed slopes and chutes, the sudden drops or the rolling pitches give you some idea of the attraction. For those who can afford it, it can also be a family sport.

Figure 1.—Helicopter skiing has two main operations, the guided part and the helicopter use. Both have unique safety management requirements.

Figure 2.—Virtually all commercial helicopter skiing operations in the U.S. and Canada are guided. Guides need special skills in order to ensure client safety.


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In British Columbia, where all of this started in earnest, it has become something very significant to the Province’s economy and very professional. Also, the Canadian operators have assumed a great deal of responsibility. Two very significant differences between the Canadians and the Americans is that they have a strong association of helicopter skiing operators which work together to improve the sport and they have the benefit of a good and well disciplined mountain guide certification program. In the U.S. we have neither.

The background for this paper came in part from experience, but more significantly from people like Lloyd Gallagher who used to run the Canadian Mountain Holidays Cariboo Mountains operation, was co-leader of the Canadian Mount Everest Expedition and now is the Alpine Specialist for the Province of Alberta’s Kananaskis Park area near Banff. I derived much of what we expect of operators on the National Forest lands here in the U.S. from the British Columbia state-of-the-art material.

Hans Gmoser, who is here for this meeting, started commercial heli-skiing in the Bugaboo Mountain area of B.C. and operated out of this small deserted logging camp. This was 1965. It took a long time to haul skiers to the slopes in early day helicopters. Business got rolling in 1968 when he built a lodge and was able to use a jet turbine-powered Allouette II, but it still took several loads. Later he switched to a 10 passenger Bell helicopter and about that time more operators got involved. Still, in the U.S., smaller ships are used and it takes several loads before a guided group is together.

There are about nine significant locations in B.C. where you can heli-ski, and up to a dozen and a half here in the U.S., depending upon the year. What happened three years ago in France is important. The environmental organizations were able to convince the Ministers to ban helicopter skiing throughout the country. Here in the U.S., it is prohibited by law in Wildernesses and may be restricted in both the National and Provincial Parks of the U.S. and Canada. The following gives you an idea of how the operation works.

A. PLANNING

1. Planning.—Before any skiing starts, a lot of planning and organization is needed. I’ll hit the highlights. An outline for an operating plan which I have as a hand-out essentially shows what the industry state-of-the-art involves. This is a condensation of that outline but it shows the major elements.

Figure 3.—OPERATING PLANS

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B. CLIENT ORIENTATION—All skiers must be given explicit instructions before being allowed to heli-ski. Briefings include:

1. Tranceiver use.—John Lawton invented the SKADI, a transceiver which we all use so we can be found in case we get buried in an avalanche. The devices are made by several manufacturers. Unfortunately, some have different frequencies but they are very effective for finding buried people who still have them on. All clients must be taught how to use them and practice before going skiing.

2. The Helicopter.—The pilot is responsible for clients using the helicopter. Clients must know why and how to do certain things. For example, they must never put skis on their shoulders because they might hit the rotor blades. They should drag them. They must know how to approach the helicopter with their skis and poles so they can be positively attached to the skids or enclosed in a basket by the guide. They must know where to stand when they get out of the helicopter and where to stand when being picked up so they won’t be hit by the ship when it lands. They must hang on to loose clothes so they won’t be drawn up into the rotor blades.

C. OPERATIONS—Guides and pilots must be familiar with the country they operate in, and have good maps and preferably photos of the ski runs. Picking a pilot that can fly in mountains during the winter safely is as important as picking a guide. The FAA has no requirements for this and is not likely to have them. It is important to know that guides should know the terrain as it appears both summer and winter so that they know what the snow is sitting on.

They should know where the suitable landing spots are, and have maps showing all of the trails that get use.

They should know and record the condition and trends in the snowpack, so they can predict conditions on the slopes. Normally this involves keeping weather information at the base, getting readings from cooperators in nearby areas, and ALSO, flying to the ski slopes before taking clients out unless they have reason to know conditions have not changed from the previous visit. Sometimes a group will fly beyond that area where current snowpack evaluation has been performed. Re-evaluation on-site may be needed.
They must have communications with other guides, the helicopter, and distant sources to be warned if condition changes warrant some special action, and their home base. There must be a backup guide and helicopter available for automatic search if a scheduled radio check is missed.

They must have emergency equipment with them and be able to handle a wide variety of situations, including evacuations and doing advanced First Aid or EMT work.

Route finding sounds basic, but can be complex when conditions change. There may have to be a variety of routes available on any run as conditions change. Glacier crevasses are an obvious problem but guides must be able to thread their way safely around them so they don't get into dead-ends.

Gullies can be a problem if snow slides off of the sides and buries a skier deep in the pack.

1. Avalanches.—Avoiding avalanches and maintaining client confidence and control is a critical job. It is a difficult task to know the snow well enough that skiers can have the fun of skiing the loose snow, yet avoid the hazardous situations. Skiing the loose sliding snow can be fun and no problem, if the location and conditions are all right. Doing this near some trees could be another matter altogether. Fatality statistics for helicopter skiing in North America indicate that about 70 percent are avalanche caused, about 20 percent are in tree wells or related accidents.

2. Client Happiness.—The brochures usually show great snow conditions in the photos but many fairly say that conditions can be less than perfect.

Likewise, all skiers may not like some kinds of tree skiing as they may detest breakable crust or wind slab. This is all part of the sport, and heli-skiers must learn to take the bad with the good.

3. Helicopter Operations.—We've had some heli-skiing helicopter crashes in Colorado for the past two years. I am not at all happy with the helicopter operations in Colorado. The FAA here in the U.S. does not check pilots out in mountainous terrain, much less winter flying conditions. In fact, these operations are becoming less regulated each year. Forest Service permitted heli-ski operations and have had several accidents in Colorado during the past two winters at high elevations—one over 13,000 feet. A pilot was landing a full load, generated a white-out condition, lacked reserve power to liftoff and drifted into the mountain. Fortunately nobody was killed. The record in the other western States at lower elevations has been much better. Pilots in Canada I know subtract one passenger for every 1,000 feet of elevation over 9,000 feet when using the Jet Ranger. In Colorado one heli-ski operator uses a helicopter capable of operating to 15,000 feet, such as the Llama. Other makes operate in Colorado as well. Last month we met with the FAA and hope to develop a safety "ADVISORY" which, though not a regulation, will provide some guidance to this type operation.

First of all, pilots should be picky about where the aircraft lands. The pilot must be satisfied that he won't be caught by an avalanche.

Special designs are fitted to the skids so the helicopter will remain balanced when it settles onto soft snow. Uneven landing spots or settling can put a narrow-skidded helicopter at an angle which precludes safe liftoff. Some operations do not allow a helicopter pilot to land at a site with passengers, until he/she has tried the landing with an empty plane. There are many potential hazards at landing spots, such as wind, uneven snow, crust, overhanging cornices or more commonly simply visibility due to dry blowing snow. Pilots should have good depth perception during landing and this is often provided by placing dark stakes at landings. The pilot approaches a landing looking at the stake or, at the pick-up point, by watching the guide. It isn't possible to watch both the clients and the guide at the same time, so it is important that skiers keep a proper distance and keep an eye on the ship. Pilot visibility at landing can almost disappear when the snow is loose. This need not be a problem if there is a marking. We feel these are needed under certain conditions.

Liftoff at any location, with a full load or otherwise, can be a problem if the area is tight with trees. Helicopters need running space in order to gain altitude, unless they have plenty of reserve power. This severely limits options for ski run selection. In some cases, trees need to be cut in order to provide safe helispots.

These have been only the highlights, of course—only a fraction of what is actually involved.

D. AGENCY ADMINISTRATION—Here, the Forest Service and BLM have the overall responsibility for all of the recreation uses on lands they administer and our laws require us to issue permits for the land use. Outfitter and guide permits are issued and permittees have an obligation to abide by the permit terms. Permits (land use authorization and performance agreement) are issued only after an Environmental Assessment is made. The use should be needed and in the public interest, lawful, etc. The methods of administration, frankly, differ among the western Forest Service Regions.

We all feel the permittee has the responsibility for the safety of the operation and the Forest Service assumes a monitoring role. In some cases it means flying and skiing with the operator in order to monitor the operation.

In Colorado, we principally rely on operating plans, on-the-ground work on guide proficiency, the safety record, word of mouth complaints about performance, etc. We don't feel we can or should spend time with every adventure sport permittee to determine if he is proficient. We don't check out kayak instructor skills, the ability of a climbing instructor to set ice screws, etc., nor have we developed a cadre of specialists who could fairly consistently and accurately assess them.
Other Regions than this Rocky Mountain Region take a more participatory role by regularly flying with the permittees. Their safety record has proven to be better, but this does not mean that we will be making a shift in the Rocky Mountain Region at this time. If permittees do not perform as they have agreed to, they may lose their permits permanently. That is a large risk on their part. If they feel our requirements are unreasonable, there is a means of negotiating something that is reasonable.

I personally feel heli-ski operators here must improve their own operations if they are to remain viable and in business.

In the United States, we have no associations of helicopter skiing guides. In Canada the associations function to help improve their operations, although they may well have some lobbying strength also. The developed ski area industry here is very effective in sharing skills and knowledge for the benefit of the entire industry. I would hope that such an alliance can be developed among guides represented here. It is unlikely that there will be an effective guide certification program in the United States in the foreseeable future so it is essential that anyone wanting to stay in the heli-ski business on the National Forest lands very long will need competent people.

The Forest Service wants successful outfitter and guide operations, as this is the only way to serve the general public. The average self-guided person can take care of him or herself for many sports, but this is not the case with helicopter skiing.

E. CONCLUSION--It is important for this group to understand what is occurring in the undeveloped areas of our forests. It is going to be even easier for the public to get access to avalanche hazard areas and perhaps even less expensive. Forecasting hazards is not a precise science and may never be. Means that can be developed to reduce the risk may only saw lives, but may make such operations more viable. There certainly are profit making reasons for improving of the state-of-the-art.

There are good reasons for commercial outfitters and guides to have good operating plans and records if they expect to attract clients and to be allowed to use someone else's land for their business. Through the monitoring processes, the Forest Service and the BLM have the responsibility to determine if outfitters and guides are meeting the terms of their agreement (permit). If they are not, they can lose the privilege of conducting business.

In any case, there is a great deal involved in helicopter skiing and this just skims the surface. No doubt you have visited with some of the people who operate these companies and if you have not, you still have time before the workshop closes. Perhaps we will be seeing some of you on the slopes this or some future winter.

During the Workshop, the Forest Service was criticized for not maintaining a strong avalanche forecasting and control presence nor keeping a strong cadre of winter sports experts. In fact, we feel we need better informed people, but fewer of them. The industry has come a long way since the Forest Service first got involved in administering safety at ski areas. In those days the operators were not always willing or capable of this. Times change. For example, while the Forest Service perfected the parachute and smokejumping, public interest has advanced the state-of-the-art. There is no reason for us to be the leaders any longer.

In the free enterprise system, the private sector is encouraged to take over roles of Government in many instances. It simply is not the Forest Service job to perform the "doing" work for companies doing business on National Forest land. It is true that the job of monitoring safety and permit requirements may become difficult if not impossible if we are unable or unwilling to maintain some high level skills and if our line managers are unwilling to share them with units having lesser workloads. The facts are that even in the old days, only the Ranger Districts and National Forests with the heavy workloads actually had the high level of skills needed and that the low volume units - though the risks may have been higher because of low operator skills - actually lacked needed skills. It is important for this group to continue to include the Forest Service, BLM and other involved agency people in meetings and to work with them so this end of the business can be kept up to par.

There are certain political realities, and reduced budgets tied to growing legal demands in new areas are a couple of them. The role of the Forest Service and other agencies will incrementally change over time, just as the capabilities and responsibilities of private companies and organizations will continue to increase in areas such as ski area development.

1984-1985 SEASON
OPERATING PLAN GUIDE FOR
HELICOPTER SKIING

Rocky Mountain Region

RECREATION SPECIAL USES (for use in the 1985 season)

Applications and Awards of Helicopter Sking

1. PROCESS

1. Receive application including statement of need.

2. Review existing management guidelines (Forest Plan, etc.) to analyze if the proposal will conform.
3. Review credentials of applicant including knowledge of the proposed area.

4. Prepare Environmental Assessment. This should address:
   a. Current Outfitter-Guide Policy
   b. Exclusive use for the area. If there is more than one applicant for one area, a prospectus should be prepared.
   c. Wildlife
   d. Conflicting Uses
   e. Other Government Agency Approvals
   f. Forest Plan
   g. Explosives

5. Statement of Need - This document should include the following instruction along with sufficient information about the applicants' credentials for an evaluation of his/her ability to operate a safe helicopter skiing program.
   a. Avalanche Hazard
      (1) Terrain identification.
      (2) Snow stability evaluation procedures and method of data accumulation and locations.
      (3) Specific outline of methods of evaluating stability of snow prior to exposing clients to avalanche terrain, utilizing decisions based on data analysis concepts.
   b. Resource Impacts
      (1) Need for and location of landing zone improvement and vegetation removal.
      (2) Need for and location of on-site improvements such as snow depth markers, reference poles, helispot markings, etc.
      (3) Flight corridors with consideration of noise as it effects wildlife habitat areas.
      (4) Other appropriate resource considerations.
      (5) Conformance with recreation opportunity spectrum objectives in Forest Plans.
   c. Safety Considerations

(1) Operations and Safety Plan
   d. Permits and Approvals from other agencies such as County, Municipal, FAA, etc.
   e. Detailed terrain and ski run records.

II. OPERATING PLAN CONTENTS AND OUTLINE
   (Permittee’s Plan)

Operating Plans may be entirely self-contained or refer to separate permittee documents. This also provides one basis for monitoring and evaluating the outfitter and guide performance.

1. Introduction
   a. Objectives of permittee and overview of operations.
   b. Clear statement of permittee responsibility for all aspects of public safety.

2. Guide Qualifications
   a. Show adequate experience and training in the following:
      (1) Advanced first aid and CPR (current).
      (2) Rescue capability - mountain rescue, avalanche rescue, beacon use.
      (3) Avalanche hazard recognition - snow pack evaluation, terrain recognition.
      (4) Skiing ability.
      (5) Helicopter safety.
      (6) Ability to effectively give directions and communicate with clients.
   b. Resumes of guides' experience and documentation to substantiate the above experience.

3. Company Organization
   a. Internal, including responsibilities.
   b. External support.
4. Snow, Climate, and Terrain
   a. Each run or area used - written description to include terrain identification name or number, characteristics, location, aspect, elevation, gradient, configuration, ground cover, and avalanche history.
   b. The above noted information is to be drawn on a 7-1/2" USGS quad map and an oblique photograph. Important avalanche run out, starting zone, and other pertinent data should be added as that information is accumulated.

5. Avalanche Forecasting
   a. Detailed procedure to be followed for evaluation of the stability of the snow pack prior to exposing clients to hazardous areas. Decisions should be based on these data.
   b. Snow pack, meteorological, and current conditions procedure should show how all available data is formulated into stability evaluations and forecasts.
   c. Records of data and procedures should be required and available to the Forest Service at all times.
   d. Process for notifying others, or receiving information (when in field or through company dispatcher) of current, significant hazard change.

6. Daily Operating Outline
   a. Go/No Go Procedure.
   b. Basis for determining need for field condition evaluation prior to taking clients to ski slopes.
   c. Client orientation - rescue procedures, rescue beacons, helicopter safety, skiing procedure - group control.
   d. Guide-Client ratio - must have one guide in front and one to perform sweep, or provide basis for deciding when a sweep guide would not be required.

7. Helicopter Operations
   a. Flight procedures.
   b. FAA regulations and requirements.
   c. Loading and unloading procedures for clients and equipment, including "fail-safe" ski and pole tie-downs.
   d. Take-off and landing sites. Basis for deciding with marking will be used at landing points.
   e. Flight paths.
   f. Procedures for posting flight plan and regular check-in with base station. Procedures for automatic check by back-up helicopter and guide if check-in is missed.
   g. Refueling.
   h. Establishing landing elevation parameters for specific helicopter used, for various or maximum loading.
   i. Pilot shall have mountain flying and landing experience in snow conditions.
   j. Helicopter landing skids shall be fitted with snow landing attachment suitable for the conditions anticipated.

8. Communications
   Provide for communication among guides, helicopter, and base station.

9. Emergency Procedure
   a. Ski accident
   b. Avalanche accident
   c. Helicopter accident

10. Emergency Equipment
    a. Type
        (1) Rescue
        (2) First aid
        (3) Client comfort
    b. Location
        (1) Helicopter
        (2) Guide packs
        (3) Base location
        (4) Back-up
    c. Personnel trained in use.

11. Advertisement
    a. Identify that operator is under Forest Service Special Use Permit authorizing use of National Forest land. Forest Service shield and National Forest name on all brochures and maps.
    b. Should clearly state the hazardous elements involved with back-country skiing.

12. Explosive Use
    The use of explosives for avalanche control and/or snow stability evaluation will consider the following:
a. Snow avalanche control programs will be limited in scope. It is not possible to control avalanches with explosives as at a ski area. Permittees must rely on the soundness of forecasts and the ability of the guides to avoid hazardous areas. After large storms, control teams could be sent out on selected runs to determine the accuracy of the forecasts. At that time, explosives could be used as an aid in determining stability within the snow pack. In general, the control philosophy is if a slope must be controlled by explosives to make it safe to ski, then it will not be skied.

b. Plan is to show how protection of private property, wildlife, other users, and forest environment is provided. Extreme care is needed.

c. All applicable regulations regarding use and storage of explosives must be followed.

III. MONITORING PLAN (Forest Service's Plan)

A good monitoring plan is one that the permittee can use in order to maintain needed internal controls. The Forest Service may not need to monitor all of these.

1. Monitor procedures to implement the safety and operating plan and other special use permit requirements.

2. Periodically review the Avalanche Forecasting Data and determine if forecasters and guides are able to and have been correctly forecasting snow hazard conditions, and if their cumulative records are complete and subject to effective analysis.

   a. Pit data
   b. Weather data
   c. Field observations

3. Guide procedures and effectiveness in controlling clients to degree needed to maintain safety standards.

4. When monitoring indicates that field problems exist requiring on-site monitoring, Forest officers may visit the site only in approved helicopters and with pilots certified by the Forest Service. Forest officers administering this use should, as a minimum, be familiar with the terrain even if fixed-wing aircraft must be utilized.