AVIATION POLICY REVIEW OF WILDLIFE AGENCIES IN CANADA

Prepared by: Yukon Department of Environment

Yukon
Environment
Environnement

October 2014

AVIATION POLICY REVIEW OF WILDLIFE AGENCIES IN CANADA

Yukon Fish and Wildlife Branch
MR-14-02

Acknowledgements

This report was compiled for the Canadian Wildlife Directors Committee.

Copies available from:
Yukon Department of Environment
Fish and Wildlife Branch, V-5A
Box 2703, Whitehorse, Yukon Y1A 2C6
Phone (867) 667-5721, Fax (867) 393-6263
Email: environmentyukon@gov.yk.ca

Also available online at www.env.gov.yk.ca

Suggested citation:
YUKON DEPARTMENT OF ENVIRONMENT. 2014. Aviation Policy Review of Wildlife Agencies in Canada. MR-14-02. Whitehorse, Yukon, Canada.

Summary

This paper reviews aviation policies that wildlife agencies in Canada use to manage risk to staff when conducting aerial-based wildlife work. The purpose of the jurisdicitonal scan is to assist those wildlife agencies interested in reviewing their air charter practices in order to manage risk and improve safety. This review includes the standards and policies of government widlife agencies from each province and territory (except Prince Edward Island and Nunavut), as well as the Canadian Wildlife Service, Ducks Unlimited Canada and the United States Fish and Wildlife Service. The review focuses on standards used during procurement of air charters, safety policies, and staff training. All safety requirements and policies described are additive to Transport Canada regulations.

Most wildlife agencies focus on pilot experience, staff training, personal protective equipment and additional aircraft safety equipment to manage risk. The criteria used in each category vary widely among agencies and reflect the conditions in which the work is being conducted. Those agencies that operate frequently in mountainous, remote terrain tend to have more stringent requirements and defined policies. Several pilot experience requirements stem from wildfire management operations, agencies who often administer contracts within organizations, and may not be well suited for wildlife surveys and captures that involve low-level flights, specialized manoeuvers, and travel in remote regions.

Wildlife agencies looking to review their aviation standards and policies to manage risk to staff during wildlife surveys and specialized activities may want to consider the following aviation safety requirements:

Considerations:

1. Minimum pilot experience criteria:
    1. **Wildlife Surveys by Rotary Wing**: 1000 minimum pilot-in-command hours for helicopters in low-level flights and at least 50hours in the same type of aircraft, 100 hours in the last 12 months, and 1000 hours in speciality terrain (if relevant);
    2. **Widlife Captures by Rotary Wing**: 2000 minimum pilot-in-command hours for helicopters in very low-level flights such as wildlife captures at least 100 hours in the same type of aircraft, 100 hours in the last 12 months, and 1000 hours in speciality terrain (if relevant); and
    3. **Wildlife Surveys by Fixed-Wing**: 1500 minimum pilot-in-command hours for fixed-wings and at least 100 experience hours in the same type of aircraft.
2. Equipment requirements for aircraft:

1. Automated flight following for all flights without a flight watch system;
2. Shoulder harnesses for all passengers and body harnesses for open-door flights; and
3. Additional survival and overwater life-support for remote flights or specified conditions.

3. Weather restrictions appropriate for region and operations.
4. Aviation safety training standards for staff:
    1. Minimum basic aviation safety training for all staff using aircraft;
    2. Hover exit and aircraft egress training for staff involved in low-level, mountainous, or open-water work;
    3. Specialty training and safety protocols for staff enganged in specialized activities, such as wildlife capture;
    4. First aid and survival training for staff in remote areas or for specified activities;
    5. Standard operating proceduces for operating in aircraft; and
    6. Training of procedures in the event of a downed aircraft.
5. Personal protective equipment requirements for staff:
    1. Use of helmets encouraged for regular operations and required for specified activities;
    2. Survival gear for remote areas or for specified activities;
    3. Safety clothing such as warm clothes and fire-retardant outfits for specified activities; and
    4. Communication devices such as satellite phones or VHS radios.

Table of contents

List of Tables

Introduction

Agencies that manage wildlife in Canada routinely employ aircraft to conduct surveys of wildlife populations and their habitats. In this paper we review the policies and practices that wildlife agencies use when conducting aerial-based work. The purpose of this review is to assist those wildlife agencies interested in reviewing their air charter policies and practices in order to manage risk and improve safety. The interest for this review stemmed from recent aircraft incidents that occurred while Canadian agencies were conducting wildlife studies. These incidents resulted in the involved agencies reviewing or modifying their requirements related to staff training and procurement for air charters. Several agencies have adopted additional measures after considering the findings from investigations by the Transportation Safety Board of Canada.

This review summarizes aviation policies and practices provided by government widlife management agencies in each province and territory (with the exception of Prince Edward Island and Nunavut), Ducks Unlimited Canada, and the Canadian Wildlife Service. We also included the United States Fish and Wildlife Service (USFWS) aviation policies for comparison. This review excludes the standard practises of commercial wildlife contractors providing aerial-based services.

The first section of this review discusses air charter standards used during procurement. This includes pilot experience, pilot duty day restrictions, required equipment, and weather restrictions (see Table 1 for a summary). The second section describes safety policies and staff training. This section includes flight watch systems, staff safety training, personal protective equipment, low-level flight operations, and special activities (see Table 2 for a summary). The third section compares how wildlife agencies operate with non-government personnel on flights. The fourth section summarizes key findings and offers some considerations for wildlife agencies interested in reviewing their policies and practices when employing air charters.

Table 1. Summary of standards specified by wildlife agencies when chartering aircraft for wildlife operations.

See Appendix 1 for a complete list of abbreviations for each wildlife agency. Please note that the table summarizes information provided by agencies and may be incomplete.

Standards	AB	BC	MB	NB	NL	NS	NT	ON	QC	SK	YT	CWS	DU	USFWS
Pilot Experience	√	√	√		√	√	√	√	√		√	√	√	√
Rotary Wing	√	√	√			√	√	√	√		√	√		√
Fixed Wing	√		√			√	√	√			√	√	√	√
Pilot Duty Day	√		√		√		√				√			√
Equipment Requirements	√	√					√				√			√
Project Related											√			
Automated Flight Following	√	√					√				√			√
Survival Gear		√					√	√						√
Heaters for Comfort/ Visibility		√												
Horsepower Ratings														√
GPS Specifications		√					√				√			
Shoulder Harnesses							√	√						√
Emergency Locator Transceiver		√					√	√						√
Fire extinguishers		√												√
Other							√	√						
Weather Restrictions	√	√	√					√		√	√		√	√
Cold	√		√					√		√	√			
Visibility		√	√											√
Wind Speed			√					√			√		√	√

Table 2. Summary of policies and practices for wildlife agencies when chartering aircraft for wildlife operations.

See Appendix 1 for a complete list of abbreviations for each wildlife agency. Please note that the table summarizes information provided by agencies and may be incomplete.

Safety Policies	AB	BC	MB	NB	NL	NS	NT	ON	QC	SK	YT	CWS	DU	USFWS
Flight Watch Systems / Automated Flight Following	√	√	√				√	√		√	√			√
Staff Safety Training*		√			√			√		√	√	√		√
Safe Work Practices								√		√		√		
Basic Aviation Safety Training		√						√		√	√			√
Hover Exit Training		√						√			√			
Emergency Egress Training											√			√
First Aid Training					√						√			
Survival Training											√			
Personal Protective Equipment	√							√		√	√	√	√	√
Medications	√									√				
Helmets	√							√			√	√	√	√
Safety Clothing								√				√	√	
Survival Kits											√	√	√	
Low-Level Flight Operation	√		√								√			√
Special Activities	√		√		√			√		√	√	√	√	√
Open-Door/Wildlife Capture	√		√		√			√			√			√
Open-Water	√										√	√	√	√
Transport Wildlife	√													
Non-Government Personnel	√		√								√			

*Staff training described specified for wildlife management operations.

Standards

Wildlife agencies use various sets of standards during procurement of air charter companies to safeguard employees. These additional measures were often adopted after considering investigations by the Transportation Safety Board of Canada. The standards discussed include high standards of experience for pilots, additional pilot duty day restrictions to avoid fatigue, introducing policies that restrict working in inclement weather, and extra safety and survival equipment.

Pilot Experience

Most wildlife agencies have pilot experience requirements above those stipulated by Transport Canada regulations, although few requirements are directly related to wildlife management activities. In many jurisdictions, wildfire management or forestry divisions administer government aviation contracts. Many of the noted pilot qualifications relate to wildfire management and are relevant to many wildlife operations (Table 1 and 2). In general, wildlife agencies use one of three approaches to specify pilot qualifications to manage risk: 1) experience requirements; 2) demonstrated competencies; or 3) requirements at the discretion of the project manager.

Most wildlife agencies use pilot experience requirements, such as minimum hours, to be eligible for contracts (Table 3 and 4). These standards of experience are additional measures that jurisdictions have adopted following Transportation Safety Board investigations in order to safeguard staff. In a safety study of visual flights into adverse weather conditions, pilots with less than 1000 hours total flying time accounted for 56% of accidents studied and many of those pilots had acquired very low annual accumulations of flying time over an extended period (Transportation Safety Board of Canada aviation safety study 90-SP002). Most agencies use 1000 pilot in command hours or more as a minimum for rotary wing pilots and several agencies require more hours for specified activities.

British Columbia and Alberta are moving towards using pilot competencies for helicopter pilots. Pilots must show competency in a series of tasks associated with wildfire management operations that were developed by the Helicopter Association of Canada. The competencies include hover exits, confined area operations, external loads, mountain flying, and low visibility flying. They do not include open-door operations, low-level capture operations, or prolonged low-level surveys, which are higher risk activities, associated with some wildlife programs. Saskatchewan and Newfoundland use the approach that pilot qualifications are at the discretion of staff. For example Saskatchewan directs staff to ensure that the pilot's experience and qualifications meet or exceed the mission's requirements prior to flight. Newfoundland does not describe specific pilot experience but has a policy stating the biologist in charge has the right to accept or reject any helicopter or pilot and has the right to request a specific helicopter and pilot. Yukon recently developed a post flight report where employees are encouraged to document the pilot's aptitude and safety management.

New Brunswick, Nova Scotia, and the USFWS employ pilots whose qualifications are set in job descriptions. The USFWS pilots are also biologists. The USFWS has a comprehensive training program established for these staff. In order to maintain professional pilot status, both staff pilots and contract pilots must have and maintain requirements detailed in Table 3 and 4.

Table 3. Helicopter pilot experience criteria by agency for wildlife surveys and captures.

Minimum Pilot in Command Experience Requirements								
Agency	**Type of Flying**	**Total Pilot Hrs**	**Total Mountain Hrs**	**Hrs in Last 12 Months**	**Hrs on Type**	**Hrs on Type in Last 12 Months**	**Other**	**Accepted Aircraft**
AB	All	1000[1]						
BC	All	1000					100 hrs on wildlife surveys	
MB	Survey	1000		200	1000	200		Bell 206B, no piston engines
	Capture	1000		200	1000	200		MD500,AStar,Bell 407, no piston engines
NS	All	2000/ 1500[2]						light and medium rotary wings (e.g. Bell 212)
NT	All	600/ 1000[3]			100		1 season of firefighting	
ON	All	500/200 (2000/ 1000)[4]			100		Un-prepared and confined areas	
QC	Survey				1000			Bell 206B, AStar 350, Bell 206L, Bell 407, no piston engine
	Capture				2000			AStar 350BA+, B2
YT	Survey	1000	1000	100	100			Bell 206, AStar 350, MD 500, Bell 407, R44
	Capture	2000	1000	100	200			Bell 206B, AStar 350,MD 500, Bell 206L, Bell 407, no piston engines
CWS	All				500 - 1000			
USFWS	All	1200	200	100	100	25		

[1] Proposed new criteria. Alberta standards are currently from Helicopter Association of Canada wildfire operations competencies.

[2] All helicopter types/ turbine helicopters.

[3] Light / intermediate operations.

[4] Multi-engine instrument flight rule / Multi-engine and single engine visual flight rule (Total flight time on multi-engine instrument flight rules / Total flight time on multi-engine and single engine visual flight rules). Pilots require flight time on type within preceding 60 days and 2 years of experience in instrument flight operations also required.

Table 4. Fixed-wing pilot experience criteria by agency for wildlife surveys.

Agency	Type of Flying	Minimum Pilot in Command Experience Requirements						Hrs Low-Level Flying
		Total Pilot Hrs	Total Mountain Hrs	Hrs in Last 12 Months	Hrs on Type	Hrs on Type in Last 12 Months	Hrs on Floats	
AB	Survey	600			200		150	
MB	Survey 500 ft AGL[5]	1500	1200	100	50	100		
	Survey 200 ft AGL	4000	1500	300	1000	150		
ON[6]	Multi-Engine IFR	500 (2000*)			100			
	Multi-Engine VFR	100 (1000*)			50			
	Single Engine IFR	500 (2000*)			100		100	
	Single VFR	50 (1000*)			50		100	
NT	Survey	1000/ 2000[7]			100		100/ 150[8]	
YT	Survey	3000	1500	300	500	150		
CWS	Survey	500 - 1000						
DU	Survey	2000						500
USFWS	Survey	1500	200	150	100	100		

[5] AGL: Above ground level

*(total flight time hours)

[6] Pilots require flight time on type within preceding 60 days and 2 years of experience in instrument flight operations also required

[7] Single/multi-engine

[8] Fixed wing / rotary wing

Pilot Duty Day

Transport Canada regulations state a pilot's duty period is 14 hours in any 24 consecutive hours. Several jurisdictions further specify duty day restrictions. Alberta, Manitoba, and USFWS restrict pilots to less than 10 hours in 24 hours (Table 5). Newfoundland requires pilots to receive a full day off from flying if more than 21 hours of capture activities occurred in the last 3 consecutive days. They also note breaks from flying are to occur daily at the discretion of the crew. The USFWS also notes a maximum of 42 duty hours in 6 consecutive days.

Table 5. Pilot duty day restrictions by wildlife agency.'

Agency	Maximum Flying Hrs/ 1 Day	Maximum Hrs/ # Consecutive Days	Minimum Hrs of Rest in 24 Hrs
AB	10		8
MB	8		10
NF		21 / 3	
USFWS	8	42 / 6	10

Required Equipment

Most jurisdictions rely on Transport Canada regulations for safety and survival equipment. Agencies also note in contracts the need for specific equipment to support the particular project needs, such as bubble windows for observers in the rear of light helicopters (Table 2). Automated flight following systems are becoming common requirements in contracted helicopters and some fixed-wing aircraft. British Columbia notes that aircraft must have functioning NAD83 GPS system and fully functioning fans and heaters for passenger comfort. Northwest Territories describes in detail requirements for survival gear, hour meters, radio equipment and rotor blade upper surface contrasting bands of colour (see Appendix 3). The USFWS stipulates horsepower ratings in addition to other required equipment (Appendix 3). Northwest Territories, Ontario and USFWS specify helicopters have shoulder harnesses for all passengers.

Weather

Several jurisdictions have policies to restrict aircraft use during cold weather, wind, and low visibility. All of these policies are additive to Transport Canada regulations. Table 6 summarizes these additional weather considerations by jurisdiction.

Ontario uses a wind chill temperature chart to consider the danger of exposure and cold to passengers. Operation at excessively low temperatures may be terminated at the pilot's discretion and -25 °C is demonstrated as minimum operating temperatures for open-door operations in consideration of wind chill effects to crew members.

Table 6. Additional weather restrictions by wildlife agency.

Agency	Temperature (°C)	Wind Chill (°C)	Wind Speed (kph)	Visibility (km)
AB	-30			
BC				1.6
MB			>50	
ON	-25 for Open-Door			
SK	-30	-43		
YT	-40		High Winds	
USFWS			65	0.8 / 3.2[9]

Safety Policy and Staff Training

A variety of policies and practises were found that relate to staff training and instruction. These come from various training standards, safety directives, and flight watch programs. Many of these were developed by wildfire management programs, and are applied broadly across government divisions. Few are specific to wildlife operations.

Flight Watch Systems

Flight watch systems are common with wildlife management operations and at times used by wildlife agencies (Table 2). The flight watch system is based upon the premise that, should an aircraft encounter difficulty and need assistance, the search area is significantly reduced if contact with the aircraft occurs every 30 minutes. Agencies with established flight watch systems generally have an overdue and downed aircraft procedures manual. British Columbia, Alberta, and Manitoba are the only agencies with specific processes and timelines in place regarding emergency protocols.

Most jurisdictions require that contracted helicopters have automated flight following systems. This technology is used with flight watch systems, and gives immediate details of an aircraft location and status. Fixed-wing operators are not always equipped with automated flight following and flight watch systems remain in place. Where flight watch systems are in place, flight watch personnel often have access to the individual aircraft automated flight following records, and monitor both simultaneously.

Not all regions have the ability to follow the entire flight due to the remoteness of the area. Alberta describes how the person initiating the flight is responsible for designating a person to be responsible for their flight itinerary and closing the flight plan. This includes providing the designated person with a departure time, flight path, planned stops, list of passengers, and return time.

[9] Rotary-wing / fixed-wing

In areas of Manitoba where flight following is not in place, flight plans must be logged with the nearest flight services centre. Flights that are conducted beyond access to repeater radio towers require 2 satellite phones and a predetermined flight itinerary filed with the regional fire centre. A check-in procedure is established in those situations.

Yukon does not have a radio system that covers the entire territory. Employees use a check-in procedure for end of day or more frequently if the situation warrants. In cold weather employees are encouraged to track their locations on personal satellite messengers (SPOT messengers).

Staff Safety Training

As a requirement of Transport Canada regulations, the pilot is responsible to ensure that all passengers are provided a full safety briefing prior to each flight. Several agencies have safe work practises in place for rotary and fixed-wing flights and indicate training requirements (Table 2). Ontario, Yukon, and Saskatchewan have stand-alone aviation safety training standards (Appendix 4). Additional training generally includes basic aviation safety, hover exits, and emergency egress training (including how to exit a downed aircraft while underwater). First aid training is noted or implied for those personnel with a field duty component in their work. A few agencies also include references to winter and summer survival training.

The USFWS has very comprehensive aircraft passenger training requirements. These specify thorough courses such as aviation safety, ditching techniques, over-water safety, use of personal protective equipment, use of oxygen at high altitudes, and how to land fixed-wing aircraft in the event the pilot is incapacitated. Managers are trained in risk management and awareness, human factors in aviation, aviation policy and regulations, and personal responsibility and liability.

Personal Protective Equipment

Most agencies have policies that require passengers traveling in remote areas to wear the appropriate clothing and footwear in the event of a forced landing (Table 2). Alberta notes that based on the nature of the activity, environment and assessed risks, individuals shall be attired to spend a minimum of 24 hours in the bush. Canadian Wildlife Service encourages staff to wear flame retardant clothing and flight helmets for helicopter travel (Table 2). Few agencies require that their employees use helmets. Ducks Unlimited Canada has a policy for the use of helmets, Nomex flight suits, personal floatation devices, and on-person fanny pack survival kits. Yukon also has a directive to staff on the use of flight helmets for helicopter work, requiring the use of these during capture operations, and encouraging their use for all other operations. Ontario requires staff to wear helmets for capture work. Alberta

staff also use flight helmets. Alberta requires any person on prescribed medication to ensure they have sufficient medication on their person for 3 days. Saskatchewan requires a 7 day supply.

Low-Level Flight Operations

Few agencies have policies for additional aviation safety requirements for passengers working in low-level flying operations (Table 2). Alberta, Manitoba, Ontario and USFWS have additional safety requirements for flights below 500 ft above ground level; whereas Yukon defines 200 ft above ground level as low-level flying. Many of these agencies have higher minimum pilot hour requirements for these flight contracts. For example, Manitoba required 4000 pilot hours for fixed-wing flying under 200 ft above ground level (Table 4). USFWS requires pilots to have 200 hours low-level flying experience plus 10 hours instruction and a pre-flight inspection for competency. Yukon has several classifications of flying type that describe during flights less 200 ft above ground level pilots must have between 1000 to 4000 total pilot in command hours (Appendix 2).

Alberta has the most comprehensive requirements and considerations for low-level flight operations. Low-level flights are to be avoided in built-up areas of communities. If rotary wings need to operate below 300 ft above ground level they must meet the criteria listed in Table 7. Fixed wings must operate above 300 ft above ground level and meet the criteria listed in Table 7.

Table 7. Low-level flight considerations by Alberta.

Low-level Flying in Rotary Wings
• Only essential crew • Over-water safety briefings must include egress and ditching procedures • Cut-off at winds less than 75km/hr sustained and less than 30km/hr gusts above sustained • Task hazard analysis completed to determine need for additional safety equipment • Power check conducted by pilot before going low-level to ensure sufficient torque to remain in a hover for 5 minutes without exceeding torque and temperature limits and maintain tail rotor authority
Low-Level Flying in Fixed Wings
• With the exception of a wings level pass, the flight profile shall remain at an altitude of at least 300ft AGL • The maximum angle of bank while operating below 500ft AGL shall be 30 degrees • Other than take offs and landings, at no time shall the flight profile go below the adjacent tree canopy • In level flight, the indicated forward airspeed must not drop below 1.3 times the configured stall speed. If the aircraft will be in a turn, the airspeed must be maintained at 1.5 times the stall speed or higher

Special Activities

A few wildlife agencies have policies for staff involved in specialized flying activities such as wildlife capture, over-water work, and the transport of wildlife. In Saskatchewan, specialty aviation operations require joint pre-mission briefing sessions with flight crew and employees are required to review standard operating procedure documents.

Wildlife Capture/Open-Door Activities

Wildlife capture work is a complex task that involves an open door or window, often with a technician partially out of the helicopter, the use of projectiles (net-guns or darts), and very close manoeuvring to the targeted animals. Manoeuvers in these conditions are technical and require pilots to be aware of obstacles, ground distance, animal location, and shooter requirements.

Yukon and Quebec require more stringent pilot minimum hour requirements for open-door capture operations (2000 pilot in command hours) (Table 8). Ontario, which contracts wildlife captures and surveys, occasionally requires more than the minimum requirements listed in Table 4 and 8 (e.g. 4000 pilot in command hours and 200 hours on type and net-gunners with 5 years' experience and 500 ungulates). Several agencies also specify accepted aircraft. Most agencies have body harnesses specifications and Yukon and Ontario require that staff wear helmets. Newfoundland, Yukon, and Ontario

describe staff training requirements, which include first aid, chemical immobilization, basic aviation safety, hover exits, aviation egress, firearm safety, physical fitness, and practical experience.

In recognition that not all pilots with minimum hour requirements are well suited for capture work, Yukon began using a pre-qualified source list where pilots demonstrate competency. In order to be pre-qualified, a company and pilot must demonstrate experience in wildlife capture or be assessed for their aptitude by conducting a series of manoeuvers that are assessed by wildlife technicians and experienced capture pilots. By using this approach, pilots are familiar with the tasks needed for successful completion of the project.

Over-Water Activities

Alberta, Yukon, Ducks Unlimited Canada, and the Canadian Wildlife Service describe considerations for over-water flights. Alberta, Ontario and Northwest Territories require a minimum 100 to 150 pilot in command hours on floats. Both Alberta and Canadian Wildlife Service require that all passengers have floatation devices. Alberta also requires floatation kits, sufficient altitude for inflation of the floatation kits, and that long flights over water have air to ground communications. Ducks Unlimited Canada notes that pilots must always have line of sight to shore, altitude reference on flat water and be at an angle to be able to auto-rotate or glide to shore if without floats. Canadian Wildlife Service also requires that pilots have experience over water including familiarity with protocols for working over glassy conditions. Yukon requires staff that use float planes or regularly fly over water to have aviation egress training.

Transport of Wildlife Activities

Alberta describes requirements for the transport of wildlife. Department employees are considered essential crew if they are required to monitor the condition of an animal during flight or to facilitate its release.

Table 8. Additional requirements for open-door and capture flying operations by agency.

Topic	Additional Requirements	Agency
Pilot Experience	• 2000 total pilot hours and 200 hours on type, pre-qualified list of pilots who demonstrated competency	YT USFWS
	• 200 pilot hours in low-level flying, 50 hours aerial capture flying within last 12 months, 10 pilot hours with make/model	QC ON
	• 2000 pilot hours on type	
	• Pilots for net-gunning operations are trained in capture flying techniques, hover exit, annual animal capture exam with extensive flying experience in low-level winter operations and familiar with terrain in the area. Experience in animal darting programs an asset. Experience includes training exercise with practice target towed by snow machine.	
Staff Training	• 2 members of capture team must have current first aid, CPR, and chemical immobilization training	NL
	• Dart-gunner and Net-gunners must have captured >30 animals (85% efficiency)	NL
	• Net-gunner has >5 years front seat navigation on caribou composition surveys, net-gunning training including safety harness, aircraft position, pad safety, practice firing	YT
	• Dart-gunner must have experience in >3 capture projects and dart-gunning training including chemical immobilization, safety harness, aircraft position, pad safety, practice firing	YT
	• Mandatory wilderness first aid, basic aviation safety, hover exit, and aviation egress training to all passengers (chemical immobilization training also required for any immobilization operations)	YT
	• Net-gunners have helicopter safety training including hover exits, trained in net-gun capture, firearms safety and experience with high power rifles; physical fitness and ability to handle helicopter rides without becoming uncomfortable.	ON
	• Net-gunners have mandatory initial training and practice training for crew that includes exercise with practice targets towed by snow machine. Mandatory if more than 12 months have elapsed since previous training or capture project.	ON
Required Equipment	• Accepted aircraft are Hughes 500, A-Star, Bell 407	MB
	• Accepted aircraft are MD500, A-Star 350, Bell 407, Bell 206, Bell 206L	YT
	• Accepted aircraft mentioned are A-Star350B and EC130 B4	ON
	• Horsepower requirements	USFWS
	• A-Star preferred over Long Ranger for net-gunning	NL
	• Shoulder-harness restraints (fixed-wing)	USFWS
	• Body harness and restraints (rotary-wing)	AB, ON,
	• Day of flying inspection of body harness and restraint	USFWS, YT
	• Mandatory use of helmets	AB ON, YT
Chemical Immobilization	• 2 members of capture team must have knowledge of counter measures in the event of human drug exposure	NL
	• Wear rubber gloves	NL
	• Biologist in charge must provide emergency plan to hospital prior to capture work and have drug exposure kit on board	NL
	• During capture operations, an biologist experienced in field immobilization of the species will accompany the operation	YT
Firearms	• Staff must meet criteria for firearms for chemical immobilization and net-gunning	NL, YT
Weather	• < 30 km/hr winds during precipitation and over rough terrain	NL

Other Considerations

Non-government personnel in aircraft

Few agencies have policies in place regarding safety or training requirements for passengers on wildlife-related flights who are not employees. Alberta, Manitoba, and Yukon specify that passengers must be approved by the agency. Alberta requires program managers to approve contractors on flights if they are associated with departmental work and have workers compensation board coverage. Passengers without coverage are allowed with the approval of the program manager, a signed waiver, and if the flight duration is less than 15 minutes.

Manitoba has operational guidelines for personnel using aircraft. All flying must be authorized by an employee. Passengers must receive a safety briefing. The transport of any passenger not acting in an official capacity of the government must receive prior approval. Other people may also be transported in an aircraft when it is essential to their safety, such as emergency evacuations or rescues.

Yukon describes the participation of non-government people in wildlife surveys and other flights based on the type of flight. Non-Yukon government individuals may participate in wildlife surveys provided they have current basic aviation safety training. To participate in wildlife capture operations, non-Yukon government individuals must have basic aviation safety, hover exit, aviation egress, wilderness first aid, and previous experience. Non-government people must also receive an orientation by the project lead on expectations during the course of the flight and pad side safety briefings from pilots prior to their participation.

Conclusion and Considerations

The standards and policies that wildlife agencies in Canada use to manage risk for aerial-based wildlife work center on pilot experience, staff training, personal protective equipment and additional aircraft safety equipment. These criteria vary widely among agencies and reflect the conditions in which the work is being conducted. Those agencies that operate frequently in mountainous, remote terrain tend to have more stringent requirements and defined policies. A common theme among agencies is that most wildlife surveys and captures occur in remote areas where crews must address incidents before help arrives. Wildlife surveys also compose the bulk of the aerial work, which involves prolonged low-level flights, multiple turns and other manoeuvers that are not normal practise in the aviation industry. Pilot experience and staff training and experience are key aspects of safe project execution.

Pilot experience and aptitude, basic aviation safety training and additional staff training for specialized activities stand out as foundations for

continued successful operations. A common standard for staff training, required equipment, and pilot experience or competency would help wildlife agencies manage risk during aerial operations. Aviation policies used by wildlife agencies are generally based from wildfire management and some key differences exist between wildfire and wildlife operations. Wildlife operation crews work during many specialized operations, such as low-level surveys and captures whereas wildfire management crews typically use aircraft to mobilize crews. In order to mitigate risk to staff, fire management agencies are increasingly looking to competency systems for pilots. Given the amount of low-level and specialized work inherent with wildlife surveys and captures, a similar approach may be warranted.

Most agencies require minimum pilot hours or demonstrated competency. In general, helicopter pilots are required to have 1000 in command hours or more for general, prolonged low-level wildlife surveys and 50 hours to type or within the last 12 months. Similar hourly experience requirements are used for fixed-wing pilots. Agencies that specify pilots hours for wildlife captures typically use 2000 hours, 200 hours on type and 100 hours in the last 12 months. Not every helicopter pilot with 2000 hours experience may have the aptitude and a competency test may be necessary for those pilots without previous experience in wildlife captures.

Staff training in essential aviation safety is noted by some agencies. A basic aircraft safety course is a recommended standard of practise given that operations can involve long hours, working around aircraft at idle, remote fueling, and entering and exiting under power. Veteran staff can also benefit from updates provided in basic safety training. Hover exit training is an additional consideration, particularly for capture crews, given the risk associated with this kind of activity. Aircraft egress training is another valuable addition to aircraft safety training for staff regularly flying over water. These three safety courses are the most common currently employed by a variety of agencies, although not every agency notes all three as standard requirements. First aid and survival training may also be essential given the remote nature of some operations. Specialized activities such as wildlife capture require those involved to have demonstrable higher levels of experience in working in aircraft and specific training. Training in standard operating procedures and protocols in the event of an emergency would also be beneficial.

Many wildlife agencies require additional equipment for staff and air charters; however there is no consistency about the type of equipment among agencies. Equipment designed to reduce the consequences of an incident, such as helmets, shoulder harnesses, automated flight following equipment, specified survival equipment, and communication devices such as a satellite phone, are required by only a handful of agencies.

Based on this review, wildlife agencies looking to review their aviation standards and policies may want to consider the following.

Considerations:

1. Minimum pilot experience criteria:
    1. **Wildlife Surveys by Rotary Wing**: 1000 minimum pilot-in-command hours for helicopters in low-level flights and at least 50 hours in the same type of aircraft, 100 hours in the last 12 months, and 1000 hours in speciality terrain (if relevant);
    2. **Widlife Captures by Rotary Wing**: 2000 minimum pilot-in-command hours for helicopters in very low-level flights such as wildlife captures at least 100 hours in the same type of aircraft, 100 hours in the last 12 months, and 1000 hours in speciality terrain (if relevant); and
    3. **Wildlife Surveys by Fixed-Wing**: 1500 minimum pilot-in-command hours for fixed-wings and at least 100 experience hours in the same type of aircraft.
2. Equipment requirements for aircraft:
    1. Automated flight following for all flights without a flight watch system;
    2. Shoulder harnesses for all passengers and body harnesses for open-door flights; and
    3. Additional survival and overwater life-support for remote flights or specified conditions.
3. Weather restrictions appropriate for region and operations.
4. Aviation safety training standards for staff:
    1. Minimum basic aviation safety training for all staff using aircraft;
    2. Hover exit and aircraft egress training for staff involved in low-level, mountainous, or open-water work;
    3. Specialty training and safety protocols for staff enganged in specialized activities, such as wildlife capture;
    4. First aid and survival training for staff in remote areas or for specified activities;
    5. Standard operating proceduces for operating in aircraft; and
    6. Training of procedures in the event of a downed aircraft.
5. Personal protective equipment requirements for staff:
    1. Use of helmets encouraged for regular operations and required for specified activities;
    2. Survival gear for remote areas or for specified activities;
    3. Safety clothing such as warm clothes and fire-retardant outfits for specified activities; and
    4. Communication devices such as satellite phones or VHS radios.

Appendix 1 List of Wildlife Agencies

Abbreviation	Wildlife Agency
AB	Alberta Fish and Wildlife Branch
BC	British Columbia Fish, Wildlife and Habitat Management Branch
MB	Manitoba Conservation and Water Stewardship Wildlife Branch
NB	New Brunswick Fish and Wildlife Branch
NL	Newfoundland and Labrador Wildlife Division
NS	Nova Scotia Wildlife Division
NT	Northwest Territories Environment and Natural Resources
ON	Ontario Fish and Wildlife Management Branch
PE	Prince Edward Island Forests, Fish and Wildlife Division
QC	Québec Direction Générale de la Faune
SK	Saskatchewan Fish and Wildlife Branch
YT	Yukon Fish and Wildlife Branch
CWS	Canadian Wildlife Service
DU	Ducks Unlimited Canada
USFWS	United States Fish and Wildlife Service

Appendix 2 Pilot Qualifications

Yukon rotary wing pilot qualifications for wildlife survey and capture.

Type of Flying Required	**CLASS I**	**CLASS II**	**CLASS III***
Duty or Operational Functions	Mostly above 200' AGL Examples: Radio Telemetry relocation with no visual locations Specimen Collection Transport of passengers from location to location – not often requiring confined space landing/toe-in	Mostly under 200' AGL Examples: Prolonged low level flying (ex: large mammal survey) Confined space flying (e.g. raptor survey) Snow Tracking Radio Telemetry relocation requiring visual identification Repetitive confined space landings and/or toe-in	Mostly under 25' AGL Examples: Low Level Pursuit, Mustering, Marking or Live Capture of large mammals (net gunning, darting/immobilizing, marking) Lethal control **
Min. Total Time	600/800 hours (light/ intermediate)	1000 Hours	2000 Hours
Min. Total Mountain	150 hours	1000 Hours	1000 Hours
Min. Total Last 12 Mos.	100 hours	100 Hours	100 Hours
Min. Total on Type	50 hours	100 Hours	200 Hours ***
Min. Hours in Class (light or intermediate)	100 hours	100 hours	200 hours
Aircraft Types	Bell 206 MD 500 AS 350 Bell 407 Consider R44 project by project.	Bell 206 AS 350 MD 500 Bell 407 Consider R44 project by project.	Bell 206 B AS 350 Consider - MD 500 and Bell 206L and 407 project by project. No piston engine helicopters.

* Must be listed as "pre – qualified". See pre qualifications criteria

** Pre qualifications may be exempted by order of a conservation Officer to address circumstances

*** Must have 200 hours on make & model (including variants)

Yukon Fixed Wing Pilot Qualifications for wildlife survey.

TYPE OF FLYING REQUIRED	**CLASS I**	**CLASS II**	**CLASS III**	**CLASS IV**	**CLASS V**	**CLASS VI**
DUTY, OR OPERATIONAL FUNCTIONS (1997)	Non passenger fuel and freight hauls	Passenger(s) mostly above 3000' AGL, broad geographic telemetry with no visuals. Location transport of passengers from location to location (examples- crew change, moving staff from field camps to various locations).	Passenger(s) mostly above 500' AGL in non-mountainous terrain (examples- Waterfowl surveys, and broad range large animal distribution in open habitats).	Passenger(s) mostly under 500' AGL in various terrain types. Prolonged low level transects or contour flying (examples- Moose and Caribou stratification and distribution surveys, telemetry requiring visuals of small species or of large species in heavy cover.	Passenger(s) mostly under 200' AGL in various terrain types, prolonged low level transects of contour flying, low level circling (examples- wildlife classification moose, composition counts, sheep surveys, telemetry requiring visuals of large or small species in heavy cover, den site locations).	Passenger(s) mostly under 200' AGL in various terrain types searching for and prolonged following of tracks (wolf and other species examples- wolf surveys and population estimates based on snow tracking).
MIN. TOTAL TIME	1000 HRS.	1500 HRS.	1500 HRS.	2500 HRS.	3000 HRS.	4000 HRS.
MIN. TOTAL MTN.	100 HRS	100 HRS	250 HRS	1000 HRS.	1500 HRS.	1500 HRS.
MIN. TOTAL LAST 12 MOS.	250 HRS	250 HRS	300 HRS.	300 HRS	300 HRS	300 HRS
MIN. TOTAL ON TYPE	50 HRS	100 HRS	100 HRS	300 HRS	500 HRS.	1000 HRS.
MIN. ON TYPE LAST 12 MOS	50 HRS.	100 HRS.	100 HRS.	150 HRS.	150 HRS.	150 HRS.
AIRCRAFT TYPES	Suitable fixed wing A/C including but not limited to: HS748, DC3, Beech 99, King Air 200, Navajo Chieftain, C-185, 205, 206, 207, and 337; Maule M5 and M7; Pilatus Porter; Single Otter,	C-185, 205, 206, 207, and 337; Maule M5 and M7; PA-18-150, Pilatus Porter, As per job requirements. .	C-185, 205, 206, 207 and 337, Maule M5 and M7; PA-18-150, Pilatus Porter; As per job requirements. .	C –STOL- 185, 205,206,207; Maule M7; PA-18-150; Pilatus Porter; As per job requirements.	Maule M7; PA-18-150	Maule M7, PA-18-150 Not min. Wolf/ Equiv. 300 hrs. But lesser time can be accepted with proven extensive track record of successful and safe very low flying ops.

Manitoba Rotary Wing Pilot Requirements for wildlife survey and capture.

Duty or Operational Functions	**Surveys Specimen Collection Radio Telemetry Relocations (Moose, Elk, White-tailed Deer, Caribou)**	**Low Level Pursuit and Live Capture, Net Gunning Caribou (Wolf, Elk, White-tailed Deer, Moose)**
Min. Total Time	1000 Hrs.	1000 Hrs
Min. Total Last 12 Mos.	200 Hrs.	200 Hrs.
Min. Total on Type	1000 Hrs.	1000 Hrs.
Min. on Type Last 12 Mos.	200 Hrs.	200 Hrs.
Aircraft Types	Bell 206 B (No piston engine helicopters)	Hughes 500/A-Star/Bell 407 (No piston engine helicopters)

Manitoba Fixed Wing Pilot Qualifications for wildlife survey.

Duty or Operational Functions	**Passenger(s) mostly under 500 AGL in various terrain types. Prolonged, low level transects or contour flying (examples- Moose, Elk, White-tailed deer, and Caribou Stratifications; and Distribution Surveys, telemetry requiring visuals of small species or of large species in large heavy coverage).**	**Passenger(s) mostly under 200 AGL in various terrain types. Searching for, and prolonged following of tracks (examples- Wolf survey, and population estimates based on snow tracking).**
Min. Total Time	1500 HRS.	4000 HRS.
Min. Total Mtn.	1200 HRS	1500 HRS.
Min. Total Last 12 Mos.	100 HRS.	300 HRS.
Min. Total on Type	50 HRS	1000 HRS.
Min. on Type Last 12 Mos.	100 HRS.	150 HRS.
Aircraft Types	C337, Partenavia, Otter, C185 STOL, C205 STOL, C206 STOL, C207 STOL, As per job requirements	Maul M7, PA-18-150 Not: MIN. Wolf/ Equiv. 300 Hrs. But some lesser time can be accepted with proven extensive track record of successful and safe very low flying ops.

Appendix 3 Aircraft and Equipment Requirements

Northwest Territories

Aircraft contracts for NT state specific equipment requirements. Below is a list of the noted equipment to be available. This applies to all aircraft contracts for GNWT.

- Two (2) sets of barrel slings and two (2) cargo nets with lanyards; each set of slings to be capable to handle the sling capacity of the aircraft.
- Main rotor upper surfaces to be painted with contrasting bands.
- White or red strobe lights visible from all directions.
- An hour metre activated by either the collective or transmission oil pressure.
- Cargo restraint nets sufficient to secure cargo in compliance with Transport Canada Regulations.
- Survival equipment specified for flight in sparsely settled areas.
- Shoulder harnesses are mandatory for front seat positions and rear seat positions.
- Cargo securing equipment for rated capacity of the aircraft.
- Inertia reel harnesses are preferred for side facing positions.
- A twelve (12) volt accessory outlet for GNWT owned peripherals is preferred.
- Portable refuelling equipment is required.
- Dual controls must be removed when carrying passengers.
- Radio/Navigation equipment (minimum requirements):
    - One VHF-AM Transceiver; 50 kHz spacing.
    - One VHF-FM transceiver with a frequency range of 150 to 174 MHz with a control head provision for 20 pilot-programmable, pre-set simplex and semi-duplex channels and pilot programmable guard frequencies or scanning capabilities. Northern Airborne Technology (NAT) Tac Com CH-201 control head, Wulfsberg C-5000 control head and Technisonic TFM-138 transceiver or equivalent will meet these requirements. Alternate options of installing two VHF-FM transceivers each with a frequency range of 150 to 174 MHz, which can be programmed individually and monitored simultaneously and continuously, will also be acceptable. The maximum hi/low power setting on any FM radio will not exceed ten (10) watts.
- A satellite telephone system or equivalent, wired through aircraft audio panel, with external antenna is preferred. Provision for operation of all radios and intercom through headset boom microphones by both pilot and passenger occupying front seat.
- One intercom:
    - Medium aircraft - front and three rear seats, with headsets and boom microphones.

    - Light/intermediate aircraft - front and all rear seat positions with headsets and boom microphones.
- Unserviceable radio equipment and accessories are to be considered as rendering the aircraft unserviceable for operational use.
- One installed Global Positioning System (GPS) Receiver.
- One Emergency Locator Transmitter (ELT). All aircraft must be equipped with a serviceable 406 MHZ Emergency Locator Transmitter (ELT). An unserviceable ELT will render the aircraft unserviceable for operational use.
- It is preferred that all aircraft provided by the Contractor have a "Mode C" Transponder
- It is preferred that all aircraft provided by the Contractor have an Iridium-based AFF system providing voice communications and data management/transfer, with the tracking data made available to Forest Management while under hire. Data management/transfer should meet the Canadian and United States requirements.
- All aircraft must be equipped with a serviceable 406 MHZ Emergency Locator Transmitter (ELT).

USFWS

Aircraft requirements for fixed-wing aircraft and helicopter speak to performance capabilities that must be sufficient to accomplish the mission considering altitude and load to be carried. Aircraft must be equipped with Government Satellite AFF Equipment, or commercial Spidertracks ® flight following.

Required aircraft capabilities:

- A four-place (seat) fixed-wing should have a minimum of 200 sea level rated horsepower for any low-level operations in mountainous terrain (180 if the engine is turbocharged or STOL certified).
- A two-place (seat) fixed-wing should have a minimum of 150 sea level horsepower.
- All helicopters shall have a minimum seating for a pilot and 2 passengers.
- A turbine-powered helicopter shall have a minimum of 400 shaft horsepower.
- A piston, normally aspirated powered helicopter shall have a minimum of 300 shaft horsepower (260 if turbocharged).

Appendix 4 Yukon Fish and Wildlife Branch – Aviation Safety Training Standard (Draft)

Aviation Safety Training

The Department of Environment is committed to providing a safe worksite to all employees. As such, aviation safety training is required for employees who use helicopters and small fixed-wing aircraft as a normal part of their work.

Aviation Safety training, as described in the Field Worker Safety Program, consists of:

- Basic Aviation Safety - 1/2 day classroom instruction on safety principles and practises
- Hover Exit - 1/2 day practical instruction on entry/exits of helicopters under power
- Aviation Egress - 1 day combined classroom and pool session for egress from aircraft after an incident

Certification lasts 5 years. In order to ensure safe practises are followed, more frequent completion may be considered.

ENV conducts a variety of aerial operations using both helicopter and fixed-wing aircraft. Classes of flying operations were developed to reflect level of associated risk for flights. See Appendix A & B – Classes of Flight Operations. Training for employees varies, depending on the Class of flights they will be involved with. Employees must be current in the described courses and meet other criteria to be eligible to participate. All passengers on a flight must receive pad-side safety briefing from the pilot before a flight commences.

Training Requirements – ENV employees

Class I helicopter/Class II - III fixed-wing flights

- No additional aviation safety training is required

Class II helicopter/Class IV fixed-wing flights

- Basic Aviation Safety and Hover Exit training
- Standard First Aid

Class III helicopter/Class V or VI fixed-wing flights

- Basic Aviation Safety, Hover Exit, and Aviation Egress training
- Previous experience working in aircraft
- Wilderness First Aid

Specialized Training

Float plane and flying over water

- ENV employees who regularly use float planes or regularly fly over water – regardless of the class of flying – also require the Aviation Egress training.

Winter operations

- ENV Employees annually involved in winter flying operations are encouraged to take winter survival training.

Wildlife Capture Operations

- Additional specific experience and training are required to conduct aerial darting/net gunning.
- Certain skills and safety training occur on the job while conducting various operations. Experienced net-gunners and dart-gunners who have more than 5 years of experience in leading these operations may train a selected candidate for these kinds of operations.

  Net-gun operations**:**

  Candidate selection

  - Relevance to the caribou program (i.e. Regional or Species program position).
  - Candidate must have >5 years operational experience in front seat navigation for caribou composition counts.
  - Candidate must have front seat experience during net-gun capture operations (3 or more capture projects).

  Instruction

  - Candidate will be instructed on procedures, safety and likely scenarios by an experienced net-gunner and capture pilot prior to net-gun operations. This includes an enhanced pad side safety briefing from the pilot, with a focus on safety harness attachment and release mechanisms, caribou/aircraft positioning considerations, communication expectations, and positioning of the aircraft.
  - Instruction will include firing equipment on the ground and from the helicopter at a practise area before attempting a live animal capture.
  - During capture operations, an experienced net-gunner will front-seat the operation.
  - Over the course of several captures, a person who demonstrates proficiency and capability with all the methods and considerations of this work may be deemed, by the experienced net-gunner, ready to lead capture operations.

  Aerial Darting/Immobilization Operations

  Candidate Selection

- Relevance of position to the planned species to be immobilized.
- Candidate must have current certification in Chemical Immobilization of Wildlife.
- Candidate must have experience in aerial darting operations (3 or more capture projects).

Instruction

- Candidate will be instructed on procedures, safety and likely scenarios by experienced species biologists, veterinarian, and capture pilot prior to operations. This includes an enhanced pad side safety briefing from the pilot, with a focus on safety harness attachment and release mechanisms, animal/aircraft positioning considerations, and communication expectations.
- Instruction will include firing equipment on the ground and from a helicopter at practise targets before attempting wildlife immobilization from the air.
- During capture operations, a biologist who is experienced in field immobilizations of the species will accompany the operation.
- Over the course of several captures, a person who demonstrates proficiency and capability with all the methods and considerations of this work may be deemed an experienced dart-gunner.

Non-Departmental people in aircraft

- Participants who are directly involved with Departmental projects may accompany ENV employees on flights.
- Participants must be current in the described courses and meet other criteria to be eligible to participate.
- Project lead must provide an orientation on the expectations of the participants during the course of the flight.
- All passengers on a flight must receive pad-side safety briefing from the pilot before a flight commences.

Training Requirements – Non Departmental passengers

Class I helicopter/Class II - III fixed-wing flights

- No additional aviation safety training is required

Class II helicopter/Class IV fixed-wing flights

- Basic Aviation Safety

Class III helicopter/Class V or VI fixed-wing flight

- Basic Aviation Safety, Hover Exit, and Aviation Egress training
- Previous experience working in aircraft
- Wilderness First Aid

Appendix A - Helicopter Flight – Class of Flying Activity (Yukon Standard)

Type of Flying	DUTY, OR OPERATIONAL FUNCTIONS
CLASS I	**Mostly above 200' AGL** Examples: - Radio Telemetry relocation with no visual locations - Specimen Collection - Transport of passengers from location to location – not often requiring confined space landing
CLASS II	**Mostly under 200' AGL** Examples: - Prolonged low level flying (ex: large mammal survey-moose) - Confined space flying (e.g. raptor survey) - Snow Tracking - Radio Telemetry relocation requiring visual identification - Repetitive confined space landings and/or toe-in
CLASS III	**Mostly under 25' AGL** Examples: - Low Level Pursuit related to marking or capture of large mammals (net-gunning, darting) - Open door sampling while under power - Lethal control **NOTE:** - must be flown by a pre-qualified pilot for Class III operations

Use of Flight Helmets Directive applies to all Classes of Helicopter flights, with particular focus on class III

Appendix B - Fixed-Wing Flight – Class of Flying Activity

Type of Flying	DUTY, OR OPERATIONAL FUNCTIONS
CLASS I	**Non-passenger fuel & freight hauls**
CLASS II	**Passenger(s), mostly above 3000' agl**, - broad geographic telemetry with no visual locations - Transport of passengers from location to location (examples: crew changes, staffing of field camps and charters to various locations).
CLASS III	**Passenger(s), mostly above 500' agl** - non-mountainous terrain (examples: waterfowl surveys and broad range large animal distribution in open habitats).
CLASS IV	**Passenger(s), mostly under 500' agl** - various terrain types. - Prolonged, low level transects or contour flying (examples: moose and caribou stratification and distribution surveys, telemetry requiring visuals of small species or of large species in heavy cover)
CLASS V	**Passenger(s), mostly under 200' agl** - various terrain types, prolonged low level transects of contour flying. - Low level circling (examples: wildlife classification, moose composition counts, sheep surveys, telemetry requiring visuals of large or small species, in heavy cover, den site locations).
CLASS VI	**Passenger(s), mostly under 200' agl** - in various terrain types. - Searching for, and prolonged following of tracks (wolf and other species) (examples: wolf survey and population estimates based on snow tracking).