



MINASKUAT LIMITED PARTNERSHIP

**DRAFT REPORT**

**BASELINE MONITORING OF**

**GOLDEN EAGLE (*Aquila chrysaetos*)**

**IN THE LLTA**

MIN0440  
2007



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**PROJECT NO. MIN0440**

**DRAFT REPORT TO**

**INSTITUTE FOR ENVIRONMENTAL MONITORING AND RESEARCH**

**REGARDING**

**BASELINE MONITORING OF  
GOLDEN EAGLE (*Aquila chrysaetos*)  
IN THE LLTA**

**November 2007**

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## GLOSSARY

Active Nest	One in which eggs or young are observed or suspected and/or where the associated adults exhibit aggressive behaviour.
CYA 731	refer to LLTA
CYA 732	one of the air ranges over CYA 731 from 5,000 feet to 28,000 feet above sea level
EEM	Environmental Effects Monitoring
IEMR	Institute for Environmental Monitoring and Research
LLTA	Low-level Training Area, also known as CYA 731, represents a military air range associated with 5 Wing Goose Bay that covers an area of approximately 130,000 km <sup>2</sup> , from surface to 5,000 feet above sea level

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## 1.0 INTRODUCTION

In response to an identified need to expand the current military training activities at 5 Wing Goose Bay, supersonic flight and/or other training options, including night exercises, may be conducted by Canadian and foreign air forces in the future. In preparation for such initiatives and the anticipated need for related Environmental Effects Monitoring (EEM), Golden Eagle (*Aquila chrysaetos*) was selected in 2005 (Minaskuat 2005a) as a focal species for observation and monitoring prior to, during and post-exposure to such activities. This species is considered a Valued Ecosystem Component (VEC) in Labrador (DND 1994). To document the behaviour of Golden Eagles at nest sites and to examine the feasibility of monitoring techniques during the night in the Study Area, Minaskuat Limited Partnership (Minaskuat) was retained by the Institute for Environmental Monitoring and Research (IEMR) in 2006 and again in 2007. This report documents the efforts of Minaskuat during the 2007 field season.

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### 1.1 Objective

The objective of the 2007 monitoring program was to collect baseline behavioural observations (day and night) at occupied Golden Eagle nests in the absence of (prior to) noise and visual disturbance associated with future night training activities by military aircraft.

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### 1.2 Background

Golden Eagle is a mid-distance migrant that breeds in Labrador (Kochert and Steenhof 2002) and is known to nest within the Study Area on cliffs (Jacques Whitford 1995). These sites are selected primarily by proximity to hunting grounds (Camenzind 1969) and weather conditions at the beginning of the nesting season (Morneau *et al.* 1994). Nest site selection may also be influenced by exposure, and most nests in northern climes face south to exploit positions that are free from snow, and to minimize exposure to cold and inclement weather (Kochert *et al.* 2002). Note that the physical parameters may be as important or more so at least in the Study Area, as several nest sites are known to exist on north facing cliffs (Jacques Whitford 1995) (Minaskuat 2005a).

Nest construction usually begins 1-3 months prior to egg-laying (Kochert *et al.* 2002). Nest material consists of a wide variety of vegetation including sticks and branches, with an inner lining of grasses, bark, leaves, mosses, and lichens. Heights of nests have been found to range from 0-100 m across its range (Kochert *et al.* 2002). Golden Eagles have one brood per season but will nest again if eggs fail to hatch (McIntyre 2002). A study by Steenhof *et al.* (1997) found that eagles hatched earlier when prey was abundant, and later after severe winters. McIntyre and Adams (1999) also found that Golden Eagle laying rates, brood size, and productivity were correlated to the abundance of cyclic snowshoe hare (*Lepus americanus*) and Willow Ptarmigan (*Lagopus lagopus*) in a clime relatively similar to Labrador (in Alaska). Food preferences vary by region, but Golden

Eagles seem to prefer mammals (mostly larger rodents) and hares to other prey types, although the North American diet is quite varied (Olendorff 1976).

**Figure 1 Air Ranges at 5 Wing Goose Bay**



Note: CYA 732 overlaps the Study Area

**Figure 2 Photo of Golden Eagle Nest 2**



Note: Nest 2 was chosen for observation on 9 June 2007, the first overnight monitoring period. This photo was taken 2 July 2007 during the second overnight monitoring period, from the observers' vantage point.

**Figure 3 Photo of Golden Eagle Nest 4**



Note: Nest 4 was chosen for observation on 9 June 2007, the first overnight observation period. This photo was taken 2 July 2007 and shows the collapsed nest, since the first overnight observation period.

**Figure 4 Photo of Golden Eagle Nest 12**



Note: Nest 12 was chosen for observation on 2 July 2007; the start of the second overnight observation period. Three chicks are visible at the back of the nest.

Golden Eagles in Labrador typically initiate nesting (incubation) in mid-April, hatching occurs during the first week of June, and fledging is expected by mid-August but may vary by several weeks (Jacques Whitford 1998, 1999a). Active nests of Golden Eagle within CYA 731 (the low-level training area for 5 Wing Goose Bay; 100 – 5000 feet above sea level) (Figure 1) are currently excluded from sub- and super-sonic military activity by a 2.5 nautical mile radius. Suitable nest sites (i.e., with a good vantage and accessible by helicopter) were previously identified based on earlier work by the Study Team over the previous two decades [Jacques Whitford 1992, 1994, 1995, 1996a, 1996b, 1997, 1998, 1999a, 1999b, 2001, Minaskuat 2003, 2004a, 2004b, 2005a, 2005b, 2006a, 2006b]. A new air range known as CYA 732 (5000 – 28000 feet above sea level) overlaps the northern portion of CYA 731 and is over several known Golden Eagle nests. In 2005 and 2006, Minaskuat (2005a, 2006) visited previously occupied Golden Eagle nests and identified new nests in areas of suitable habitat [areas with prominent cliff faces on the upper one-third of a cliff face, usually under a rock ‘overhang’ (JWEL 1997; Figure 2)] within the LLTA, specifically in the in CYA 732 air range (Figure 1).

Nest status and condition has been previously assessed in Labrador to document possible locations for baseline (preexposure) observations during 2005 and 2006 (Minaskuat 2005a, 2006a). There are seven known historical locations for Golden Eagle nest sites in CYA 732 (Table 1). Two of these sites had active nests in 2005 (one near the Kanairiktok River and one near the Naskaupi River) but only the Naskaupi River nest was active in 2006. Two locations outside the CYA 732 Study Area (on the Churchill River) were also monitored, and were active in both 2005 and 2006 (Minaskuat 2006a). To reduce disturbance during the anticipated nesting season the following spring, observation blinds were constructed in the fall of 2005 at two of the active nest locations, with a third established at a site known to have been repeatedly occupied in previous years (Minaskuat 2005a). Active nests of Golden Eagle within CYA 731 (the low-level training area for 5 Wing Goose Bay) (Figure 1) are currently excluded from sub- and super-sonic military activity by a 2.5 nm radius. The air range known as CYA 732 overlaps the northern portion of CYA 731 and has contained several Golden Eagle nests in previous years.

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## 2.0 METHODS

Prior to the start of the field program, a permit application was submitted to the Department of Wildlife and Conservation, Wildlife Division, describing the project and requesting approval to proceed. Approval for the research and monitoring of Golden Eagle was received in a letter from Ms. Rebecca Jeffery, Regional Biologist – Labrador, Province of Newfoundland and Labrador. Check for this year’s permit. Consistent with Minaskuat procedures, a project health and safety checklist was completed with daily last minute risk assessments to ensure the Study Team was aware of hazards and appropriate Safe Work Procedures.

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### 2.1 Study Team

Mr. Perry Trimper (Principal) was the Project Manager for this study, responsible for project deliverables and quality control. Field reconnaissance surveys were completed by Mr. Trimper, Mr. Marcel Gahbauer (Scientist Level 3), Ms. Lisa Stepnuk (Engineer Level 1) and Mr. Apenam Pone

Jr. (Innu Field Technician). Overnight observations during the incubation period were conducted by Mr. Trimper, Mr. Gahbauer, Ms. Stepnuk and Mr. Pone. Overnight observations during the nestling stage were conducted by Mr. Gahbauer, Ms. Jennifer Mitchell (Scientist Level 1), Mr. Steve Gullage (Scientist Level 3) and Mr. Clarence Snow (Innu Field Technician). Mr. Geoff Goodyear and Mr. Peter Jefford of Universal Helicopters Newfoundland and Labrador served as pilots. Reporting components were the primary responsibility of Mr. Trimper, Mr. Gahbauer and Ms. Mitchell.

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## 2.2 Schedule

Golden Eagles in the Study Area initiate their clutch (and incubation) during mid-April and hatching typically occurs during the first week of June (Jacques Whitford 1992, 1994, 1995, 1996a, 1996b, 1997, 1998, 1999a, Minaskuat 2005a, 2006a). Fledging occurs by mid-August, though dates may vary by several weeks. Based on this information, two (2) day and night observation periods were scheduled during the incubation period and brooding periods, following the reconnaissance surveys.

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## 2.3 Survey

The approach to surveying Golden Eagles during 2007 was identical to Minaskuat (2006a). A sample of known Golden Eagle nests<sup>1</sup> (DND/Jacques Whitford/Minaskuat unpublished data) was surveyed on 31 May 2007 (corresponding to the incubation period) to determine nest activity (Figure 1). The goal was to re-examine previously known Golden Eagle nests, locate new nests in areas of suitable habitat and identify sites for monitoring during overnight observations. To document possible locations for baseline (pre-exposure) observations, the Team assessed nest status, condition, either active or inactive, and whether the nest was collapsed or suitable for future use. Customized field data sheets were generated to facilitate relocation and accurate recording of nest status. Aerial surveys were conducted using a Bell 206L helicopter (or equivalent) with a navigator/observer seated beside the pilot and at minimum one observer seated in the rear.

Golden Eagle nests were considered active if eggs or young were observed or suspected in the nest during the survey and/or if adults exhibited aggressive behaviour (Minaskuat 2006a). Pairs of Golden Eagles (adult male and female), displays of aggressive behaviour by individual adults, or an apparent reluctance to leave an area were considered as evidence of an occupied nest whether or not nest contents were observed. When active nests were identified during the survey, the Study Team immediately left the area to reduce unnecessary disturbance to the nesting eagles.

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## 2.4 Monitoring

Prior to the commencement of overnight monitoring on 9-10 June and 2-3 July, the helicopter carefully approached the nest until it could be determined that the nest was still active. Once

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<sup>1</sup> Potential candidate nest sites and their nest history were identified from extensive experience of the Study Team in the monitoring of raptors over the last two decades.

confirmation was achieved, the aircraft flew to the observation location for the Study Team, to minimize disturbance.

Each Study Team was equipped with a tripod-mounted spotting scope (Bausch & Lomb, 15-45 x 60 monocular), binoculars, infrared scope (Bushnell, 4 x 50 night vision monocular), digital camera, video camera, a hand-held GPS unit, required safety and camping equipment and customized field data sheets.

Observations commenced as the Study Team arrived onsite and prepared their blind and supporting camp. One observer monitored the nest at all times. Both members of each Study Team took great caution in limiting their movement at the vantage points. The observers made every effort to remain low and move slowly, quietly and only when necessary.

The priority of data collection was given to recording the absence or presence of adults; specifically, the time when incubation was not occurring (i.e., the eggs were exposed) and when the nest may have been unprotected by an adult. Nests were considered protected when one or both adults were in the visible in the area of the nest (approximately 200 m radius) and appeared vigilant, although the focus was the adult at the nest (believed to be female for the majority of observations) (Kochert et. al 2002). Behaviour such as the number and duration of visits to the nest by the male was also recorded. Weather conditions; temperature and precipitation, were also recorded by the observer. On several occasions, rain precluded effective monitoring because of restricted visibility.

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## 3.0 RESULTS

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### 3.1 Survey for Nest Activity

Two active Golden Eagle nests, Nest 2 and Nest 4, were located during the initial survey on 31 May 2007 and deemed suitable for observation. When arriving to conduct the second period of overnight observations on 2 July 2007, Nest 4 was observed to have been abandoned. As an alternative, a third active nest, Nest 12, was discovered during subsequent surveying immediately prior to the start of the second monitoring period. In addition to the three active nests, ten inactive nests were identified in the Study Area. Sixteen nests were located during the 2007 field program, including one active Rough-legged Hawk (*Buteo lagopus*) nest (previously suspected to be a Golden Eagle nest) and two inactive Golden Eagle nests outside the Study Area, along the Churchill River. Table 1 below summarizes the results of the 2007 Golden Eagle nest survey.

Note that nest sites for this species are considered confidential and their exact location is not identified in public documents.

**Table 1 Status of Golden Eagle Nest Sites in CYA 732 during 2005-2007**

Nest	Species	Status	Location	Comments
<i>Study Area</i>				
1	Suspected Golden Eagle	Active in 2005 Inactive in 2006 Active in 2007	Kanairiktok River	Species not confirmed in 2005 but young appeared to be Golden Eagle. Site occupied by a Rough-legged Hawk in 2007.
2	Golden Eagle	Not checked in 2005 Inactive in 2006 Active in 2007	Harp Lake Area	Two adults present in 2007; 1 on nest and 1 soaring nearby.
3	Golden Eagle	Not checked in 2005 Inactive in 2006 Inactive in 2007	Mistinipi Lake	Second cliff nest in this area also empty. This nest was deemed to be suitable, however inactive again in 2007.
4	Golden Eagle	Active in 2005 Inactive in 2006 Active in 2007	Kanairiktok River	Beneath overhang, nest observed, but not the contents. Adults were observed at the nest during the initial survey and the first observation period. This nest was determined to be unsuccessful on 2 July 2007, just prior to the start of the second overnight observation session.
5	Golden Eagle	Inactive in 2005 Inactive in 2006 Inactive in 2007	Kanairiktok River	Believed to be a likely location for future nesting activity.
6	Golden Eagle	Not checked in 2005 Inactive in 2006 Inactive in 2007	Mistinipi Lake Area	
7	Golden Eagle	Active in 2005 Active in 2006 Inactive in 2007	Naskaupi River	Difficult location for observations; nest fate unknown in 2006.
10	Golden Eagle	Inactive in 2007	Kanairiktok River	Empty nest located by falls upstream of Nest 1
11	Golden Eagle	Inactive in 2007	Kanairiktok River	Nest located beside falls, deteriorated state.
12	Golden Eagle	Active in 2007	Harp Lake Area	Nest located during search for a third active nest on 2 July 2007. Active nest suitable for observation, but from across the lake at a distance of > 1.5 km.
13	Golden Eagle	Inactive in 2007	Harp Lake Area	Nest located during search for a third active nest on 2 July 2007
14	Golden Eagle	Inactive in 2007	Harp Lake Area	Nest located during search for a third active nest on 2 July 2007. Two nests at this location.
15	Golden Eagle	Inactive in 2007	Harp Lake Area	Nest located during search for a third active nest on 2 July 2007. This nest is suitable for future use.
16	Golden Eagle	Inactive in 2007	Harp Lake Area	Nest located during search for a third active nest on 2 July 2007.
<i>Churchill River (Note: These nests are not in the Study Area)</i>				
8	Golden Eagle	Active in 2005 Active in 2006 Inactive in 2007	Churchill River	Good site for observation; Failed, young found dead in 2006. Note: Outside Study Area
9	Golden Eagle	Active in 2005 Active in 2006 Inactive in 2007	Churchill River	Fate unknown in 2006. Note: Outside Study Area

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## 3.2 Monitoring

Upon arrival at Nest 4, for the start of the first overnight monitoring period (9 June), it was discovered that helicopter access to the originally planned (31 May) vantage point for observation (south side of the river) was flooded. The Study Team instructed the helicopter pilot to search for an alternative appropriate location to conduct the observations. A location (on the north side of the river) was chosen, however visual accessibility to the nest was limited.

At the time of arrival in the area of Nest 4, the adult was observed in the nest. With limited fuel remaining, the pilot located a safe and suitable landing area. However, after the Study team unloaded their equipment, and then climbed to the proposed vantage point; it was determined that observers could not adequately view the nest or the eagles. Despite attempts to reposition on foot (as the helicopter had returned to Goose Bay), the nest was out of sight for the duration of the monitoring period. The only observation of Golden Eagles at this nest occurred near the end of the observation period, at approximately 0904 hours on 9 June, an eagle was observed flying at the height of the cliff top. It flew beyond the crest after approximately thirty seconds. At 0918 hours the eagle was back in sight, circling over the same part of the cliff.

The other Study Team arrived at Nest 2 (9 June 2007) at approximately 1250 hours. Upon arrival, one adult was on the nest before the helicopter landed and remained in place until after the aircraft landed. After observations commenced at 1302, the adult was on the nest for approximately ten minutes before a second adult arrived. For approximately 30 seconds, both adults were at the nest, however the first adult then flew off. The second adult soon followed in the same direction. The nest was unattended from 1317 hours to 1349 hours (32 minutes).

Thereafter, in addition to the arrival and departure of the helicopter, disturbances that appeared to elicit a reaction included the movement of the observers on four occasions (despite being at a distance of 1.2 km) and the presence of another adult golden eagle. On four occasions at Nest 2, the adult flushed as a result of what appeared to be observer movement. The longest recess related to a possible disturbance (observer movement) was 305 minutes. On day 1 (9 June) another golden eagle entered the territory of the nest and the resident adult flew toward the intruder in an attempt to ward it off. This absence lasted 1 minute and 50 seconds initially. The adult then returned for 20 seconds but left again for 6 minutes and 40 seconds. On only three occasions and for a combined total of <6 minutes, were both adults present at the nest. Another notable observation is that for the duration of the observation period, no food was observed delivered to Nest 2. The Study Team was unable to confirm whether prey had been delivered to the nest prior to the arrival for the commencement of observations.

The second period of overnight monitoring commenced on 2 July 2007. Upon arrival at Nest 4, it was discovered that access to the landing area was now available but this nest had collapsed and was therefore no longer active. Additional surveying in the area located a third active Golden Eagle nest (Nest 12) suitable for observation. Therefore Nest 2 was monitored for the second time and Nest 12 for the first occasion during this period.

Upon arrival at Nest 2, adult appeared to be feeding young and held in position for 10 minutes until after the Study Team landed. The nest remained unattended for 115 minutes. Over the remainder of the observation period there were only two other occasions when the nest was left unattended: the next morning at 1040 hrs for 28 minutes due to no apparent stimulus; and when the helicopter approached at 1545 hrs. One young at about 7-10 days of age was visible. On three other occasions, the attending adult departed from the nest but remained in the area and visible. One of these was believed related a movement of one of the observers, despite being approximately 1.2 km distant. Note however, on other occasions when the observers would have been visible, the adult held. Prey deliveries were believed to have occurred but it was difficult to confirm, again related to the distance.

At Nest 12, the nest was unoccupied by adults when the Study Team arrived and set up at 1618 hrs. No adults were seen the remainder of the day, but when sufficient light was available the next morning (0513 hrs), one adult was confirmed at the nest. Other periods when no adults were visible occurred on 3 July at 1000 hrs (40 minutes), at 1104 (41 minutes), and at 1255 (165 minutes until the helicopter arrived to collect the Study Team). Two young at approximately 2 weeks of age were identified. Prey deliveries were difficult to confirm given the distance (approximately 1.5 km).

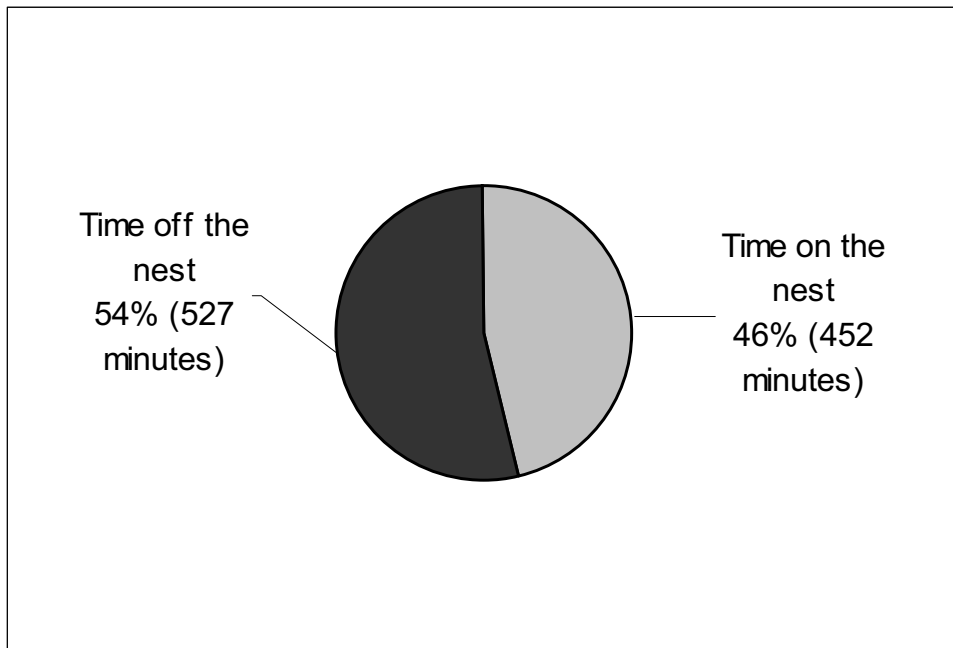
**Table 2 Golden Eagle Nest Attendance and Observation Effort during 2007**

Nest	Date	Time on Nest	Time off Nest	Total Observation Time	Comments
2	9-10 June	452 min	527 min	979 min	Adults sensitive to observer presence despite being at distance of 1.2 km,
4	9-10 June	unknown	unknown	1,069 min	Direct nest observations not possible due to difficult vantage point. Original site inaccessible to helicopter (flooded).
2	2-3 July	813 min	232 min	1,045 min	One young at 7-10 days, with attentive adults
12	2-3 July	426 min	498 min	924 min	Two young at 2 weeks of age, adults often away over 24 hr period.

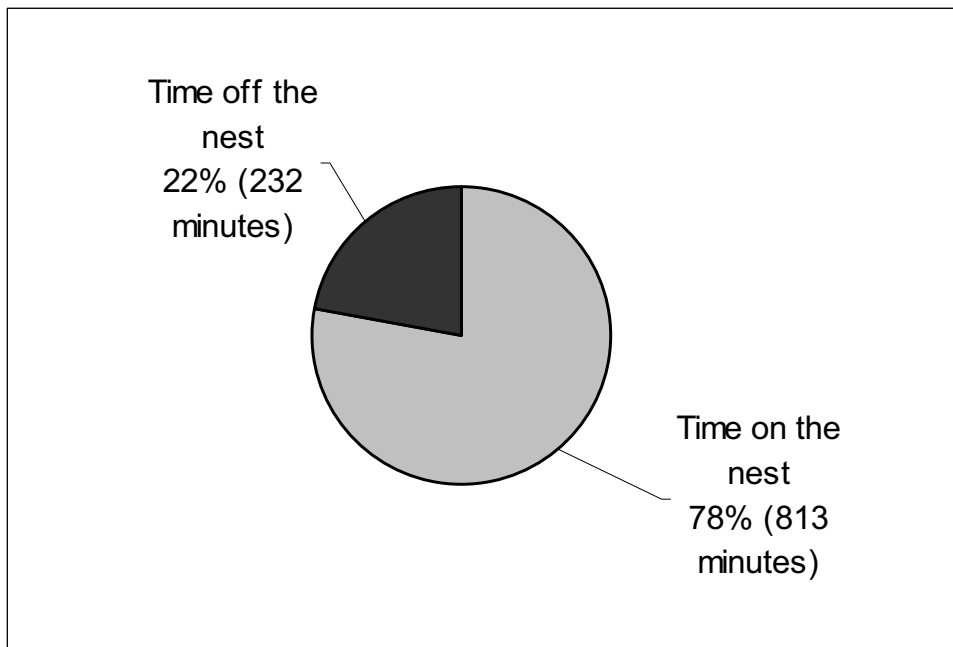
Monitoring between 2200 hrs and 0500 hrs proved impossible due to darkness. It was difficult to discern movement and whether the female was incubating/brooding. Although the crews were equipped with infrared night vision scopes, the distances from the vantage points to the nests were too great to be effective. Closer vantage points were not possible due to factors such as the width of the valley, the potential to cause disturbance and a safe landing area for the helicopter and Study Team.

Each nest was observed for between 924 and 1069 minutes during each visit (Table 2). During the first visit, nest attendance was documented only for nest #2 due to the poor visibility at nest #4. At nest #2, one or both adults were present at the nest 46% of the time (Figure 5). During the second visit, one or both adults were present at this nest 78% of the time (Figure 6). At nest #12 during the second observation period, one or both adults were present only 46% of the time (Figure 7).

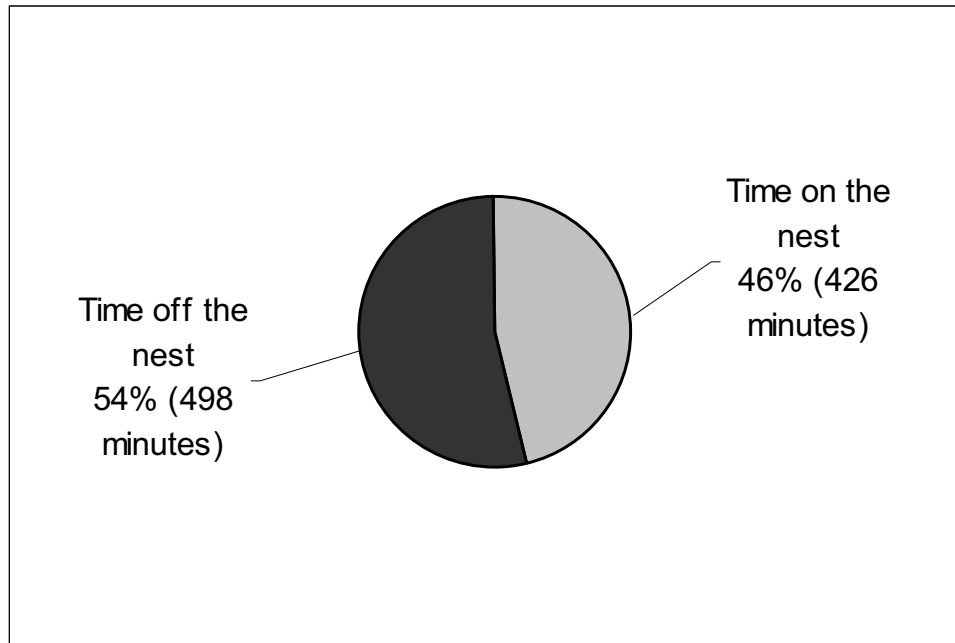
**Figure 5** Adult Golden Eagle Attendance at Nest #2 during First Overnight Observation Period – Incubation (9-10 June 2007)



**Figure 6** Adult Golden Eagle Attendance at Nest #2 during Second Overnight Observation Period – Nestling (2-3 July 2007)



**Figure 7 Adult Golden Eagle Attendance at Nest #12 during Second Overnight Observation Period – Nestling (2-3 July 2007)**



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## 4.0 DISCUSSION

Observer distance was an important limiting factor in the effectiveness of confirming various behaviours at the nest during 2007. For example, it was often difficult to determine sex of the adults, when and what type of prey were being delivered, and when light faded whether or not adults were even present. This challenge was compounded by the ineffectiveness of the night scopes that were compromised by the distance between observers and active nests.

The review by Kochert et al. (2002) indicates that nest defense by Golden Eagle is mainly passive and not normally aggressive toward human intruders in nesting area; but may often leave the area for several hours. Long recesses of several hours were noted during observations in June and July and on accession were believed related to movement (as they occurred immediately) by an observer (at distances  $\geq 1.2$  km) although this was not a consistent reaction. In a review of literature and expert opinions (including that of the Study Team), Ruddock and Whitfield (2007) identified a wide divergence of recommended buffers to eliminate human disturbance but concluded a range of 750-1,000 m. These authors also noted that contrary to the opinions expressed, the available literature indicated that adults responded to disturbance at greater distances during chick rearing than during incubation. Helicopter arrivals were similarly inconsistent in terms of whether the attending adult(s) held or flushed from the nest in 2007. During extensive helicopter surveys in the 1990s by the Study Team, there was certainly a tendency for the Adult(s) to hold at the nest upon approach by the helicopter (Jacques Whitford 1999b).

Though nesting populations of Golden Eagle in Canada are considered stable (Kochert and Steenhof 2002), the number of active nests identified by the Study Team in Labrador (Minaskuat and formerly Jacques Whitford) has varied considerably over the past number of years and area surveyed (JW 1992, 1994, 1995, 1996a, 1996b, 1997, 1998, 1999, Minaskuat 2005, 2006). One reason for low levels of nesting activity may be limited prey availability. Several researchers have linked the availability of prey with such parameters as the proportion of Golden Eagles that lay eggs, nest success, mean brood size at fledging, number of young fledged and hatching dates (Morneau et al. 1994, Steenhof et al. 1997, McIntyre et al. 1997, Kochert et al. 2002). McIntyre (2002) found that laying rates, mean brood size and overall population productivity were significantly correlated with the abundance of the cyclic snowshoe hare (*Lepus americanus*) and Willow Ptarmigan (*Lagopus lagopus*) populations. Golden Eagle reproduction may also be influenced by how severely the previous winter affected small mammal populations, (Steenhof et al. 1997). In contrast, however, the number of territorial pairs was not influenced by the availability of cyclic prey (Steenhof et al. 1997, McIntyre 2002, Kochert et al. 2002) or winter severity (Steenhof et al. 1997).

Reproductive rates are also known to fluctuate with prey densities (and weather conditions), such that pairs may not lay eggs during years of low prey abundance (Steenhof et al. 1997, McIntyre et al. 1997, Kochert et al. 2002). Based on a review of the existing literature on Golden Eagles in North America, Kochert et al. (2002) concluded that mammals comprise 90% of prey items. The number of territorial pairs did not fluctuate with annual changes in prey abundance and weather (Steenhof et al. 1997, McIntyre and Adams 1999), however reproductive rates fluctuate with prey densities and weather conditions (Smith and Murphy 1979, Tjernberg 1983, Bates and Moretti 1994, Steenhof et al. 1997, McIntyre and Adams 1999). The relationship between Golden Eagle nest activity and small mammal populations has been previously documented in Labrador. In 1995, high numbers of active Golden Eagle nests (n=15, JW 1997) coincided with relatively high small mammal populations in the region (Chubbs and Trimper 1998). In the following year, when there was a sharp decline in the local small mammal population (Chubbs and Trimper 1998), the Study Team was able to locate only two active nests (JW 1997). Additionally, few observations of another important prey item, Willow Ptarmigan (*Lagopus lagopus*), were recorded during 1991 and 1992, when active Golden Eagle nest densities were low (<0.2 active nests per 100 km of survey effort). However, in 1994 when densities reached 1.28 active nests/100 km, Willow Ptarmigan were frequently encountered (JW 1995).

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## 5.0 SUMMARY

- Within the LLTA area, the Study Team visited fourteen Golden Eagle nests, of which three were found active. Note that two other Golden Eagle nests on the Churchill River, further south, were previously active in 2006, but inactive in 2007.
- One nest monitored overnight (Kanairiktok River) during incubation was discovered to be unsuccessful upon return for the second overnight monitoring period.

- Golden Eagles at active nests often (but not consistently) reacted (by flushing) to subtle movements by an observer particularly at the start of a 24-hour monitoring period. As the monitoring period progressed, the eagles reacted less to the movements of the observers.
- Given the current distribution of Golden Eagles in CYA 732 and their location for observation, future effects monitoring would need closer access and more sophisticated observation blinds for evaluating 'subtle' aspects of nesting behaviour such as confirming prey delivery and type, or differentiating adults. Note that overt reactions such as flushing from an active nest, as might occur during a supersonic event – would be possible with the current design and during periods of sufficient daylight.

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