

NARRATIVE REPORT
MONITORING ANALYSIS FOR 2007 SEASON

Chugach Powder Guides

Glacier and Seward Ranger Districts, Chugach National Forest

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I. MONITORING RESULTS FOR CPG'S 2007 SEASON

Introduction: The Environmental Impact Statement and Record of Decision for Commercially Guided Helicopter Skiing on the Kenai Peninsula (September 2004) identified monitoring in three distinct areas. These areas included; Global Positioning System (GPS) recording of helicopter flight paths and permit compliance with the no-fly zones; wildlife monitoring; and social and human use monitoring. This report provides a summary of the monitoring activities and results for the 2007 operating season.

A. Monitoring Helicopter Flight Paths

The Forest Service (FS) worked collaboratively with Chugach Powder Guides (CPG) on the GPS monitoring procedure for the 2007 season.

During the 2007 operating season from January 30 thru April 21 CPG flew 54 out of 77 days available within this time frame. Throughout the season CPG submitted to the FS raw data and maps showing helicopter flight lines for each operational day. Also included were narratives that described the reason for any incursions into no-fly zones, or other information of importance. As agreed, the FS returned the maps to CPG. The narratives and the FS response to each narrative are included in this report as Appendix A.

Compliance

The requirement for CPG to track their flights using a GPS data logger system is a permit stipulation. The intent of the stipulation is to use the collected data throughout the season to jointly monitor operational activities associated with CPG's permit compliance with the no-fly zones.

Performance Standards for Compliance with No-fly Zones, January 24, 2006 (located in case file at GRD office) defines the thresholds related to successful permit compliance. Entries into no-fly zones are grouped into seven categories: GPS error (*G*), safety (*S*), weather (*W*), resource (*R*), mapping error (*M*), navigational error (*N*), training and preseason operations (*T*). Any entries of 100 feet or less due to GPS error, or entries as a result of safety considerations, poor visibility and/or weather, wildlife resource avoidance, unavoidable mapping errors, or during training and preseason operations will be noted in the performance evaluation but will not impact the performance evaluation rating. Navigational errors, defined as entries into no-fly zones greater than 100 feet, may impact the performance rating. Table 1 summarizes each day CPG's helicopter(s) entered into a no-fly zone along with a category designator to explanation each entry.

Due to technical complexities CPG was not able to download and review data with the Forest Service until February 22, 2007. As a result, incursions up through this date do not count against CPG's performance rating.

Table 1

Date	Summary of all entries into no-fly zones G (GPS error), S (safety error), W (weather), R(resource), M (mapping error), N (navigational error), T (training and preseason operations)										
	3	8	9	10	11	12	13	15	16	22	27
2/04/07				T							
2/12/07	G										
2/21/07		N		N		N					
2/22/07						N		N	N		G
2/23/07				S							
2/24/07						N					
2/25/07				N							
2/27/07				N		N					
2/28/07						S		G			
3/01/07				N							
3/03/07		N	N								
3/04/07		N		T, G	N	G		G			
3/05/07		N		G							
3/09/07	N										
3/10/07	N										
3/17/07				G	G			N			
3/18/07											
3/19/07							G				
3/26/07										G	
3/28/07					G						
4/03/07	G										
4/21/07	S										

Appendix B also defines 4 standards that CPG must meet in order to receive an acceptable level of performance related to compliance with the no-fly zones:

- 1) Following three occasions of navigational errors within a specific no-fly zone, the Permittee will meet with the Forest Service to identify corrective actions.

Results:

Zone #10.

Three incursions occurred on three separate occasions February 25 and 27 and March 1. CPG met with the FS on March 9 and the resulting follow-up letter dated March 12 listed two corrective actions that were identified at the meeting: (1) Flight patterns were to be reviewed with the pilots and guides, and (2) Navigational aids, such as a landing stick, would be used as a visual reference to assist the pilots and guides.

Zone #8.

Three incursions occurred on three separate occasions March 3, 4, & 5, all resulting from navigational errors. As a result, the FS notified CPG of the incursions on March 17. The resolution identified was for CPG to provide each pilot and guide with additional training to avoid future incursions in this zone.

Zone #12

Two incursions occurred on February 24 and 27. These were discussed at the March 9 meeting. The same resolution measures that were identified for Zone #10 incursions were to be applied to Zone #12.

- 2) Successfully record, download and map GPS flight data on a minimum of 75% of

operating days.

Results: Monitoring results were tracked throughout the season on Appendix B, spreadsheet titled CPG No-fly Zone Monitoring Results for 2007 Season. To determine compliance a point system was utilized which gave one point to each task record, download, and map for one helicopter on one operational day. During the 54 days that CPG operated, there were a total of 99 helicopter days (on 13 days only 1 helicopter operated, 2 helicopters operated for 35 days, and 3 helicopters operated for 6 days.) A final total of 234 points were received out of a possible 297 which resulted in 79% compliance rate.

3) Conduct 95% of all operation time outside of no-fly zones, over the course of the season.

Results: CPG operated a total of approximately 429 hours from January 30 to April 21, 2007. During that time CPG spent a total of approximately 15 minutes within the boundaries of 13 no-fly zones. The results indicate that CPG conducted approximately 99% of their operations outside of the no-fly zones. See Tables 2 and 3 below.

Table 2 (below) displays the total amount of time operations were conducted inside and outside of the permit use areas.

Table 2

<i>Amount of time operations were conducted inside and outside of use areas</i>	
Permit Use Area	Hours:Minutes:Seconds
Mount Ascension	0.00:00
East Moose Creek	0:47:50
Grandview	52:42:55
East Bench Peak	11:48:40
North Bench Peak	22:14:20
West Bench Peak	2:35:45
Placer-Skookum	170:07:40
East Seattle Creek	5:14:55
Mid Seattle Creek	0:12:20
East Twentymile	2:05:20
North Twentymile	0:00:50
West Twentymile	43:32:55
Glacier-Winner	117:00:30
Total Time inside Permit Use Areas	428:39:45
Total Time Outside Permit Use Areas	486:12:10

Table 3 (below) displays the amount of time in minutes and seconds CPG spent in each no-fly zone. Note that “0” indicates time not calculated as the incursions were either fly-overs above 1,500’ AGL or entries less than 100 ft.

Table 3

	<i>NO FLY ZONES & TIME SPENT IN EACH (Min: Seconds)</i>										
	3	8	9	10	11	12	13	15	16	22	27

<i>Date</i>											
2/04/07				0:25							
2/12/07	0:05										
2/21/07		0:15		0:40		1:15					
2/22/07						0:35		0:20	2:00		0:05
2/23/07				1:45							
2/24/07						0:50					
2/25/07				0:15							
2/27/07				0:25		0:15					
2/28/07						0:10		0:05			
3/01/07				0:05							
3/03/07		0:15	0:15								
3/04/07		0:05		1:40	0:15	0		0:10			
3/05/07		0:10		0:10							
3/09/07	1:31										
3/10/07	0:15										
3/17/07				0	0			0:20			
3/18/07											
3/19/07							0:05				
3/26/07										0	
3/28/07					0						
4/03/07	0										
4/21/07	0:35										
Total = 15:16	2:26	0:45	0:15	5:25	0:15	3:05	0:05	0:55	2:00	0	0:05

4) Follow the flight recording and reporting procedures in the November 18, 2005 GPS protocol paper.

Results: On a weekly basis CPG was required to submit maps containing helicopter flight lines and date of flight. In addition, CPG was required to submit a weekly report that documented any incursion and the reason for each incursion. CPG coordinated with the FS to ensure data, maps and reports were submitted as often as possible and when needed.

B. Wildlife Monitoring Items

1. Goats and No-fly Zones.

Methods Used: Much of the analysis area and adjacent lands were surveyed by biologists from the Alaska Department of Fish and Game (ADF&G) using fixed-wing aircraft during winters and summers of 2000-2004. Those efforts were continued in 2005 and especially focused in the southern portion of the analysis area where new exploratory helicopter use areas were established. We also evaluated a partial data set from a multiple year mountain goat telemetry study conducted during the early 1980s by Lyman Nichols, formerly with the ADF&G. The study followed the movement patterns of 48+ mountain goats over seven years. Mr. Nichols provided goat locations (only locations for 17 goats were available from his original work for our analysis) on original maps which were pinpointed by radio telemetry survey flights and digitized into a GIS database.

We contracted with Western Ecosystems Inc. for statistical analysis expertise under a Resource Selection Function (RSF) modeling framework. Based on literature review and professional opinion we identified landscape variables important in determining mountain goat distribution,

which could be represented by Chugach National Forest (CNF) corporate GIS layers. We employed stepwise, multivariate, linear regression modeling to assess the importance of each selected variable as well as interactions between variables. Using Akaike's Information Criterion (AIC) we modeled the combination of variables which best explained the variation in mountain goat distribution. These procedures were applied to both datasets collected during 2000-2005 aerial surveys and the Nichols radio telemetry data to produce two separate models.

Both models were statistically validated using a K-fold cross validation technique in which iterative evaluations of portions of the dataset are analyzed relative to the predictions being made by the model. Evaluation of variation in habitat use predicted by goat locations collected during aerial survey vs. those collected using radio telemetry identified some inconsistent predictions between the two datasets. Given the completeness of the more recent flight survey data we chose to make a final habitat model using only those data and a predictive layer of goat habitat distribution within the analysis area was produced.

Simultaneous to these efforts 12 goats were collared across the analysis area and adjacent portions of the Kenai Peninsula in summer of 2006. Four additional goats were collared in summer of 2007. Collars have a two year life and should return two winters of GPS locations. The first 12 collars will drop off of animals in June of 2008 and the remaining four in June of 2009. This effort was launched in partnership with biologists from the ADF&G and aims to improve our current understanding of habitat use and goat mobility throughout the year. It is our aim that the data returned will help us better understand goat movements on the Kenai during the winter relative to winter recreation activity and will provide a more rigorous, empirical validation of our prior habitat modeling efforts.

A minimum count strategy for monitoring goat populations on the Kenai was developed in collaboration with ADF&G during 2005 and 2006. Initial surveys were attempted in fall of 2006 but were not completed due to complications with weather which prevented flights. This strategy has been adapted into a CNF monitoring protocol which is currently under peer review and will be before the Forest Leadership Team for approval in fall of 2007. This protocol calls for the monitoring of goat populations in areas within and adjacent to the analysis area which support high levels of winter recreation (including CPG activity) so that it can be compared to those without. Following approval the surveys called for in this protocol will be enacted in cooperation with ADF&G.

Realized/Expected Results: A spatial layer predicting goat distribution across the Kenai has been produced in fall of 2007. Based on the results of this analysis an evaluation of overlap between CPG use and all winter recreation activity (ie. snowmobile and backcountry skiing) occurring within the analysis area will be completed by spring of 2008. Further empirical validation of the predictive habitat model will be completed when goat locations and movement data are collected from collared goats, within and adjacent to the analysis area, in June of 2008. Pending results of this evaluation, the current predictive layer may have to be modified and a re-analysis of overlap between habitat and winter recreation may be necessary. Some initial population monitoring surveys were completed in fall of 2006. These surveys will be continued under CNF Forest plan monitoring for at least the next 10 years and the results will be evaluated relative to winter recreation throughout that monitoring period.

In accordance with the FEIS any changes to no-fly zones would be reviewed by ADF&G and CNF personnel. Prior to the 2005-2006 operation, CPG proposed 10 zone-boundary changes, three of which were accepted for zones 39, 15, and 3. In 2006-2007 a minor modification was requested for zone 3 and was accepted during ADF&G and CNF review. These changes result in small slivers (in total < 200 acres) being removed from the 59 *no-fly* zones covering 95,463

acres to protect mountain goat habitat in the analysis area.

Supplemental: The most recent published study regarding mountain goat response to helicopter over-flights was completed by USFS researchers in Alaska (Goldstein et al. 2005). It demonstrated that overt disturbance reactions to helicopter over-flights at distance >1500' were not severe or prolonged in nature. The 59 no-fly zones we have established throughout the analysis area were established so that the majority of over-flights would happen at this distance (originally established as a management guideline for this species under the 2002 Forest Plan). Mountain goats are harvested from within and adjacent to the analysis area and in recent years ADF&G biologists have reduced the number of harvest tags available in many of these areas because of concerns about population numbers. As a result the CNF and ADF&G will continue to cooperate in a partnership for the monitoring of goat populations on the Kenai. It is hoped that by closely monitoring population trends in areas of high recreation activity, and continuing to improve our understanding of habitat use, will be better able to elucidate potential impacts from the permitted activity on goats in the analysis area.

2. Distribution Brown Bear Denning Habitat

Methods Used: We described habitat variables conducive to brown bear denning on the Kenai Peninsula. They are based on radio telemetry locations collected from denning brown bears during winters of 1995-2002. We then developed probability of use models and used a cross-validation procedure to evaluate their utility.

Realized/Expected Results: The final validated model was completed in 2006. A raster surface predicting the probability of den occurrence across the analysis area has been created. Following evaluation relative to CPG activity and the extent of other winter recreation within the analysis area, the analyses and results will be submitted for publication during winter of 2008.

Supplemental: Brown bears continue to be a harvested species on Kenai though at times the total take allowed is significantly decreased if Defense of Life and Property take has been exceptionally high in a given year. The CNF continues to be an active partner in the Interagency Brown Bear Study Team (IBBST) and collaborates on population monitoring efforts for this species on Kenai.

3. Population Distribution Wolverine

Methods Used: The existing study plan for wolverine surveys was expanded in 2005 beyond the Aerial surveys of 2003 and 2004 (conducted in collaboration with biologists from ADF&G, U.S Fish and Wildlife Service, and National Park service) to include a capture and collaring effort in partnership with ADF&G. We aim to track movements of at least 6 wolverines. This monitoring information will allow better understanding of wolverine home range and movement patterns on the Kenai Peninsula and their actual overlap with winter recreation including CPG's activity. In cooperation with ADF&G, three seasons of capture effort were planned using a combination of log and barrel traps as well as an aerial darting campaign.

Realized/Expected results: In 2005 the specialized GPS collars being developed for this project were still in the testing phase and thus were not available for deployment. During the winter of 2006-2007 we initiated trapping efforts using six permanent traps in the vicinity of the Seward highway corridor but we were unsuccessful at capturing animals. The supporting aerial capture operations, to be implemented by our partner agencies in the effort, were never launched due to complications with weather and availability of the required personnel. With continued cooperation from ADF&G, we intend to double our capture effort during the winter of 2007-2008. Twelve traps will be maintained for a longer period of time across a broader extent of the analysis area and improvements will be made in specific trapping techniques. We are hopeful that at least six individuals will be captured this year and their movements will be compared to CPG activity as well as other winter recreation patterns from the analysis area. We expect results

from those analyses in Spring of 2008.

Supplemental: According to data maintained by ADF&G, harvest levels for wolverines have remained relatively stable for the past several years on the Kenai Peninsula. Harvest limits and the spatial extent of harvest has remained essentially the same for a number of years indicating a stable population in the area; however ADF&G has no specific data about total trapping effort from the area. It should be noted that almost nothing specific is known about the potential of helicopter skiing activity to affect this elusive and poorly understood species. Through our continued work with ADF&G we hope to better understand the potential effect of winter recreation on wolverines.

Social and Human Use Monitoring

A. Monitoring Item: Spatial Distribution of Winter Recreation and Human Use Activities

Methods or Techniques Used: We conducted 12 systematic aerial surveys of 60 watersheds totally about 4000 km² within the analysis area. Tracks left by winter recreations and individual recreation parties were mapped by user type (snowmobile, pedestrian, and aircraft supported). We conducted 57 vehicle and snowmobile trailer surveys of the 42 plowed parking lots used by winter recreationists along the Seward highway corridor between Girdwood and Seward. These two survey efforts were stratified by weekend vs. weekday during January-April of 2004 and 2005. These efforts allowed us to define the spatial extent of winter recreation with the analysis area as well as understand the relative intensity of use. Data regarding spatial extent and intensity of CPG's activities is annually submitted to GRD and this data for the 2004 and 2005 years will be included in this overall analysis of winter recreation.

In order to understand the behaviors and motivations of snowmobile riders and backcountry skiers we also completed a winter user questionnaire/interview survey at 44 parking lots along the Seward and Sterling Highway corridor between Girdwood and Seward, Alaska. Surveys were conducted during three, 30-day periods, beginning in February and continuing through mid-April, 2005. Survey forms were distributed to all parking lots on one weekend day and one weekday during each 30 day sample period. Survey days were selected by stratified random sample. We distributed 570 questionnaires, 250 of which were completed and returned. Using the same questions from questionnaire we also conducted 38 on-site interviews at trailheads and parking lots used by backcountry recreationists. The data resulting from these two efforts was pooled to develop behavior profiles for winter recreationists on the Kenai.

Analysis is being completed using of the software package Recreation Behavior Simulator (RBSim)¹ to model the spatiotemporal distribution of winter recreation on the Kenai Peninsula and Upper Turnagain Arm area of Alaska (including the CPG analysis area). We employed the principles of Individual-based Modeling to define agents representing different classes of winter recreationists then simulated their activities on travel networks. Seventeen winter travel networks have been developed for the Kenai based on flight survey data collected in 2004 and 2005. Trailhead arrival curves for each agent type were developed using a combination of 46 parking lot vehicle count surveys and 287 user questionnaires. Preference for landscape features and estimated durations of landscape use were also generated for each user type based on these questionnaires. Spatial modelling techniques were developed to translate simulation model

¹ For description of RBSim <http://www.srn.arizona.edu/~gimblett/rbsim.html>

outputs into a raster surface capable of predicting winter recreation overlap with wildlife habitat at the landscape level. An example proto-simulation was completed for one of these networks and spatial modelling techniques were presented and critiqued at two professional meetings.

Realized/Expected results: Seventeen winter travel networks have been mapped within and adjacent to the analysis area. The relative numbers of recreation parties dispersing on to these networks between mid-January and mid-April have been quantified along with the total number of CPG visits to ski runs within the analysis area. Behavior profiles have been developed to characterize the activity patterns of snowmobile riders and backcountry skiers within the analysis area. Several example proto-simulations were completed in summer of 2007 and the procedures used for simulation development and some initial results were presented at two professional meetings in fall of 2007. The complete characterization of winter recreation activity (including CPG's activity) on the Kenai as well as the analysis of overlap with important wildlife habitat will be completed spring of 2008.