

Standard Operating Procedure (SOP) 1: Preparations for the Field Season, Version 1.0

Dall's Sheep Monitoring Protocol

Arctic (ARCN) and Central Alaska (CAKN) Inventory and Monitoring Networks

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The main Narrative for the Protocol for Monitoring Dall's Sheep, Arctic (ARCN) and Central Alaska (CAKN) Inventory and Monitoring Networks is available from the NPS Inventory and Monitoring Arctic Network website (<http://science.nature.nps.gov/im/units/arcn/>), the NPS I&M Central Alaska Network website (<http://science.nature.nps.gov/im/units/cakn/>) and the Natural Resource Publications Management website (<http://www.nature.nps.gov/publications/nrpm/>).

SOP 1 – Preparations for the Field Season

Standard Operating Procedure #1
 Version 1.0 (03/01/2017)

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SOP 1.0 – Introduction

This SOP describes how to prepare for the field season except where specific tasks are covered by other SOPs. Pre-season field tasks include 1) scheduling personnel, 2) coordinating aircraft and base airstrips, 3) preparing equipment (covered in SOPs 2, 3, 4, 6), 4) generating and selecting survey transects (SOP 2), 5) uploading transects for data collection and navigation (SOPs 2-4), 6) obtaining permits and 7) personnel training (SOP 5).

SOP 1.1 – Scheduling Personnel

Up to 12 people will need to be scheduled (or hired) to conduct the data collections from aerial distance sampling surveys of Dall's sheep. Prior to the field season, project staff will be hired and/or scheduled for a 10-14 day period in July. The exact number of project staff required will depend on the survey area (large park unit such as GAAR, WEAR or WRST versus DENA or reference area), the survey effort, number of aircraft required and the number of base airstrips used for the survey. Each aircraft requires one pilot and one observer. One to two extra observers should be available during surveys, as a back-up measure, in the event other scheduled staff personnel are unable to continue surveys. Additionally, at least one data technician should be scheduled for each base airstrip to assist with data downloading, verification and processing during the survey. Project staff used in previous surveys included biologists and biological science technicians from network or park staffs and Alaska Department of Fish and Game (ADF&G) personnel.

Housing and food will be required for up to 12 people for 10-14 days where the survey is based. For scheduling pilots and aircraft, see the 'coordinating aircraft' section below.

SOP 1.2 – Coordinating Aircraft and Base Airstrips

Up to five or even six survey aircraft will be required to conduct survey flights within the narrow sampling window. The ecologist project manager and ARCN biological science technician will schedule park and contract pilots during the winter prior to the July survey flights. Experienced pilots book up well in advance so scheduling early is strongly recommended. A combination of Piper PA-18 Super Cub, Aviat Husky and/or Bellanca Scout aircraft should be used for survey operations. Tie-down space will be needed for all aircraft at a base airstrip.

Base airstrips are determined for a given survey and arrangements are made for fuel and housing for the survey crews at each base at least one month prior to the survey. The ecologist project manager and ARCN biological science technician will coordinate fuel amounts needed and cache locations for surveys flights. Bases should have a means to safely store and dispense fuel for survey aircraft: either an AMD-approved tank containing an adequate supply of 100LL av-gas, or a means to transport in and out an adequate supply of 55-gallon drums of av-gas, fire extinguisher, pump and fuel containment systems to the airstrip. A contracted Cessna 208 may be required to transport fuel to base airstrips where there is no established fuel tank and air transport is the only access. Proper permits for the temporary storage of fuel barrels must be obtained prior to the field season (e.g., for storage at the Anaktuvuk Pass airstrip; in May or June). Bases should ideally have a permanent structure available for housing survey crews because of the long hours that they may be flying (up to eight hours a day) and the need to procure adequate rest, food and water during a survey and should also have either a temporary (i.e., generator) or permanent power source available for processing data each evening after

flying. See Table SOP 1-1 for a list of the base airstrips and permanent fuel tanks used for previous Dall's sheep surveys in the ARCN and CAKN park units.

Table SOP1-1. Base airstrips and available amenities used during the 2009-2010 aerial surveys conducted in ARCN and CAKN park units for monitoring Dall's sheep abundance. Other options are shown with *.

Survey Area, airstrip	Access	Housing ¹	Fuel ²		Communications ⁴
GAAR					
Anaktuvuk Pass	Air only	NPS	Drums only	Permanent	Full
Bettles	Air only	NPS/FWS	Vendor	Permanent	Full
Coldfoot	Air or road	NPS/FWS	State tank	Permanent	Limited
Dahl Creek	Air only	NPS	NPS tank	Generator only	Satellite phone only
Galbraith Lake*	Air or road	FWS	Shared tank	Sporadic	Satellite phone only
WEAR					
Kotzebue	Air only	NPS/FWS	Shared tank	Permanent	Full
Kelly River bar*	Air only	NPS	Drums only	Generator only	Satellite phone only
Dahl Creek*	Air only	NPS	NPS tank	Generator only	Satellite phone only
Red Dog Mine*	Air only	Mine	Drums only	Permanent	Limited
DENA					
Park Headquarters	Air or road	NPS	NPS tank	Permanent	Full
WRST					
McCarthy/Kennicott	Air or road	Hotel	NPS tank	Permanent	Full
May Creek*	Air only	NPS	NPS tank	Generator only	Satellite phone only
Nabesna	Air or road	Hotel	Drums only	Hotel, permanent	Satellite phone only
Gulkana/Glenallen	Air or road	Hotel	NPS tank	Permanent	Full
Itkillik subarea (GAAR)					
Anaktuvuk Pass	Air only	NPS	Drums only	Permanent	Full
Galbraith Lake*	Air or road	FWS	Shared tank	Sporadic	Satellite phone only
West. Baird Mtns (NOAT)					
Kotzebue	Air only	NPS/FWS	Shared tank	Permanent	Full

¹Listed housing indicates the most accessible housing available for survey crews. In McCarthy/Kennicott and Gulkana/Glenallen (WRST airstrips) there is NPS housing available but is generally fully reserved for WRST staff and is not available for transient crews. Travel costs are considerably higher when government housing is not available.

²Listed fuel indicates the available fuel source at that airstrip. In Bettles there are no government fuel tanks, but fuel can be purchased from Bettles Lodge or Brooks Range Aviation; rates in 2009 and 2010 were ~\$8 per gallon of 100LL av-gas. The tank in Coldfoot is logistically problematic because it is a state-owned tank and refueling is difficult year-round. The shared tanks at Galbraith Lake and Kotzebue are managed by FWS, but are relatively easy to refuel.

³Electricity at Galbraith Lake is dependent upon the Alyeska facilities. Bringing a generator from Fairbanks is recommended for backup. Toilet facilities at Galbraith are also limited, and no more than two survey teams should be based there.

⁴Communication systems are especially important for communicating with flight following services and when more than one base airstrip are used for a survey and teams need to regularly communicate weather conditions and survey progress. "Full" communications indicate that a phone landline, fax and internet are available either in the airstrip housing and/or nearby NPS offices. Communications are listed as "limited" for Coldfoot and Red Dog Mine because phone landline access is sporadic and access to internet and fax is sporadic or non-existent. Where "satellite phone only" is listed, the survey teams must provide their own satellite phones.

SOP 1.3 – Preparing Equipment

Major categories of equipment preparation include electronic survey equipment preparation, other equipment preparation, and data collection equipment organization. More details on each of these are listed in SOP 6.

SOP 1.4 – Generating and Selecting Survey Transects

A set of transects must be generated for the survey area and uploaded to all data recording equipment for each team. Once a desired sampling intensity (grid spacing, number of transects and transect length) is determined for a survey year, a custom ArcMap (ESRI, Redlands, CA) extension (NPS Animal Tracking Project v2.0.5 Transect Generation ArcMap Extension, GeoNorth, LLC, Anchorage, Alaska) or Add-In (NPSTransectAddin [3].esriAddIn, NPS Alaska Region GIS, Anchorage, Alaska) is used to generate transects of specified length, centered on a random-start grid (SOP 2: Transect Generation). A file geodatabase is produced during transect generation and uploaded to portable tablet PCs (Xplore Technologies, Austin, TX) running a specialized ArcPad 7.1.1 (ESRI, Redlands, CA) application for data collection in the survey aircraft (NPS Animal Tracking Project v1.1.2 Animal Tracking ArcPad Applet, GeoNorth, LLC, Anchorage, Alaska).

SOP 1.5 – Uploading Transects for Data Collection and Navigation

The tablet PCs are interfaced with GPS USB units (Garmin 18X, Olathe, KA) to display real-time GPS locations while the Animal Marking ArcPad Applet is running (SOP 3: Uploading to ArcPad). Transect shapefiles are also uploaded to the pilots' GPS units (Garmin 296/495/496/AERA, Olathe, KA) for navigation, as well as to a spare GPS unit (Garmin 76csx, Olathe, KA) that the observer uses for backup (SOP 4: GPS Unit Setup). Transects should be generated in the March preceding a July survey and reviewed by the project managers so that any adjustments can be made before uploading the transects to the data recording and navigation equipment used by the survey teams. Uploading and equipment troubleshooting should be completed at least two weeks prior to a survey.

SOP 1.6 – Obtaining Permits

An NPS research permit should be obtained before conducting aerial Dall's sheep surveys within park units. Applications can be submitted online through PEPC, and will be reviewed by the park unit-appropriate compliance team. A special-use permit is required for remote fuel caches within park units. These are obtained through the environmental compliance specialist and require the specific cache locations for the evaluation process. The project PI(s) must ensure that permits are obtained well in advance of survey operations to avoid delays in collecting data. They must also ensure that all personnel have or are scheduled for appropriate training (see SOP-5).

SOP 1.7 – Aviation Requirements, Safety Plans and Flight Following

Aviation activities will comply with all applicable policies and regulations issued by the Department of the Interior (DOI), the Federal Aviation Administration (FAA) and the NPS – Alaska Region. Aerial surveys for Dall's sheep monitoring are considered 'Special Use' flights, which are defined as any flight operation other than point to point. They are also considered 'Low Level [< 500 feet] Aerial Surveys'. Aerial surveys for Dall's sheep monitoring will be conducted at 91 m (300 ft) Above Ground Level (AGL), and are considered 'Low-Level' flights. Low-level flight operations are conducted in accordance with Federal Aviation Regulations FAR 91.119, subpart D of part 135, part 137 or a FAA waiver or grant of exemption, if applicable.

These flights require special pilot and aircrew qualifications (see SOP-5), special equipment and personal protective equipment (PPE) to enhance safe transport of personnel (NPS 2003). Personal protective equipment required for Special Use flights includes fire-retardant clothing (NOMEX), aviator's protective helmet, aviation/survival vest, gloves made completely of NOMEX or a combination of NOMEX and leather and leather boots that extend above the ankles. ARCN and CAKN will provide these items for all observers involved with the aerial Dall's sheep surveys and can provide the same for any pilots on the survey, although the pilots usually provide their own PPE. First aid and survival kits are mandatory equipment and are the responsibility of the pilot. Pilots will ensure these kits are complete prior to flight operations and will inform their observer of the location of these kits within the aircraft. The Aviation Life Support Equipment Handbook details equipment lists for these kits (NPS 2003).

Specifications related to transport of hazardous materials and fuel handling are described in Chapter 10 of the Aviation Management Plan (NPS 2003). If caching fuel for aircraft surveys will be necessary, ensure fuel drums are properly stored per DOI regulations. Figure SOP1-1 shows the fuel cache location if Anaktuvuk Pass is used as a base airstrip.

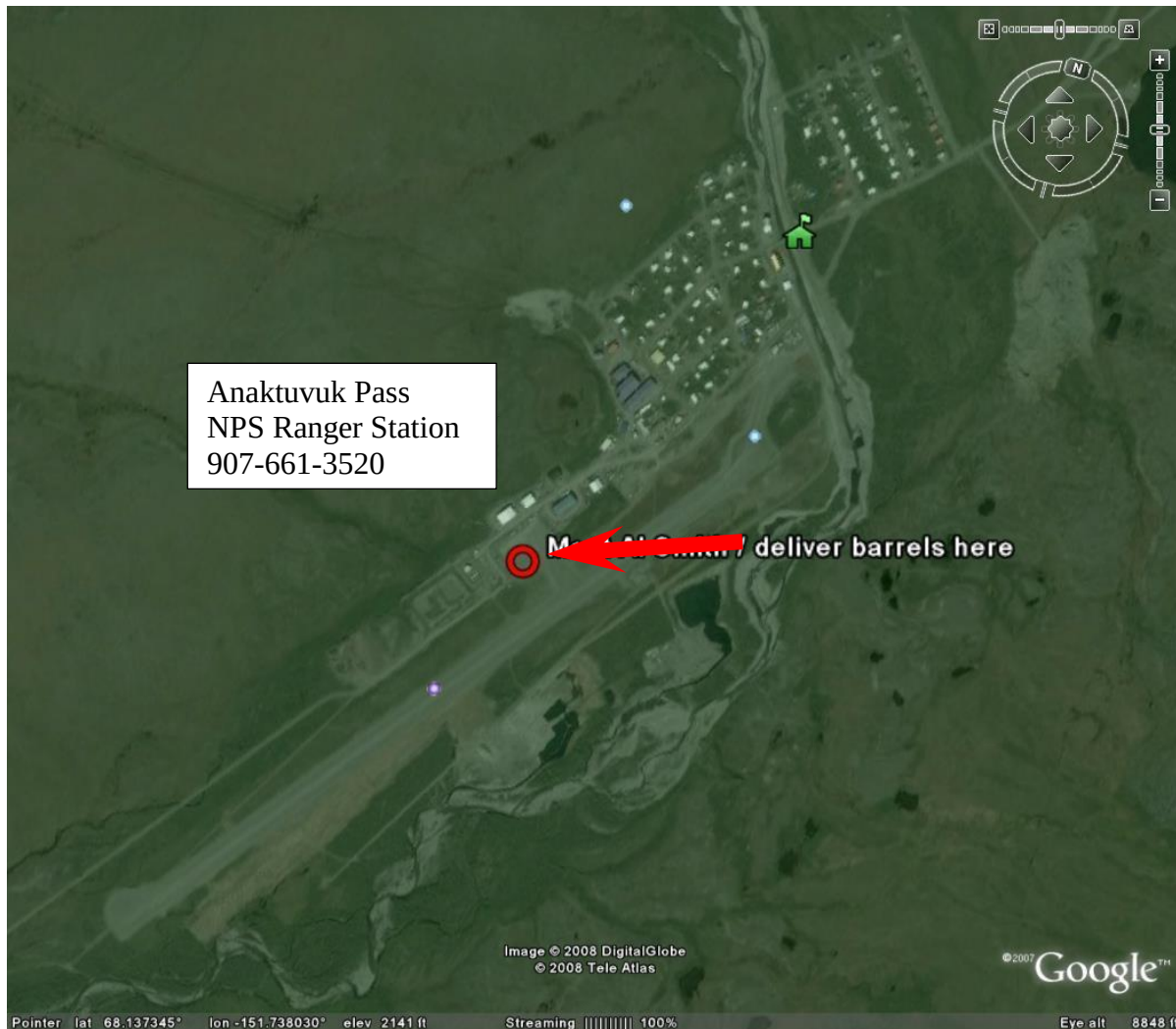


Figure SOP1-1. Location where fuel barrels can be cached on a side apron of the Anaktuvuk Pass airstrip for use during a Dall's sheep aerial survey in GAAR. The GAAR ranger stationed there can assist with this setup. All barrels must be in a DOI-approved containment system and permission must be obtained from the North Slope Borough prior to putting a fuel cache here.

Flight following for the survey aircraft is required by Operational Procedures (OPM) Memorandum Number 06-02 (<http://amd.nbc.gov/library/opm/06-02.pdf>). Flight following requires position reporting at one hour intervals. The NPS-Alaska Region office now requires all aircraft used in its field projects to be equipped with an Automated Flight Following (AFF) system. Procedures indicate that pilots make contact with Denali Dispatch as soon as practical after takeoff to confirm satellite phone communication and the AFF status. Dispatch must monitor Web Tracker (AFF program) at a minimum of every 15 minutes for aircraft data. Flight following check-in calls to Denali Dispatch must be made every hour by the pilot-observer team. Satellite phones are mandatory equipment in aircraft for safety reasons, although flight following call-ins may be made by park radio if repeaters are available. Details regarding the crews, aircraft, transect locations, flight following procedures, fueling procedures and safety protocols must be covered in a Project Aviation Safety Plan (PASP; Appendix SOP1-1), written for each survey and signed at least one week prior to the survey by the project PIs, their supervisors, the

park unit superintendent, park unit aviation manager and if needed the regional aviation manager. A GAR safety model should be a part of the PASP (see Appendix SOP1-1, section PASP Attachment D).

SOP 1.8 – Pre-season Training

Please refer to SOP-5 regarding training.

Appendix SOP1-1 – Sample Project Aviation Safety Plan (PASP) and GAR Model

PROJECT AVIATION SAFETY PLAN (PASP)

Project Name: Network or Park Unit or Survey Area, Sheep Survey, Year
e.g., Southern Wrangell-St. Elias (WRST) Sheep Survey 2011

APPROVALS

Prepared By: Project Aviation Manager/Fixed-wing Special Use Aviation Manager Position, Office

Reviewed By: Project Manager (PI) if different from Aviation Manager Position, Office

Reviewed By: Supervisor of PI and/or Project Aviation Manager Position, Office

Reviewed By: Park Chief of Resources if needed for review Chief of Resources, Office

Reviewed By: Regional or Park (e.g., WRST) Aviation Manager RAM/PAM, Office

Reviewed By: Superintendant if needed for review Superintendant, Office

1. Supervision: List project managers for this survey.

2. Project Name and Objective: **Southern Wrangell-St. Elias Sheep Survey 2011.** In July 2011, the NPS Arctic Network (ARCN), Central Alaska Network (CAKN), and WRST staff will conduct distance sampling (contour transect) surveys to obtain population estimates of Dall's sheep across WRST. Distance sampling, combined with hierarchical modeling during data analysis, is expected to improve NPS estimates of sheep abundance, density and sightability that can be analyzed over time and among parks for long-term monitoring of sheep populations in the ARCN and CAKN parks. Three planes will be based out of McCarthy (MXY) for the survey from July 25 to August 2. Over 200 transects of 20-km in length have been randomly generated across the park on a 9.5-km grid (Figure 1). Northern WRST transects were flown in 2010. We plan to survey all of the southern transects, weather permitting.

3. Justification: Based on published Dall's sheep surveys as well as past experience, the preferred sampling platform is low (~300' AGL) and slow flying in tandem seated, fixed wing aircraft such as the Piper PA-18 Super Cub, Bellanca/American Champion Scout and Aviat Husky. Data quality suffers when surveys are conducted at higher altitudes utilizing aircraft that require faster flight speeds because the sightability of sheep declines.

4. Project Dates: **July 25 – August 2, 2011.** All pilots, planes and observers will travel to McCarthy on July 25. The surveys will begin July 26 and will continue until the transects have been completed, or until August 1, whichever is sooner. August 2 is scheduled as a travel home day for the survey crews.

5. Location: The 2011 WRST sheep survey will focus on those transects that were not surveyed in 2010 and are within sheep habitat in the southern portion of the park and preserve (Figure 1). All three survey aircraft and their respective pilot-observer teams will be based in McCarthy (61° 25' 58" N, 142° 54' 39" WGS84) at the Kennicott Glacier Lodge.

6. Aircraft/Pilots/Observers: The following aircraft, pilots and observers will be based in McCarthy, Alaska (MXY). Additional contact information for crews is provided in PASP Attachment A.

Aircraft	Pilot	Observer
Plane 1 tail number	Pilot 1 Name, company or DOI office	Plane 1 Observer
Plane 2 tail number	Pilot 2 Name, company or DOI office	Plane 2 Observer
Plane 3 tail number	Pilot 3 Name, company or DOI office	Plane 3 Observer

All contracted aircraft and pilots are OAS carded for low-level aerial observation. All observers flying with contract or DOI fleet aircraft have received OAS B3 Aviation refresher/orientation training.

7. Fuel: Fuel (100LL av-gas) will be obtained from the NPS fuel tank on the main McCarthy airstrip (61° 25' 58" N, 142° 54' 39" W, WGS84). Fuel may also be obtained from the NPS tank at May Creek (61° 20' 8" N, 142° 41' 12" W, WGS84). Protocols regarding use of these fuel tanks will be adhered to and are provided in PASP Attachment B. The WRST Aviation Manager will be the main point of contact for this project regarding use of these fuel tanks (list contact phone numbers here). Any fuel used from either tank for this survey will be replaced or paid for using appropriate funding sources.

8. Communications/ Flight Following: **The Project Aviation Manager or Fixed Wing Flight Manager (Special Use)** will work with the pilots to serve as the airspace coordinator for this project as well as an observer. He/she will assign transect sets each day for each crew, and all crews will report to the manager in the evening with the transect numbers that they have completed that day. Potential risks including airspace conflicts will be discussed by the airspace coordinator, pilots and observers. The airspace coordinator will be responsible for maintaining frequent communication with survey aircraft, and will work with WRST Dispatch and Denali Dispatch to ensure that all aircraft return to McCarthy at the end of each day.

Flight Following

Denali Dispatch (907-683-9555) will provide flight following for the survey, and will monitor the aircraft through the automated flight following (AFF) system. The aircraft are equipped with AFF or Spidertrax[®] transmitters that can be viewed through the AFF system. All aircraft will contact Denali Dispatch at the start and end of each survey day, after any landing and take-off, and once per hour while in-flight. Each plane will also maintain an active satellite phone while flying so that Denali Dispatch can notify the aircraft in the event that the AFF connection is lost. If the AFF connection is lost, the plane will return to McCarthy to troubleshoot the AFF connection before resuming flying.

Maps showing transects and this project aviation safety plan will be provided to the Denali Dispatch, WRST Dispatch, Copper Center and Fairbanks NPS offices. The crews will inform Denali Dispatch (by phone 907-683-9555, email DENA_commcenter@nps.gov, or fax 907-693-9640) and the WRST Aviation Manager of the transects they plan to survey before departing McCarthy each morning, and will update Denali Dispatch if that plan changes during the day. This, plus the AFFs, will minimize the search area in the event of missing aircraft.

Satellite Phone Numbers and VHF

Each aircraft will have an Iridium Satellite Phone for communicating with Denali Dispatch (or the individual NPS offices as necessary). Communication between aircraft will occur on VHF 122.9.

Aircraft	Pilot	Observer	Satellite Phone	AFF#
Plane 1 tail number	Pilot 1 Name, company or DOI office	Plane 1 Observer	e.g., 8816-5145-3678	Usually tail #
Plane 2 tail number	Pilot 2 Name, company or DOI office	Plane 2 Observer	e.g., 8816-5145-3678	Usually tail #
Plane 3 tail number	Pilot 3 Name, company or DOI office	Plane 3 Observer	e.g., 8816-5145-3678	Usually tail #

Iridium Dialing Procedure:

- 1. Landline to Satellite Phone:** **011+ Satellite Phone Number,**
or dial 1-480-768-2500, then dial sat phone number when prompted.
- 2. Satellite Phone to Satellite Phone:** **00+ Satellite Phone Number**
- 3. Satellite Phone to US Landline:** **001+Area Code+Number**

9. Emergency Procedure: Emergency procedures for overdue and missing aircraft will follow the WRST Aviation Mishap Response Plan 2011. Denali Dispatch has this plan and a list of WRST contacts. In the event of an emergency landing, the grounded plane will call Denali Dispatch and leave their satellite phone on to be contacted by other survey aircraft, NPS offices and/or Denali Dispatch. Prior to the survey, pilots and observers will discuss scenarios of overdue and missing aircraft to ensure that everyone is familiar with procedures and contacts. A copy of these procedures and lists of contacts will be available for the pilots and observers and at all base stations. Emergency contact information for the pilots and observers are included in PASP Attachment A.

NPS points of contact for WRST and this project are:

Denali Dispatch 683-9555

WRST (Gulkana) Dispatch 822-7425

WRST Headquarters office, main line 822-7200

WRST Aviation Manager, phone number(s)

NPS Regional Aviation Safety Manager, phone number(s)

Chief Ranger, phone number(s)

District Ranger(s), phone number(s)

Chief of Resources, phone number(s)

Project Manager Supervisor, phone number(s)

10. Aerial Hazard Analysis: Long hours of low, slow flight will be the primary hazard. Aerial hazards include flying in mountainous terrain, and in some areas at treeline. Specific regions have been delineated and individual aircraft are assigned to specific regions. If aircraft need to survey along the border of their assigned area, or in an area not previously assigned to them due to poor weather or fuel management, they must contact the aircraft assigned to that region before starting any survey work. Additionally, use of the McCarthy airstrip will involve sharing airspace with flight-seeing aircraft based in McCarthy. The project managers will contact these companies prior to the survey start to discuss inter-aircraft communication during the survey (via VHF 122.9) and to mitigate any potential airspace conflicts.

A copy of this plan, as well as the 2011 [WRST] Aviation Management Plan and the WRST Aviation Mishap Response Plan 2011, will be provided for each aircraft. Pilots and observers will review the WRST Go/No Go Checklist prior to flying each morning (PASP Attachment C). See also the GAR model (PASP Attachment D) showing how hazard analysis and mitigation can be conducted for NPS projects. All pilots and observers will discuss this model prior to the start of the survey.

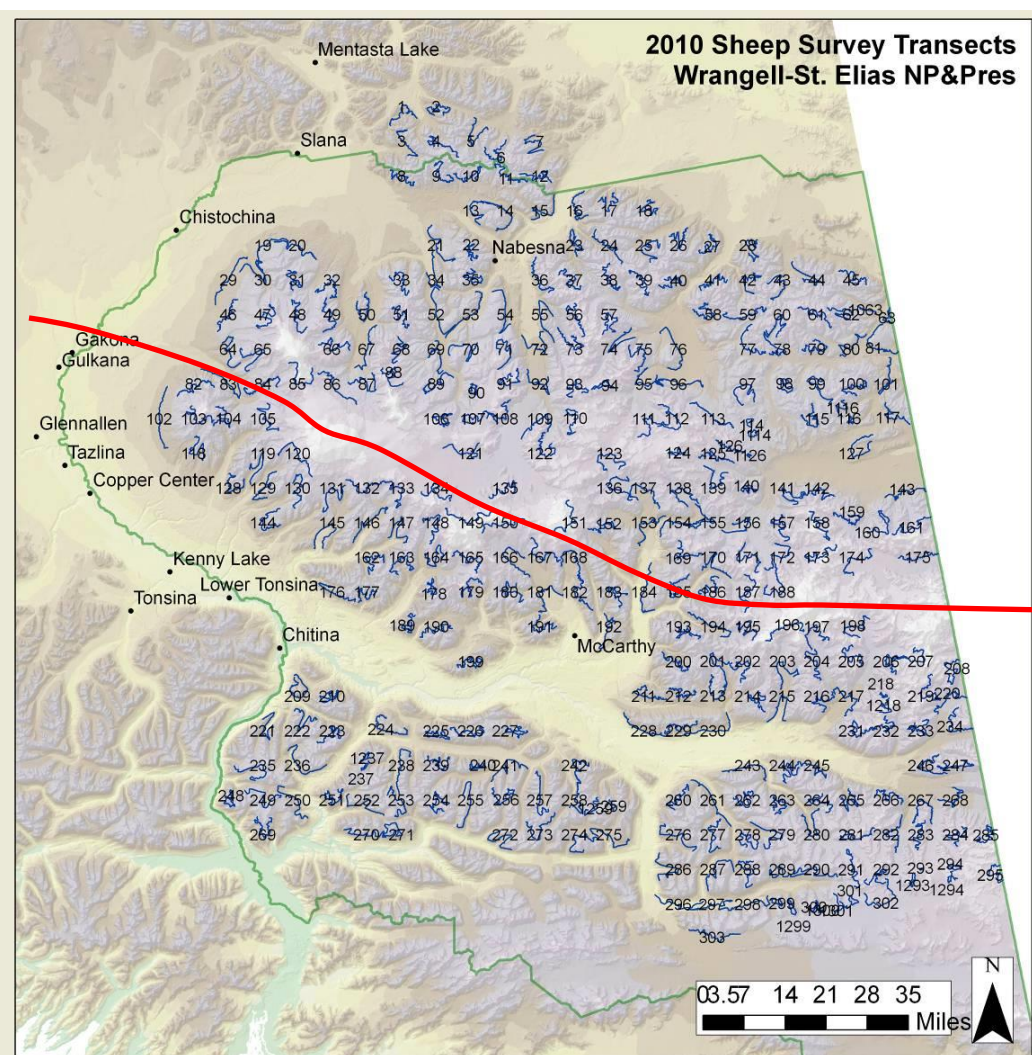
11. Protective Clothing/Equipment: All pilots and passengers will wear Nomex flight suits and gloves as well as DOI approved flight helmets. All observers/crew members will also wear survival vests.

12. Payload/Useful Load: The pilots will be responsible for the accurate completion of load calculations. The aircraft utilized for the survey are the appropriate aircraft for this project. The project managers, crew members and pilots shall ensure that all safety regulations are complied with.

13. Hazard Analysis/Mitigation: One of the greatest hazards presented by this project is weather. Prior to each morning's flight, and over the course of the day, the pilots will discuss the weather conditions, particularly visibility, precipitation and icing conditions, and winds. Forecast conditions will be requested from the FAA-FSS each morning. If all weather factors indicate safe conditions for flying, survey flying will be conducted. Survey flights in marginal weather with low ceiling and low visibility will be avoided to provide for safe conditions and for the collection of more precise biological data. If weather conditions appear to be marginal, weather forecasts will be checked by phone and via the internet and further discussion will ensue before flying that day.

Low level flight (300' when on-transect) is also hazardous. This hazard has been mitigated by selecting pilots with substantial low-level experience and training. Each airplane has been assigned a series of survey transects and will inform the airspace coordinator and other survey aircraft of their planned route and survey area. This will minimize the area that would need to be searched in the event of a missing aircraft.

A copy of this plan, as well as the 2011 [WRST] Aviation Management Plan and the WRST Aviation Mishap Response Plan 2011, will be provided for each aircraft. Pilots and observers will review the WRST Go/No Go Checklist prior to flying each morning (PASP Attachment C). See also the GAR model (PASP Attachment D) showing how hazard analysis and mitigation can be conducted for NPS projects. All pilots and observers will discuss this model prior to the start of the survey.



Appendix SOP1-1: Figure 1. Example of a Project Aviation Safety Plan map showing contour transects and aircraft bases for the 2010 and 2011 Dall's sheep surveys in Wrangell-St. Elias National Park and Preserve. The 2011 survey will be conducted by three aircraft and pilot-observer teams based in McCarthy. The 2011 teams will fly those contour transects located south of the red line. Transect elevations and start and end point coordinates are listed in PASP Attachment E.

PASP Attachment A. Contact information for survey participants.

Name/Aircraft/Office #	Phone in McCarthy	Satellite phone in plane	Emergency contact
Observer 1 Name Pilot – Aircraft tail # Phone number	WRST cell on loan: ###-#### Kennicott Glacier Lodge: 258-2350	e.g., 8816-5141-4336	Name Phone number
Observer 2 Name Pilot – Aircraft tail # Phone number	WRST cell on loan: ###-#### Kennicott Glacier Lodge: 258-2350	8816-4142-3747	Name Phone number
Observer 3 Name Pilot – Aircraft tail # Phone number	WRST cell on loan: ###-#### Kennicott Glacier Lodge: 258-2350	8816-5145-3678	Name Phone number
Pilot 1 Name Pilot – Aircraft tail # Phone number	WRST cell on loan: ###-#### Kennicott Glacier Lodge: 258-2350	8816-5141-4336	Name Phone number
Pilot 2 Name Pilot – Aircraft tail # Phone number	WRST cell on loan: ###-#### Kennicott Glacier Lodge: 258-2350	8816-4142-3747	Name Phone number
Pilot 3 Name Pilot – Aircraft tail # Phone number	WRST cell on loan: ###-#### Kennicott Glacier Lodge: 258-2350	8816-5145-3678	Name Phone number

PASP Attachment B. Protocols regarding use of WRST fuel tanks.

Use of Remote Fuel Sites
(McCarthy, May Creek, Chisana)

-All Fuel Requests MUST go through Gulkana Dispatch as far in advance as possible.

-Fuel Stations are **LOCKED**; keys at dispatch only.

-Pumps clearly marked '100 low lead' or 'Jet-A'

-Remove padlock, turn on pump at right side by lifting lower lever. Zero pump meter. Roll out hose; ground aircraft with available grounding unit. Rewind hose when finished, turn off and LOCK pump.

-Read and **record meter reading**

-When taking fuel, log amounts dispensed in fuel log book. Also write down **start and ending Meter** (totalizer).

-Notify Gulkana Dispatch if tanks need refueling/fuel transfer.

-It is the pilot's responsibility to insure the appropriate fuel is used.

Gulkana Dispatch: 907-822-7425

PASP Attachment C. WRST Go / No Go CHECKLIST.

GO	NO-GO	NA	Conditions
			Weather – better than 500/2, is a higher weather minimum needed. Helicopters – ½ mile visibility. ASK YOUR PILOT
			Pilot Qualifications – pilot carded and approved for mission Will have information ahead of time, list at GOC.
			Aircraft data card checked – mission approved
			Aircraft Weight Checked – is the weight of the gear, passengers, and fuel within allowable limits.
			Mission – approved at appropriate level Unprepared Site and Low Level approved by Superintendent
			PPE – PFD for all float plane operations Helmet, Nomex clothing, gloves for all Helicopter and fixed wing special use.
			Flight Plan- Must be on file with Gulkana Ops Center (GOC)
			Flight Following – 1 hr check ins- Must have equipment- Phone:CELL or SAT; or Radio. (Available at GOC)
			AFF – Installed and Working
			Mission Briefing
			Passenger Briefing- Pilot Safety Briefing
			Fuel – 45 minute reserve – Helicopters 30 minute fuel reserve Manifest Completed

Signature_____

Signature_____

SUBMIT TO GULKANA OPS CENTER UPON COMPLETION OF MISSION

PASP Attachment D. Generic GAR Risk Assessment.

National Park Service
Operational/Mission Risk Assessment

Category	Description	Risk 0-10	Mitigation(s)
Supervision	Presence, accessibility and effectiveness of leadership for all teams and personnel. Clear chain of command.		
Planning	Current and relevant standards and policies, team trained in accordance with same. Adequate mission planning time. Required equipment and associated training is provided. Briefs/debriefs planned, team input solicited.		
Contingency Resources	Formal agreements in place with participating cooperators. Planning accomplished with cooperators. Shared communications plan and frequencies.		
Communication	Infrastructure: radio communications possible throughout area of operations. Availability of alternate communications. Interpersonal communications on team considered. Communication plan established/ rehearsed.		
Team Selection	Level of individual training and experience. Cohesiveness and atmosphere that values input/self critique.		
Team Fitness	Level of overall physical fitness of team. Level of crew rest/fatigue and overall morale. Team members with major life events/ distractions.		
Environment	Extreme temperatures, elevation, difficulty of terrain (aspect, foliage, slope, etc.), long approach, remoteness, time of day, etc.		
Task Complexity	Severity and probability of mishap—"Red Flags". Potential for incident that would tax the current staffing levels or team capabilities.		
TOTAL			

Mitigations should be considered for any category rated higher than 5.

Overall Mission risk:

Green (1-35)	Amber (36-60)	Red (61-80)
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PASP Attachment D (cont.). Sample GAR Risk Assessment for the southern WRST Dall's sheep survey, 2011.

Category	Description	Risk 0-10	Mitigation(s)
Supervision	Superintendent, Park Aviation Manager (PAM), Supervisor. The Superintendent has clearly stated policies for all flights, employees are held accountable for deviations, and the PAM and Supervisor are directly involved in the decision to conduct the flight under the current conditions.	6	All crew members will review Superintendent's and PAM's policies, park aviation and backcountry safety policies, the park's and the Project Aviation Safety Plans and understand the chain of command. <i>The Project Managers are not experienced in providing operational oversight to aviation operations, or extensive background in aviation regulations and DOI/NPS aviation policy, and have a vested interest in project completion.</i> However, the Project Managers will not, and have not on previous surveys, tried to override the pilots' assessment of the conditions (whether that be local geography, topography and/or current weather conditions) that affect safe flying for this survey method. The Project Managers will not survey when conditions are not optimal for transect flying even if this means cancelling the entire survey and waiting until a future field season to complete the area. All three pilots have safely flown the same type of survey in at least 3 previous surveys each, for a minimum of 100 hours each with this method. The project aviation safety plan has been reviewed by the chain of command in WRST.
Planning	Current and relevant standards and policies, team trained in accordance with same. Adequate mission planning time. Required equipment and associated training is provided. Briefs/debriefs planned, team input solicited.	2	Review the available routes. Consider if there is a better choice based on elevation, known weather, or pilot reports. All crews will complete GAR models such as this one to indicate their comfort with survey planning and in planning routes each survey day.
Resources	Weather reporting: Real time and pilot reports. Aircraft and equipment appropriate for the mission? Yes. Is the required PPE available and being used? Yes.	5	No flights will occur unless real time weather reporting or current (within last hour) indicate the flights can be conducted safely. All aircraft are on tundra tires and pilots are very experienced landing on unimproved sites. All crew members will wear PPE including flight safety vests, helmets, and Nomex. Aircraft can fly transects in other parts of the survey area if the conditions are poor where they were

			planning on flying that morning. We can still get useful estimates for portions of WRST if we are not able to fly the full survey area, and have personnel and financial resources to finish the survey in another year if conditions are too poor in 2011. <i>Resources include contingency resources in the event there is a problem. Contingency resources (i.e., helicopter rescue) are not readily available that can access all areas of the park. However, survey aircraft will work closely together and would be the main aircraft called upon to search for an overdue or missing aircraft from the survey fleet.</i>
Communication	Radio or Sat Phone Continuous two way communication 0 points Intermittent two way communication 3 points One way communication 5 points No communication during flight 7 points	2	Each aircraft will have a satellite phone with spare batteries and an air-to-ground radio. Observers will check in with Denali Dispatch upon take-offs, landings and every hour in flight. All 3 survey aircraft have AFF. On most days, survey aircraft should be in radio contact distance with one another. The satellite phones in all aircraft will be turned on at all times during flight, making 2-way communication possible at all times.
Team Selection	Park Aviation Manager , Supervisor, Pilot/Crewmembers. All positions meet the minimum training requirements and have a working knowledge of policy and procedures. The mission is well within the comfort zone of the pilot based on demonstrated experience, knowledge, and training.	3	Use experienced, well trained, low-level survey pilots who have extensive experience with this survey method, delay flights until <u>known</u> weather well within mission pilots' demonstrated experience. <i>The teams are well chosen for their survey experience and capability. The pilots are well experienced. The observers are not qualified to provide safety oversight to the pilot's flight operations. However, these teams have worked together on at least 3 previous surveys using the same methods and the cohesiveness and atmosphere of the team values input and self critique by all team members.</i>
Team Fitness	Level of overall physical fitness of team.	3	If the mission has been delayed until the last 4 hours of the pilot's duty day, postpone mission until following day. The pilots and observers must be adequately rested prior to each flight.

Environment (overall)	<i>The operating environment presents significant hazards that cannot be mitigated, including weather, winds, mountainous terrain, and remote operations.</i>	7	We will not fly in areas or on days when the severity or probability of a mishap is at all. If wind is above 15 knots, delay survey or move to less windy area.
Environment	Ceiling > 3000 ft 0 points Ceiling > 1000 -3000 ft 2 Ceiling > 800-1000 ft 5 Ceiling > 500-800 ft 8 Ceiling < 500 ft 10	2	For unknown hazards discovered during mission use SPE. Do not fly in areas when ceiling is below 1000 ft.
Environment	Visibility > 6 miles 0 points Visibility > 3-6 miles 3 points Visibility > 2-3 miles 7 points Visibility > 1-2 miles 10 points Note: Don't forget to include wind or other weather related hazards	3	For unknown hazards discovered during mission use SPE.
Task Complexity	Severity and probability of mishap Unlikely 1 point Seldom 2 points Occasional 4 points (No go, automatic red classification) Likely 7 points (No go, automatic red classification) Frequent 10 points (No go, automatic red classification) <u>Note: Due to the catastrophic nature of weather accidents, any probability rating above seldom is a no go.</u> <i>Task Complexity is high; the pilot must operate low level (within 300 ft or the ground) in mountainous terrain, navigate, and at times, pay attention to the GPS and altimeter occasionally while on-transect. Additionally, due to the survey parameters (contour flying at 300 ft), the pilot must correlate between the map and visual cues in areas where there is inadequate room to turn around and the terrain is too steep to climb out of. The observer is also operating data recording equipment.</i>	8	For unknown hazards discovered during mission use SPE. <i>This cannot be easily mitigated. The observer can help the pilot maintain situational awareness, assist with communications and navigation.</i>
TOTAL		36	Without the ceiling and visibility scores. Mitigate amber rating with signed PASP.

Mitigations should be considered for any category rated higher than 5 and the score exceeds 35.

Overall Mission risk:

Green (1-35)	Amber (36-60)	Red (61-80)
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Green Flights – Approval Level is the pilot

Amber Flights – Park Aviation Manager

Red Flights – the Park Superintendent will approve the flight after consulting the PAM/Pilot on why the flight should be conducted. As a minimum the following questions will be answered:

Is this flight necessary?

Is there a better way to do it? (Helicopter)

Can the flight be conducted within policy? If not cancel the flight unless life or death justification.

Are all employees appropriately trained and experienced? Are these the most experienced personnel available?

Is this the best aircraft to use?

Have no-go (termination) criteria been clearly communicated to the team?

PASP Attachment E. Transect elevation and start and end coordinates (NAD 83, Alaska Albers). Not all transects are shown in this example.

Transect #	ELEV_FEET	DD_LAT1	DD_LONG1	DD_LAT2	DD_LONG2
1	3415	62.739402479	-143.447007411	62.746557175	-143.299707734
2	4271	62.743816935	-143.155618522	62.747785900	-143.205365863
3	3868	62.660345933	-143.380056846	62.722807375	-143.418036675
4	5794	62.671483629	-143.237865905	62.636469109	-143.112077727
5	3960	62.693017230	-142.932101525	62.726345645	-142.994969277
6	5890	62.659299599	-142.845525038	62.649704653	-142.965577961
7	4164	62.658509791	-142.689950465	62.618332896	-142.658441080
8	4522	62.592905025	-143.369016558	62.631862904	-143.485141993
9	5720	62.596782302	-143.191121332	62.631837375	-143.237775972
10	4772	62.575315557	-143.035766172	62.597878312	-143.152629157
11	6210	62.551721527	-142.768336065	62.595385788	-142.926103243
12	5261	62.570174062	-142.806870721	62.537061071	-142.646052409
13	4313	62.511220680	-142.989019819	62.464003144	-143.058017352
14	4106	62.520646574	-143.035525869	62.444182439	-142.981008563
15	3012	62.456230065	-142.785271314	62.506764027	-142.640813394
16	4101	62.502446832	-142.481208322	62.442395160	-142.483575566
17	4821	62.470332757	-142.417661769	62.484571568	-142.323846837
18	4263	62.415358878	-142.126051991	62.449042762	-142.158560016
19	4264	62.486072177	-144.088547937	62.435089567	-144.241645747
20	4462	62.501933516	-144.159147943	62.443554423	-143.950499015
21	4183	62.482822986	-143.312984279	62.387436342	-143.238768741
22	6343	62.380792756	-143.132529664	62.382952496	-143.105233292
23	4131	62.397102551	-142.565685516	62.348381235	-142.577412240
24	5033	62.312023712	-142.353259920	62.405527767	-142.453711679
25	4880	62.301998424	-142.200904126	62.342614385	-142.132718212
26	4538	62.368742717	-141.973435801	62.356536476	-142.076721656
27	5416	62.324724241	-141.837311933	62.308188980	-141.937652174
28	3914	62.280730113	-141.678284945	62.308030197	-141.620116505
29	3479	62.369327195	-144.517027364	62.472297328	-144.313004955
30	3948	62.441459181	-144.362546804	62.464101283	-144.266435585
31	6134	62.427003715	-144.109187385	62.376591452	-144.098432728
32	4976	62.364898870	-143.981714768	62.344771669	-143.907712344
33	5321	62.375872855	-143.578185217	62.334129951	-143.490158079
34	3116	62.369647948	-143.381220107	62.429534610	-143.332135602
35	5723	62.361544978	-143.145274091	62.331871927	-143.160432656