

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

Protocol for Monitoring Brown Bears

Arctic (ARCN) Inventory and Monitoring Network

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September 2017

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

Please cite this Standard Operating Procedure as:

Robison, H. L., K. L. Rattenbury, and E. S. Boyd. 2017. Standard Operating Procedure (SOP) 1: Preparations For Field Season, Version 1.0. Protocol for Monitoring Brown Bears in Arctic (ARCN) Inventory and Monitoring Networks. National Park Service, Fairbanks, Alaska. Available online at <https://irma.nps.gov/DataStore/Reference/Profile/2210687>

The main Narrative for the Protocol for Monitoring Brown Bears in Arctic (ARCN) Inventory and Monitoring Networks is available from the NPS Inventory and Monitoring Arctic Network website (<http://science.nature.nps.gov/im/units/arcn/>) 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 (09/01/2017)

Revision History Log:

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #
Add rows as needed for each change or set of changes associated with each version.					

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SOP 1.0 – Introduction

This SOP describes how to prepare for the field season for Brown Bear aerial surveys, except where specific tasks are covered by other SOPs. Pre-season field tasks include: 1) obtaining permits; 2) scheduling personnel; 3) coordinating aircraft, base airstrips and fuel caches (SOP 6); 4) preparing equipment (SOPs 2, 3, 4, 5, 6); 5) uploading maps, waypoints, Brown Bear survey protocols, and the most recent version of Park Observer onto the iPads for data collection and navigation (SOPs 2, 3, 4, 6); 6) aviation requirements such as safety and flight following (SOP 6); and 7) pre-season training (SOP 3).

SOP 1.1 – Obtaining Permits

Required permits for the Brown Bear aerial survey include NPS park compliance and research permits for the park unit in which the survey will occur. For the Seward Peninsula survey, which includes Bering Land Bridge National Preserve (BELA), permits will be required from BELA. For the Upper and Lower Noatak surveys, permits will be required from Western Arctic Parklands (WEAR). For the Gates of the Arctic National Park and Preserve (GAAR) survey, permits will be required from Yukon-Charlie Rivers National Preserve and Gates of the Arctic National Park and Preserve (YUGA). The permits must be obtained before conducting aerial brown bear surveys within park units. The call for permit applications usually comes in March of a given year and park permits usually require at least 60 days prior to the project start date. Applications for park permits can be submitted online through PEPC, and will be reviewed by the park unit-appropriate compliance team. A special-use permit from the affected park unit (e.g., BELA, WEAR, YUGA) is required for remote fuel caches within park units. These are obtained through the affected park unit's 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 prior to conducting surveys ([see SOP 3](#)).

SOP 1.2 – Scheduling Personnel

Up to 5-6 people will need to be scheduled (or hired) to conduct the data collections from aerial brown bear surveys. Prior to the field season, project staff will be hired and/or scheduled for a 10-day period in mid-May (May 15-30). Each tandem 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 and to conduct flight following. Additionally, at least one data technician should be scheduled for each base airstrip to assist with data downloading, verification and processing during the survey and flight following of survey aircraft. Project staff used in previous surveys included biologists and biological science technicians from network or park staff and from Alaska Department of Fish and Game (ADFG) collaborators.

Housing and food will be required for up to 14 people for 10 days at survey base location in Kotzebue, Dahl Creek, Quartz Creek, Anaktuvik Pass, or Cold Foot, Alaska. Arrangements for housing should be made as early as possible and at least two months ahead of time. For scheduling pilots and aircraft, see the 'coordinating aircraft' section below.

SOP 1.3 – Coordinating Aircraft, Base Airstrips and Fuel Caches

No fewer than six survey aircraft will be required to conduct survey flights within the narrow sampling window. It is better to have arrangements for seven planes because inevitably something comes up. The ARCN Brown Bear project manager will work with the Northern Hub Aviation Manager to schedule park and contract pilots during the winter prior to the May 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 wheeled aircraft should be used for survey operations.

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 two month prior to the survey. The ARCN Brown Bear project manager will work with the Northern Hub Aviation Manager and consult pilots to 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. An OAS or contracted Casa, Cessna 206 or 185 or fuel tanker may be required to transport fuel and/or equipment to base airstrips where there is no established fuel tank and/or equipment and air transport is the only access. Proper permits for the temporary storage of fuel barrels at remote fuel caches must be obtained prior to the field season (e.g., for storage at Quartz Creek). 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. However, at some locations (e.g., at Quartz Creek) camping will be needed to supplement cabin space. Additionally, generators (e.g., Honda 1000s or 2000s) will be needed to heat planes. At all locations, except Kotzebue, generators for planes and computers will be required. The base airstrip used for the Brown Bear aerial surveys are in Kotzebue (Lower Noatak survey area), Dahl Creek (Upper Noatak survey area), Quartz Creek (Seward Peninsula/BELA survey area), and Anaktuvik Pass and/or Coldfoot (GAAR survey area), Alaska. Solely Kotzebue has permanent full communications (“Full” communications indicate that a phone landline, fax and internet are available either in the airstrip housing and/or nearby NPS offices) permanent fuel tanks, a hangar, and tie down space for wheeled aircraft.

SOP 1.4 – 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 SOPs 2, 3, 4, 5 and 6).

SOP 1.5 – Uploading Park Observer, Base Maps and Survey Protocols for Data Collection and Navigation

Please refer to SOP 2 regarding the setup of the Park Observer app, base maps, and survey protocol on the iPads for survey data collection and navigation.

SOP 1.6 – 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 Brown Bear 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 brown bear monitoring will be conducted at ~ 500 ft Above Ground Level (AGL); flights below 500 ft 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 SOPs 3 and 6), 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, WEAR, BELA, and/or GAAR will provide these items for all observers involved with the aerial brown bear 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 in fuel containment per DOI regulations.

Flight following for the survey aircraft is required by 351 DM 1.4 and *OPM-02, Flight Plans and Flight Following*, which is referenced in the National Park Service *Reference Manual 60 Aviation Management* (https://www.nps.gov/policy/rm-60_april_2013.pdf). Flight following requires position report 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 the Alaska Region Communications Center (a.k.a. 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 ARCC/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 and safety protocols must be covered in a Project Aviation Safety Plan (PASP) (Appendix SOP 1.1), written for each survey and preferably signed at least one week prior to the survey by the project PI, their supervisor, the park unit superintendent (if required), Norther Hub Aviation Manager, and the Regional Aviation Manager (if required). A GAR safety model and Aviation Risk Assessment Worksheet should be a part of the Project Aviation Safety Plan (see Appendix SOP 1.1).

SOP 1.7 – Pre-season Training

Please refer to SOP 3 regarding training.

Appendix SOP 1.1 – Sample/Example Aviation Safety Plan

PROJECT AVIATION SAFETY PLAN

Project Name: 2017 Aerial Brown Bear Survey, Upper Noatak Brown Bear Survey, NOAT-GAAR

REVIEWS and APPROVALS

I reviewed the contents of the Special Use Project Aviation Safety Plan and Risk Analysis and find that it conforms to existing NPS policies and identifies the necessary precautions that flights of this nature must address.

Prepared By: Project Aviation Manager/Fixed-wing Special Use Aviation Manager	Position, Office
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Reviewed By: Project Manager (PI) if different from Project Aviation Manager	Position, Office
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Reviewed By: Supervisor of PI and/or Project Aviation Manager	Position, Office
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Reviewed By: Park Chief of Resources (if needed for review)	Chief of Resources, Office
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Reviewed By: Northern Hub Aviation Manager	HAM, Office
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Reviewed By: Superintendent (if needed for review)	Superintendent, Office
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RA Score: 2

If Risk Assessment Score is 2.1 points or higher, The Superintendent will have to approve the Project Aviation Safety Plan. If Risk Assessment Score is 2.0 points or lower or the overall complexity level of the Risk Assessment Worksheet is at Low or Medium Risk, approval signature by Superintendent is not required and the Northern Hub Aviation Manager can approve the PASP.

After all required signatures are obtained submit original PASP to the Northern Hub Aviation Manager.

1. Supervision:

Jane Doe1 (Position/Title, park unit [e.g. WEAR]) is the Project Aviation Manager (PAM) and Fixed-Wing Flight Manager (FWFM) for the project, supervised by Jane Doe2 (Position/Title, park unit). John Doe is the Northern Hub Aviation Manager (HAM).

2. Project Name and Objective:

2017 Aerial Brown Bear Survey, Upper Noatak Brown Bear Survey, NOAT-GAAR. ARCN, WEAR and ADFG will conduct an aerial brown bear in the Upper Noatak River drainage, including NOAT and GAAR. The objective of the project is to estimate the number of brown bears within the survey area (Figure 1). The survey area consists of 192 sample units. Pilots will be given a waypoint of the southeast corner of each sample unit – the pilots will use those waypoints (**Appendix C**) to navigate

to the sample units; the sample units are labeled in Figure 1 (i.e., 1a, 1b, 1c, 1d, etc.). Sample units will be surveyed with Super Cub aircraft. Pilot/observer teams will fly low-level transects or contour lines to cover assigned units and record the number and location of brown bears seen.

3. Justification: Fixed-wing aerial surveys are the most cost effective and precise method to estimate brown bear populations.

4. Project Dates: Days of favorable weather between May 15 – May 30, 2017. The project may be extended depending on weather and the availability of the pilots and observers.

5. Location: Upper Noatak River drainage including NOAT and GAAR. NPS vendor planes will be based at Dahl Creek; the survey base may change to Kotzebue for 1-2 aircraft as needed to better cover the survey area. All Project maps and Aerial Hazard maps (Figure 1, **Appendix A**) have been reviewed by (PASP preparer and NPS pilot) to verify/identify hazards.

6. Cost: Estimated costs for NPS are \$135,000 including five vendor aircraft for survey work, fuel, gear shipment (including associated aircraft) and travel and hazard pay for observers. ADFG provided 1 vendor aircraft. Funding and personnel provided by ARCN, WEAR, and ADFG.

7, 8, 9, 10. Aircraft/Pilots/Observers/Participants:

Survey aircraft, pilots and observers

Aircraft	Pilots (Company Name/Agency)	Observers (Agency)
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
Plane 4 tail Number	Pilot 4 Name, company or DOI office	Plane 4 Observer
Plane 5 tail Number	Pilot 5 Name, company or DOI office	Plane 5 Observer

All NPS vendor pilots and observers will be based at Dahl Creek. Observer-pilot pairings are not set in stone and will change as needed. Jane Doe3 (park unit or organization) and John Doe2 (park unit or organization) will rotate in with the other observers.

All aircraft and pilots are OAS carded for low-level aerial wildlife surveys and off-airport landings. These pilots have extensive experience with aerial wildlife surveys including this survey method. All observers have received the required OAS-IAT training (A-100, A-110, A-116 and A-200) and are qualified to be aircrew members in accordance with OAS OPM-04. Jane Doe1 will serve as the project aviation manager and fixed-wing flight manager for the project. See section 14 and **Appendix B** for a contact list for this project.

The **Alaska Department of Fish and Game is a cooperator on the project** and will have 1 plane (pilot John Doe3, N#####E) on the survey, **but is not under the operational control of the NPS**. They will follow their own policies regarding aviation safety and flight following. However, they will use the same in-flight air-air communications procedures and will participate in daily briefings.

11. Fuel: Fueling will be provided by the NPS from the AV gas fuel tank in Dahl Creek. Fuel handling will be conducted in accordance with the AMD Aviation Fuel Handling Handbook and IAW OPM 11-20.

12, 13. Communications/ Flight Following: The PAM, FWFM, NPS-vendor pilots and ADFG pilot will collectively determine the sample units to be flown each survey day. The FWFM and the observers will be responsible for maintaining communication with Denali Dispatch/ARCC (flight following) during the day as per policy and upon morning check-in before take off, each plane will contact and inform ARCC which sample units will be flown by their aircraft during the day. A table listing the waypoint of the southeast corner of each sample unit is found in **Appendix C**. The following satellite phone will be at the base/camp at Dahl Creek: 8816-####-#### * (which is a DOD SIM card phone).

Flight Following

The PAM and FWFM will go over the day's current and forecasted flying conditions with the pilots. The FWFM will go over the Northern Hub Go-No Go form with the vendor pilots (**Appendix D**). The FWFM will pass this information on to the HAM as a courtesy.

ARCC (Denali Dispatch, 907-###-#### [landline] or 8816-####-#### [satellite phone]) will provide flight following for the survey, and will monitor the aircraft through the automated flight following (AFF) system during the day. The crew will contact Denali Dispatch at the start and end of each survey day, after any landing and take-off, and once per hour in-flight via satellite phone. Air to Air communications between aircraft will occur on ####.# and the designated FAA VHF frequencies for the area the aircraft is flying in.

This aviation safety plan will be provided to Denali Dispatch and the Kotzebue and Fairbanks NPS offices. The crew will inform Denali Dispatch (by land line phone 907-###-####, satellite phone 8816-####-####, email Name@nps.gov, or fax 907-###-####) of the transects they plan to survey in the morning before departing, and will update Denali Dispatch if that plan changes during the day. This will minimize the search area in the event of a missing aircraft.

Satellite Phone Numbers and VHF

The aircraft will have an Iridium Satellite Phone for communicating with Denali Dispatch (or the individual NPS offices as necessary). All aircraft will have a copy of this Aviation Safety Plan.

AIRCRAFT – Pilot	SATELLITE PHONE #	AFF#
Plant 1 tail number - Pilot	8816-####-####	Tail #
Plant 2 tail number - Pilot	8816-####-####	Tail #
Plant 3 tail number - Pilot	8816-####-####	Tail #
Plant 4 tail number - Pilot	8816-####-####	Tail #
Plant 5 tail number - Pilot	8816-####-####	Tail #

Iridium Satellite Dialing Procedure:

- 1. Landline to Satellite Phone:** **011+ Satellite Phone Number,**
(or) 1-480-768-2500, then dial sat phone number
- 2. Satellite Phone to Satellite Phone:** **00+ Satellite Phone Number**
- 3. Satellite Phone to US Landline:** **00+697+Area Code+Number (DOD SIM CARD *)**
 001+Area Code+Number (NON-DOD SIM CARD)

14. Emergency Procedures: Emergency procedures for overdue and missing aircraft will follow the Northern Hub Aviation Mishap Response Plan (see **Appendix G**). Denali Dispatch has this plan and a list of emergency 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 aircraft, NPS offices and/or Denali Dispatch. Prior to the survey, the crew will discuss scenarios of overdue and missing aircraft to ensure that everyone is familiar with procedures and contacts. Emergency contact information for the pilots and observers are in **Appendix B**.

15. Protective Clothing/Equipment: The pilots and observers will wear Nomex flight suits and gloves as well as DOI approved flight helmets. The observers will also wear a survival vest or carry survival gear in a thigh- or fanny-pack.

16. Payload/Useful Load: The pilots will be responsible for the accurate completion of load calculations. The aircraft utilized for the survey (Piper PA-18 Super Cub) are the appropriate aircraft for this project. The PAM, FWFM, observers and pilots shall ensure that all safety regulations are complied with.

17. Hazardous Materials:

5 gallons of AV gas may be transported with passengers in OAS-approved fuel bladders as per DOI policy; this will only occur when the requirement is met that all passengers are certified in “Aviation Transportation of Hazardous Materials (A-110).”

18. Hazard Analysis/Mitigation:

Hazard Analysis

In coordination with the HAM a Hazard Analysis will be completed as part of the Aviation Safety Plan, utilizing the Risk Assessment Worksheet (**Appendix E**). This model provides an in-depth look at specific threats or hazards, the model compares the probability and effect that a threat or hazard may have on the operation, and how the probability and/or effect can be mitigated.

GAR model

The attached GAR Model (**Appendix F**) will be discussed every morning prior to operations by the crew. This model provides a more general risk appraisal of the operational system and is performed “on the ground” prior to beginning the mission. The Northern Hub Go-No Go form for vendor pilots (**Appendix D**) will also be filled out each day of survey flying.

Low-level surveys in mountainous terrain

Long hours of low, slow flight in mountainous terrain, weather and the potential for airspace conflicts between survey plans flying adjacent units are the primary hazards for this project. Hazards associated with low flying in mountainous terrain have been mitigated by selecting pilots with substantial low-level flying experience and training, and with considerable experience flying wildlife surveys in this region and elsewhere in Alaska. Each morning the pilots, observers, PAM and FWFM will determine a series of units to be flown that day plus alternate units, and the FWFM will inform Denali Dispatch of the planned routes. This will minimize the area that would need to be searched in the event of a missing aircraft.

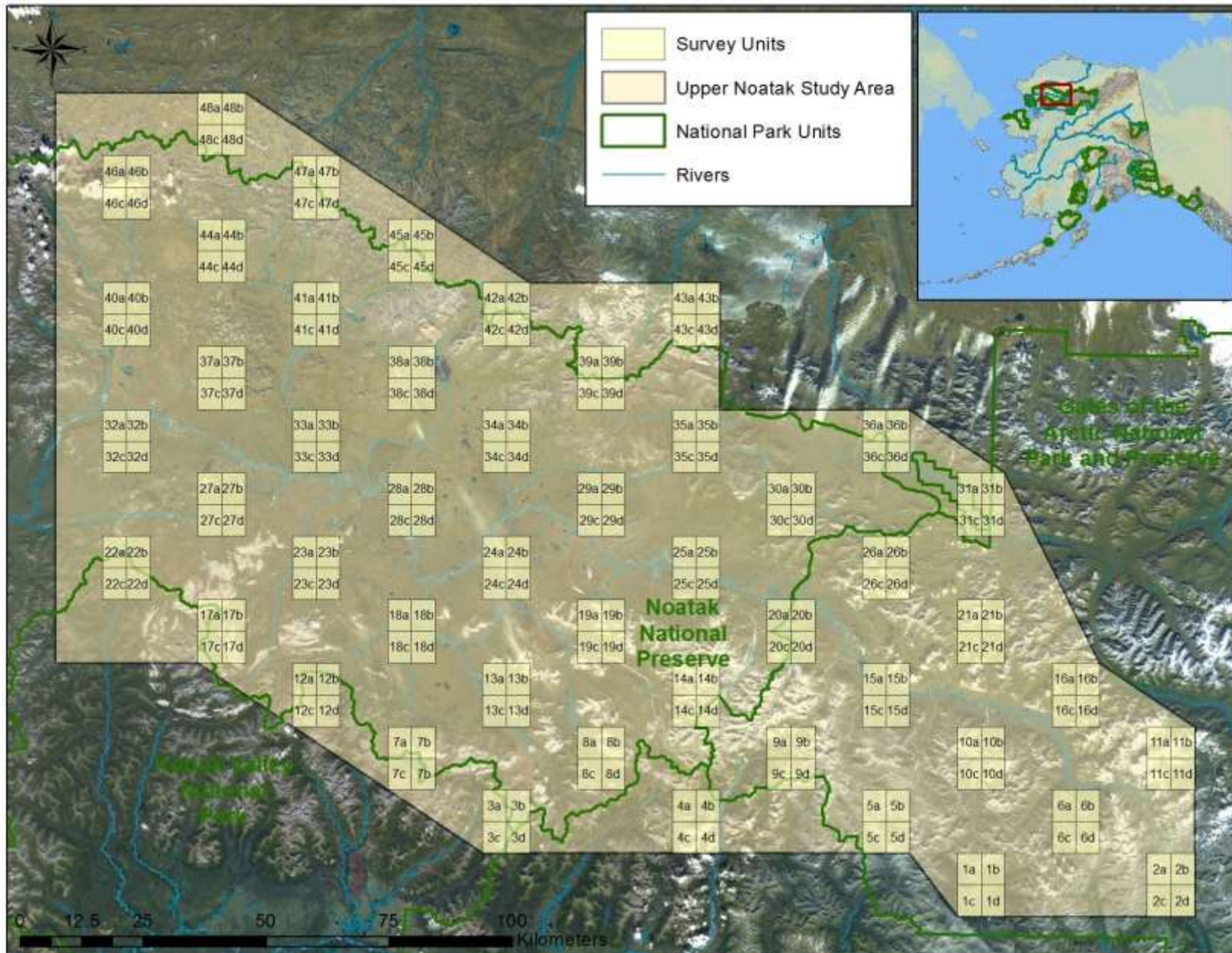
Weather

Prior to each morning’s flight, and over the course of the day, the project aviation manager, pilots and observers 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, high winds and/or low visibility will be avoided to provide for safe conditions

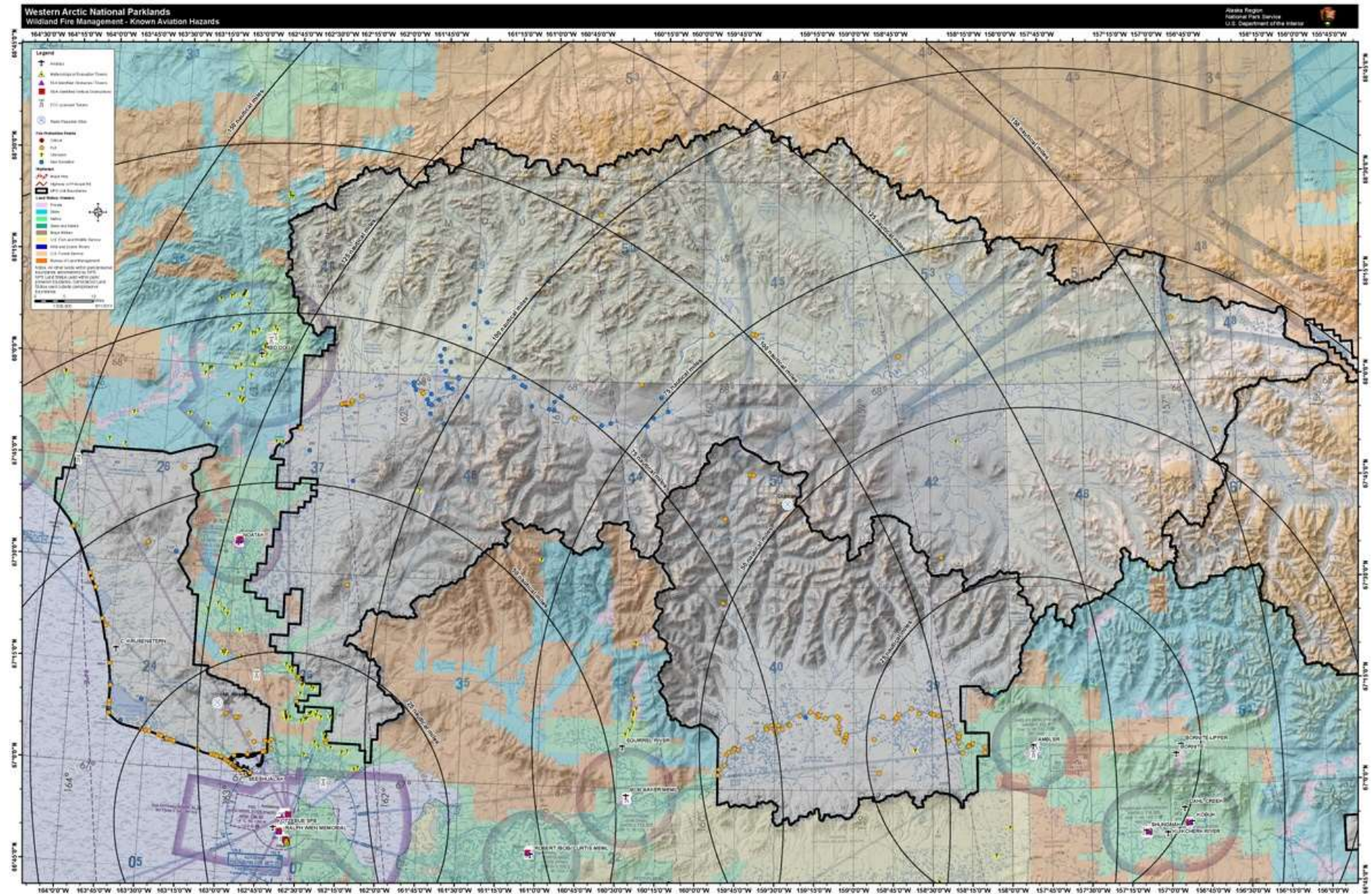
and for the collection of more precise biological data. If weather conditions appear to be marginal, weather forecasts will be checked by phone and further discussion will ensue before flying that day.

19. Procedures for Flight Consent: The Northern Hub Go-No Go form for vendor pilots (**Appendix D**) and the GAR Model (**Appendix F**) are required before flying for the day. The FWFM should pass this information on to the HAM as a courtesy. Copies of the Fleet ORM and Go/NO GO form may be requested by the HAM at the end of the project. The GAR model does not need to be submitted to the HAM.

Figure 1. Map showing survey area and sample units for the 2017 aerial brown bear survey of the Upper Noatak drainage.
 High wind units should be prioritized early in the survey when there are ideal weather conditions.



Appendix A. Aerial Hazard map



Appendix B. Emergency Contact Information.

Name/Aircraft/Base	Phone at base	Sat Phone	Emergency contact
Pilot 1 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	8816-####-####	Name Phone number
Pilot 2 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	8816-####-#### *	Name Phone number
Pilot 3 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	8816-####-####	Name Phone number
Pilot 4 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	8816-####-#### *	Name Phone number
Pilot 5 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	8816-####-####	Name Phone number
Pilot 6 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	8816-####-#### *	Name Phone number
Observer 1 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	TBD	Name Phone number
Observer 2 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	TBD	Name Phone number
Observer 3 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	TBD	Name Phone number
Observer 4 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	TBD	Name Phone number
Observer 5 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	TBD	Name Phone number
Observer 6 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	TBD	Name Phone number
Observer 7 Name Pilot – Aircraft tail # Phone number	8816-####-#### * and Denali Dispatch	TBD	Name Phone number

Base/Camp Satellite phone at Dahl Creek: 8816-####-#### *

* = DOD SIM CARD in phone

Iridium Satellite Dialing Procedure:

- 1. Landline to Satellite Phone:** 011+ Satellite Phone Number,
(or) 1-480-768-2500, then dial sat phone number
- 2. Satellite Phone to Satellite Phone:** 00+ Satellite Phone Number
- 3. Satellite Phone to US Landline:** 00+697+Area Code+Number (DOD SIM CARD *)
001+Area Code+Number (NON-DOD SIM CARD)

Appendix C. Waypoints of southeast corner of sample units (in decimal degrees).

Sample Unit	Lat_DD	Lon_DD
1a	67.346729	-155.733302
1b	67.347828	-155.621692
1c	67.288701	-155.729426
1d	67.289798	-155.618065
2a	67.353477	-154.840203
2b	67.353992	-154.728538
2c	67.295433	-154.838324
2d	67.295946	-154.726908
3a	67.4253	-157.980411
3b	67.427872	-157.868619
3c	67.367342	-157.971488
3d	67.369908	-157.859945
4a	67.443826	-157.085491
4b	67.445812	-156.97354
4c	67.385824	-157.078567
4d	67.387805	-156.966867
5a	67.457661	-156.189447
5b	67.45906	-156.077379
5c	67.399625	-156.184531
5d	67.40102	-156.072714
6a	67.466795	-155.292606
6b	67.467605	-155.180461
6c	67.408736	-155.289702
6d	67.409545	-155.177808
7a	67.530172	-158.447324
7b	67.53305	-158.335124
7c	67.472221	-158.437315
7d	67.475093	-158.325366
8a	67.551142	-157.549069
8b	67.553433	-157.436689
8c	67.493141	-157.541072
8d	67.495425	-157.428944
9a	67.567403	-156.649512
9b	67.569104	-156.536992
9c	67.509362	-156.643537
9d	67.511058	-156.53127
10a	67.578944	-155.748981
10b	67.580055	-155.636362
10c	67.520875	-155.745035
10d	67.521982	-155.63267
11a	67.585759	-154.847806
Sample Unit	Lat_DD	Lon_DD
11b	67.586278	-154.735131

11c	67.527673	-154.845893
11d	67.528191	-154.733471
12a	67.633796	-158.918035
12b	67.636984	-158.805437
12c	67.575855	-158.906924
12d	67.579035	-158.794578
13a	67.657231	-158.01651
13b	67.659829	-157.903708
13c	67.599233	-158.007424
13d	67.601824	-157.894877
14a	67.67594	-157.113501
14b	67.677945	-157.000536
14c	67.617896	-157.106451
14d	67.619896	-156.993742
15a	67.68991	-156.209337
15b	67.691323	-156.096252
15c	67.631832	-156.204331
15d	67.633241	-156.091502
16a	67.699134	-155.304354
16b	67.699953	-155.19119
16c	67.641033	-155.301397
16d	67.64185	-155.18849
17a	67.736157	-159.392544
17b	67.739656	-159.279556
17c	67.678228	-159.380314
17d	67.681719	-159.26758
18a	67.762077	-158.487817
18b	67.764984	-158.374602
18c	67.704085	-158.477625
18d	67.706985	-158.364665
19a	67.783255	-157.581419
19b	67.785568	-157.468018
19c	67.725211	-157.573276
19d	67.727518	-157.460132
20a	67.799676	-156.673683
20b	67.801394	-156.560138
20c	67.741591	-156.667599
20d	67.743305	-156.554312
21a	67.811331	-155.764946
21b	67.812452	-155.651301
21c	67.753218	-155.760928
Sample Unit	Lat_DD	Lon_DD
21d	67.754336	-155.647541
22a	67.837237	-159.870848

22b	67.84105	-159.757478
22c	67.779325	-159.857482
22d	67.783128	-159.744369
23a	67.865663	-158.962989
23b	67.868882	-158.849369
23c	67.807681	-158.951674
23d	67.810892	-158.838311
24a	67.889331	-158.053269
24b	67.891954	-157.93944
24c	67.83129	-158.044016
24d	67.833906	-157.930446
25a	67.908225	-157.142023
25b	67.910251	-157.028027
25c	67.850137	-157.134844
25d	67.852158	-157.021107
26a	67.922334	-156.229592
26b	67.923761	-156.115472
26c	67.864211	-156.224494
26d	67.865634	-156.110634
27a	67.967974	-159.442025
27b	67.971507	-159.328009
27c	67.910003	-159.42957
27d	67.913528	-159.315813
28a	67.994152	-158.529053
28b	67.997088	-158.414804
28c	67.936117	-158.518673
28d	67.939046	-158.404684
29a	68.015541	-157.614363
29b	68.017877	-157.499923
29c	67.957453	-157.60607
29d	67.959783	-157.491892
30a	68.032127	-156.698299
30b	68.033862	-156.583711
30c	67.973997	-156.692102
30d	67.975727	-156.577777
31a	68.043899	-155.781206
31b	68.045031	-155.666514
31c	67.985739	-155.777113
31d	67.986869	-155.662685
32a	68.068991	-159.924922
Sample Unit	Lat_DD	Lon_DD
32b	68.072842	-159.81052
32c	68.011037	-159.911311
32d	68.014878	-159.797168

33a	68.097702	-159.008771
33b	68.100954	-158.89411
33c	68.039676	-158.997247
33d	68.042919	-158.882848
34a	68.121607	-158.090706
34b	68.124257	-157.97583
34c	68.063521	-158.081282
34d	68.066164	-157.96667
35a	68.140691	-157.171073
35b	68.142737	-157.056026
35c	68.082557	-157.16376
35d	68.084598	-157.048978
36a	68.154943	-156.250221
36b	68.156384	-156.135047
36c	68.096773	-156.245028
36d	68.09821	-156.130119
37a	68.199964	-159.492421
37b	68.203533	-159.377358
37c	68.141949	-159.479735
37d	68.14551	-159.364936
38a	68.226407	-158.571053
38b	68.229372	-158.45575
38c	68.168326	-158.56048
38d	68.171284	-158.445443
39a	68.248012	-157.647919
39b	68.250371	-157.532421
39c	68.189876	-157.639472
39d	68.19223	-157.52424
40a	68.30092	-159.979999
40b	68.30481	-159.864544
40c	68.242921	-159.966135
40d	68.246801	-159.850945
41a	68.329922	-159.055403
41b	68.333206	-158.939683
41c	68.27185	-159.043664
41d	68.275126	-158.928211
42a	68.35407	-158.12884
42b	68.356747	-158.012899
42c	68.295936	-158.11924
Sample Unit	Lat_DD	Lon_DD
42d	68.298606	-158.003567
43a	68.373349	-157.200664
43b	68.375416	-157.084547
43c	68.315166	-157.193215

43d	68.317228	-157.077367
44a	68.432136	-159.543756
44b	68.435742	-159.427628
44c	68.374076	-159.530833
44d	68.377672	-159.414973
45a	68.45885	-158.613837
45b	68.461845	-158.497462
45c	68.400721	-158.603066
45d	68.403709	-158.486961
46a	68.533033	-160.036107
46b	68.536963	-159.919581
46c	68.474987	-160.021982
46d	68.478907	-159.905725
47a	68.562333	-159.102911
47b	68.565651	-158.986111
47c	68.504212	-159.090951
47d	68.507521	-158.974423
48a	68.664502	-159.596058
48b	68.668145	-159.478844
49c	68.606392	-159.58289
49d	68.610026	-159.46595

Appendix D. Vendor Go/No-Go form. *Form can be found on the Alaska – Northern Aviation Hub Intranet/ site - <https://sites.google.com/a/nps.gov/northern-aviation-hub/>.*

Go / No Go Form

Location:		Date:	
Preparer:		Pilot:	
Project Name or Description:			
NR = Reviewed not applicable			
Description	Yes/No/NR	Remarks	
PILOT Information			
Pilot Approved for mission		If NO - Do not fly	
Pilot within duty day policy		If NO - do not fly (14 hours on duty / 8 flight time - per day / 2 days off every 14 day period)	
Pilot briefed on mission		If NO - brief pilot on mission	
AIRCRAFT Information			
Aircraft carded for mission		If NO - Do not fly	
Fuel reserve - 45 min for wing or 30 min for helicopter		If NO - do not fly till arrangement have be made to complete mission with reserve	
Flight Plan Filed and Flight Following in place with AHCC - Radio / Sat phone - 1 hour check-in required by policy		If NO - Do not fly until other arrangements have been made (HAM or higher approval is need for other arrangements greater than 1 hour)	
AHF/ISAT system - confirmed working		If NO - Do not fly - until other arrangements have been made (HAM or higher approval is need for other arrangements)	
Aircraft weight - is the weight of gear, passengers, and fuel within allowable limits and secured		If NO - Do not fly	
MISSION INFORMATION			
Does involved personnel meet the training requirements for mission		If NO - do not fly	
Manifest completed & left a departure point / know by someone not on the flight (PASP, ARCC, HAM, other)		If NO - Do not fly till completed	
Is haz-mat being transported within policy		If NO - do not fly till completed	
PPE for mission if required by Policy - beyond gliding distance from shore requires (PFD) - Alaska Survival kit		If NO - Do not fly - contact HAM for assistance (approved helmet, ~~comex~~ clothing, gloves for all helicopter and fix wing special use mission)	
Personnel briefed on aircraft safety items (passenger briefing before flight)		If NO - Have pilot provide an aircraft safety briefing	
Flight hazards identified (MOA, high traffic area, ~~TER~~ etc.)		If NO- have pilot check for local information	
WEATHER Fix wing operations			
Pilot confirms weather is above 500 AGL and 2 miles visibility for route of flight		If NO - do not fly - HAM may be contacted to assist with forecasted ~~enroute~~ weather	
Is the air temp above -40F for earth landing or 28F for water landing		If NO - do not fly	
Is the wind below 500 AGL <30 knots or gusts spread < 15 knots		If NO - do not fly	
Is the wind at flight level above 500 AGL < 50 knots		If NO - do not fly	
Are the surface wind below 20 mph at the landing location		If NO - consider aborting flight	
WEATHER Helicopter operations			
ORM form completed by helicopter manager		If NO - do not fly (complete ORM Helicopter form or contact HAM for assistance)	

Fixed wing manager can self-release if you have all YES for answers

The HAM is available to assist you with this process if needed. HAM number cell 907 799 6232

The Go / No go form was design to assist field personnel with making the decision for allowing a flight to take place in a safe manner. It is not intended to deal with all hazards. Please use sound judgment when making the decision to fly.

Anyone can refuse or curtail a flight when an unsafe condition may exist

Appendix E. Aviation Risk Assessment Worksheet. This worksheet is a pre-planning tool and is completed prior to the project start date. Instructions and template are followed by the completed worksheet and signature(s).

AVIATION RISK ASSESSMENT WORKSHEET

Risk Assessment Matrix

	Severity			
Likelihood	Negligible IV	Marginal III	Critical II	Catastrophic I
Frequent A				
Probable B				High 4
Occasional C			Serious 3	
Remote D		Medium 2		
Improbable E	Low 1			

Severity Scale Definitions

Catastrophic	Results in fatalities and/or loss of system.
Critical	Severe injury and/or major system damage.
Marginal	Minor injury and/or minor system damage.
Negligible	Less than minor injury and/or less than minor system damage.

Likelihood Scale Definitions

Frequent	Individual	Likely to occur often.
	Fleet	Continuously experienced.
Probable	Individual	Will occur several times.
	Fleet	Will occur often.
Occasional	Individual	Likely to occur sometime.
	Fleet	Will occur several times.
Remote	Individual	Unlikely to occur, but possible.
	Fleet	
Improbable	Individual	Unlikely but can reasonably be expected to occur.
	Fleet	Unlikely to occur, but possible.

Steps 1 & 2: Identify and describe the hazards present for this project. Assess the **Likelihood** of an occurrence of each hazard and determine the potential **Severity** of the outcome by referring to the definitions at the System Safety Matrix site. Click on this link: http://www.fs.fed.us/fire/av_safety/Systems_Safety/av_risk_mgt/matrix.pdf and then click the link to the **Risk Assessment Matrix**. Once you have identified the likelihood and severity, determine the **Risk Level** using the matrix above.

Step 3: Identify the mitigation controls to follow that will reduce the **Likelihood** of a hazard occurrence. ****Remember**, the severity will likely remain the same as first determined. The mitigations generally only affect the likelihood of an occurrence. Once you have established the mitigations and changed the likelihood, determine the post-mitigation **Risk Level**.

Step 4: To obtain the overall scores in Pre/Post Mitigation categories, add Risk level totals separately, and then divide by number of hazards. If the overall score falls between 0-1.0 (Low); 1.1 - 2.0 (Medium); 2.1- 3.0 (Serious); 3.1 – 4.0 (High). This score becomes the Risk Assessment score for the project.

Describe Hazard(s): Pre-Mitigation Hazards rate out as:	Probability (A-E)	Effect (I-IV)	Risk Level
1. Air-space conflict at base airstrip, Kobuk or villages between survey aircraft and commercial or charter aircraft.	D	I	3

2. Loss of communications.	D	III	2
3. AFF system failure in aircraft or at dispatch. Effect depends on combination with incident.	C	II-III	2.5
4. Low, slow flying in mountainous terrain leading to controlled flight into terrain.	D	I	3
5. Hazardous or extreme weather.	C	II	3
6. Pilot and/or observer not rested enough resulting in bad decisions.	C	III	2
7. Distracted pilot and/or observer due to data collection/equipment requirements.	C	III	2
8. Air-space conflict with partner plane in sample units.	D	I	3
Mitigation Control (s): Post-Mitigation Hazards rate out as:	Probability (A-E)	Effect (I-IV)	Risk Level
1. Maintain radio communication using local and company radio frequencies, flight following, avoid area when other aircraft are present.	E	I	2
2. Contract aircraft with frequently maintained radio. Carry sat phone, air-to-ground radio in aircraft. Halt flying until fixed.	E	IV	1
3. Always maintain positive radio/sat phone communication. 60 min check-ins with ARCC dispatch.	D	IV	1
4. Use experienced pilot. Pre-flight planning, utilize go/no go checklist, GAR model, check Wx, change route, abort mission.	E	I	2
5. Use experienced pilot. Pre-flight planning, utilize go/no go checklist, GAR model, check Wx, use GPSs showing terrain, change route, abort mission.	D	II-III	2
6. Ensure pilot and observer maintain proper rest. Delay or don't fly if he/she has not.	D	IV	1
7. Ensure pilot and observer maintain proper rest. Delay or don't fly if he/she has not. Maintain equipment, change route or abort transect if distractions interfere with safe flying.	C	IV	1
8. Maintain active radio communication using company radio frequencies with partner aircraft.	E	I	2
Approved by (Superintendent or Designee) _____ Title: _____ Date: _____			

Post mitigation rating for risk level is: 2

Appropriate Management Level for Operational Risk Decisions

Project	Fire
Superintendent/Line Officer (3.1-4.0)	Incident Commander/OPS Section Chief
Superintendent/Line Officer (2.1-3.0)	Incident Commander/OPS Section Chief
N. Hub Aviation Manager (1.1-2.0)	
Helicopter or Flight Manager (0-1)	Helibase/Base Manager

Appendix F. 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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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

Yellow 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?

Appendix G. AVIATION Mishap Notification

Notification- Don't delay notification if someone is not available. Accident notification will be by calling 1-888-4MISHAP (DOI and USFS 24 hour accident hotline) and providing the information on OAS 77/FS 5700-28 (included).

Aviation Emergency Notification List:

Name/Position	Location	Work	Home	Cell
John Doe - Northern Hub Aviation Manager	Fairbanks	907-###-####	907-###-####	907-###-####
OAS - Flt. Coord. Center	Anchorage	907-###-####		
John Doe4 Regional Aviation Manager	Anchorage	907-###-####		907-###-####
Supervisor, Ranger Services (Acting)	Anchorage	907-###-####		
Jane Doe4 Acting Regional Director	Anchorage	907-###-#### or 907-###-####		

OVERDUE AIRCRAFT

An aircraft is considered "overdue" when it fails to arrive within 30-minutes past the estimated time of arrival (ETA) and cannot be located.

MISSING AIRCRAFT

An aircraft is considered ‘missing’ when it has been reported to the FAA as being “overdue” and the FAA has completed an administrative search for the aircraft without success. The aircraft is **OFFICIALLY** missing when the fuel duration, as reported on the request for flight following, or as reported on the FAA Flight Plan, has been exceeded and the aircraft location is unknown.

Time	Action	Contact and Phone	Time
Immediately at missed check-in/ETA	Attempt to contact aircraft by radio or phone. Contact destination agency airbase or airport. Gather info required for Accident Report. * = DOD SIM CARD – see calling procedures listed earlier in this PASP	Iridium phone onboard #N_____ is: _____. Iridium phone onboard # N#####Y is: 8816-####-#### * Iridium phone onboard # N#####D is: 8816-####-#### Iridium phone onboard # N#####Z is: 8816-####-#### Iridium phone onboard # N#####Y is: 8816-####-#### * Iridium phone onboard # N#####Z is: 8816-####-####	
15 minutes past check-in or ETA	Contact originating or enroute agency dispatch. Contact originating or enroute agency airbase. Contact originating or enroute airports. Notify Park’s Hub Aviation Manager - see AK Contacts *Contact local FAA flight service station if unable to reach park or dispatch.	Contact in this order, all 907 area code: work & (after hours numbers): N. Hub Aviation Mgr: John Doe 907-###-#### (O), 907-###-#### (C) Chief Ranger: Jane Doe 907-###-#### (O), 907-###-#### (C) WEAR Superintendent: Jane Doe 907-###-#### (O), 907-###-#### (C). YUGA FMO: Jane Doe 907-###-#### (O), 907-###-#### (C) WEAR/BELA FMO: John Doe 907-###-#### (O), 907-###-#### (C)	
30 minutes past ETA*	Contact Vendor home base. Contact FAA Flight Service Station Contact AMD (in Alaska)	1-800-WX BRIEF or 907-271-5936 907-271-3935 24 hours	
Anytime the fuel duration is exceeded or if an aircraft is missing and an accident is suspected	Submit data from the Aircraft Accident Checklist to: FAA / Lockheed-Martin Flight Service Station and request an Alert Notice (ALNOT) NBC-AM /USFS Aviation Safety Manager Local Aviation Manager	1 800 992-7433 (800 WX BRIEF) 1 888 464-7427 (888-4MISHAP)	