
APPENDIX L: HELICOPTER SAFETY

1. AERIAL OPERATIONS SAFETY

It is essential that all aviation operations be planned with the utmost consideration given to safety and operational efficiency. Missions can be accomplished safely and efficiently, provided that a high degree of pre-planning, risk analysis, and management is applied. Many users have developed Standard Operating Procedures (SOP) that streamline the planning process, incorporate the lessons learned from others experience, and utilize the best practices that balance the demands for safety and efficiency.

Helicopter operations for this project are considered high risk.

Helicopter safety is the responsibility of every individual on the project. However mechanical safety of the helicopter is the responsibility of the helicopter vendor and flight safety is the responsibility of the pilot.

The *Air Operations Supervisor* will manage personnel safety, and other potential risks to the helicopter and pilot, in and around the helicopter operating zones, i.e. the staging site and the bait loading site. The Air Operations Supervisor will delegate specific safety management tasks to other individuals where needed (e.g. the staging site during external load ops) and will be supported by the pilot. During external load operations, each site will have a designated site controller. In some circumstances the AOS will also be the site controller; the site controller will be responsible for ensuring the operations run as planned and in a safe manner.

1.1 Desecheo Helicopter Operations – Supporting Documents

(a) Pathfinder Aviation Safety Plan

The helicopter vendor, Pathfinder Aviation, will provide their Standard Operating Safety Procedures for helicopter safety management and emergency response during the operations. All safety protocols and procedures will follow the vendor's FAA operating specifications for this project.

- (b) [Appendix F: Desecheo Helicopter Strategy](#) provides details of event sequencing, for personnel and external load transport. [Appendix K: Helicopter Bait Application Logistics](#) provides details of bait application operations.

Five Steps to a Safe Flight

1. Pilot/Aircraft Data Card – Approved and Current
2. Flight Plan/Flight Following Initiated
3. PPE in Use When Required.
4. Pilot Briefed on Mission & Flight Hazards
5. Crew & Passenger Briefing to Include:
 - Aircraft Hazards
 - Seat-belt & Harness
 - ELT & Survival Kit
 - First Aid Kit
 - Gear & Cargo Security (not under seats)
 - Fire Extinguisher
 - Fuel & Electrical Shut-off
 - Oxygen Equipment
 - Emergency Egress
 - No Smoking

[OAS-103, NFES 1399, April 1997]

1.2 Hazard Identification and Mitigation

The pilot will work jointly with the Air Operations Supervisor to manage hazards associated with aerial operations. Common hazards as well as those known hazards specific to this site/ operation for helicopter missions will be identified prior to operations and controls provided to reduce risk. The Air Operations Supervisor will assist the pilot in identifying aerial hazards, creating a hazard maps for all landing zones, and will ensure high-level reconnaissance is made prior to low-level flight.

1.3 General Hazards Identified and Controls:

Lack of Knowledge/Experience

- Personnel will be provided orientation and training in helicopter safety, and individual duties and responsibilities during operations.
- All personnel are expected to read the Helicopter Safety and Personnel Safety Plans.
- The pilot and all Air Operations and Baiting Operations personnel will be briefed on the Project Mission prior to operations.
- The Air Operations Supervisor will provide helicopter safety briefings prior to helicopter operations.
- Only staff necessary for helicopter operations will be permitted to be within the boundary of operational sites.

Unsafe Activities at Landing Zones

- The Air Operations Supervisor will manage personnel working within the Bait Loading Zone; only personnel critical to the loading operations will be

within helicopter activity zones. This zone boundary will be marked on the ground at each site.

- The Safety Officer located at the Staging Site will monitor general operational safety and inform the Staging Site Controller or designee if personnel are observed to engage in unsafe activities at helicopter activity zones.
- The Safety Officer located at the Bait Loading Site will monitor general operational safety and inform the Site Controller or designee if personnel are observed to engage in unsafe activities at helicopter activity zones.
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Incident/Changing Weather Conditions

- Daily weather forecasting and monitoring of weather conditions on-island
- Defined maximum wind speeds for application of bait (30 knots)
- Wind indicators will be established at the staging site and bait loading site
- Regular updates of on-island weather conditions by on-island staff
- Plan for storage or securing of helicopter if required at short notice.

Overweight for takeoff and landing

- Maximum allowable weight limits will be calculated by the pilot at the beginning of the Operation, prior to any missions, and will be updated as necessary.
- Loads will be weighed and maximum allowable weight limits will not be exceeded. Scales will be present at the staging site.
- External load weights will be communicated to the pilot prior to securing the load.

Over-water flight

- Crew and passengers will wear certified personal life preservers.
- Helicopter fitted with an emergency GPS locator (e.g. ELT/EPIRB)
- A flight plan for the entire project will be submitted to the USCG and other supporting agencies.
- Radio communication established between the staging site and bait loading site.
- Flight-following procedures implemented as described in Section 1.5
- Arrival-delay procedures will go into effect after 15 minutes of a delayed arrival.

Fuel capacity vs. ferry distance

- In addition to fuel required for baiting operations extra fuel will be held on island as an emergency reserve.

Landing areas

- A circle of safety will be established at each LZ, circle of safety will have a diameter equivalent to 1.5 times the rotor length.
- A high level reconnaissance will be conducted of each LZ before landing.
- Approach and departure paths will be identified and discussed with the pilot prior to Operations.
- Ground personnel will clear all Foreign Object Debris (FOD) prior to use.
- Non-essential personnel will not be allowed into landing areas during the Operation.

Other aircraft

- A flight plan for the entire project will be submitted to the USCG and other government agencies.
- The Port Authority personnel at BQN will be made aware of all flights in or out of the airport.

Wire and other obstructions

- High-level reconnaissance conducted before low level flight.
- The pilot will be shown all wires/obstructions around the staging site and on flight paths.

1.4 Bird strikes

While bird strikes in helicopters are not a desired event, they are not uncommon because of the slow airspeed and high inertia rotor system of the helicopter. Because of the potential safety concern to the integrity of the helicopter caused by a bird strike, procedures outlined below will be followed.

Three possible situations are identified to occur in the event of a bird strike:

- The event of the strike is unknown by the pilot, and only identified after landing during an inspection. Termed “**Unknown**”
- The event is felt or observed by the pilot during a flight but has not affected helicopter operations to the pilot’s knowledge. Termed “**Known**”
- The event triggers an operational failure of the helicopter. Termed “**Strike Emergency**”

In the event of an **Unknown** or **Known** strike:

1. The pilot or helicopter mechanic will notify the Air Operations Supervisor of a strike occurrence.
2. The Air Operations Supervisor will notify the Incident Commander (directly or by radio).

3. At the earliest opportunity, the helicopter will be inspected for structural integrity and flight integrity according to established protocols, by the mechanic and verified by the pilot.
4. Any mechanical irregularities will be documented and if possible corrected by the mechanic.
5. Documentation of the incident and mechanical repairs implemented will be available to the Incident Commander.
6. The Operations Advisory Group will inform the Incident Commander on a go/no go status of aircraft and the IC will decide whether to resume operations..

In the event of a **Strike Emergency** :

1. Pilot will radio in MAYDAY.
2. Incident is reported to the Incident Commander.
3. Emergency Response is initiated.- refer below
4. All actions will be documented by the Air Operations Supervisor.
5. Documentation of the incident will be available to the Incident Command Group.

1.5 Flight Following

Flight following requirements will be clearly identified with the pilot prior to operations, including check-in procedures, time and location, individuals responsible for flight following, radio frequencies to be used, and any special circumstances requiring check-ins.

A standardized flight plan form will be provided by the helicopter vendor. Completed flight plans will be kept for reference at all sites. Flight following will be coordinated by the Air Operations Supervisor. The Air Operations Supervisor, Off-Island Support and Operations Section Chief will have radio contact with the pilot to ensure status tracking between the staging site or Copeca hanger and Desecheo Island.

Check-ins during external load flights will be documented by the Operations Section Chief or designee, utilizing a standardized flight following log. During Aerial baiting operations the Operations Section Chief will document flights using the bait tracking work sheet.

Check-ins shall be made as follows:

- At intervals not to exceed fifteen (15) minutes.
- Prior to and immediately after landing.*
- Prior to and immediately after takeoff. The takeoff check-in should be made as soon as communications can be established.

* If it is anticipated that terrain will interfere with check-in at the landing site, the pilot may call in while still at altitude, giving a reasonable estimate of time-on-ground. The pilot should be aware that the Point of Contact will expect a check-in at the end of the on-ground time identified. The pilot should confirm radio coverage as early as possible (i.e. are there any dead spots.)

The check-in shall consist of:

- Current direction of flight
- Next destination or area to be treated
- Estimated time on ground (if landing)

During in-flight operations, if check-ins cannot be made due to equipment failure, the aircraft shall return immediately to the closest active LZ. Operations must not proceed until the problem is corrected and communications are established. The Air Operations Supervisor or Operations Section Chief shall immediately implement emergency response procedures for overdue or missing aircraft (see below) if check-in requirements are not met.

Flight Tracking

A Delorme Inreach portable flight tracker will be installed in the helicopter which allows users to track flight online. The Operations Section Chief will be responsible for Flight tracking during external load operations. The Off-island support person will be responsible for flight tracking during the Aerial baiting operations. The flight tracking information will be used in the event of an overdue or missing aircraft incident.

1.6 Overdue Aircraft/Emergency Response

- Aircraft mishap, accident and emergency will be managed by the Incident Commander
- Overdue or missing aircraft will be managed by the Incident Commander
- Protocols for aircraft accident reporting and management, and procedures for overdue or missing aircraft are detailed in the vendor's Aviation Safety Plan.
- For IC and partner agency communications regarding a helicopter accident and emergency (e.g. informing partners, media release), refer to [Appendix P: Action Plans and Communications for an Emergency Incident.](#)

1.7 Emergency Response Actions

- In the event of a crash the Air Operations Supervisor will initiate the Incident Response Plan- If the Aerial operations supervisor is not present the site controller will initiate the incident response plan.
- Once the Incident response plan has been activated the Air Ops Supervisor or Site Controller will be responsible for coordinating actions at the crash site.
- One Helicopter Crash Kit will be available at the staging site and bait loading site.
- Time is a critical factor in responding to an emergency situation. Immediate positive action is necessary, delay may affect someone's survival.
- Preserve life of both the individuals involved in the incident and rescue personnel.
- Secure the area (deny access except to first responders and credentialed officials).
- Do whatever is necessary to extricate injured occupants, and to extinguish fires.
- Deactivate the ELT/EPIRB if no longer needed.

- Determine if HazMat is onboard and request appropriate assistance.
- Utilize PPE and protective devices for potential exposure to hazards such as flammable and toxic fluids, and sharp or heavy objects.
- Do not exceed your personal physical limitations.
- Treat the area like a crime scene. Wreckage and cargo should not be removed or disturbed. Document and/or photograph the location of any debris which must be disturbed in order to carry out rescues or fire suppression. Document perishable evidence and witness information.

1.8 Radio Communications

- All radio communications should be **clear, concise** and **professional** in manner. Please remember that transmissions may be overheard.
- Conversations should be kept to a minimum to reduce congestion.
- Radio frequencies for direct contact with the Pilot and contact via the repeater should be established and tested prior to the mission. Also test radio coverage- identify blind spots / confirm coverage at the landing sites.
- Radio call signs should be established prior to take-off, and a procedure determined for contact and sign-off.
- For full details refer to [Appendix G: Operational Communications Plan](#).

1.9 Marshalling

The Site Controller (Air Operations Supervisor or designee) is responsible for directing helicopters during personnel, cargo, and bait loading operations, and relaying helicopter traffic updates to ground staff. A Site Controller will be present at all active landing zones during aerial baiting operations this is the AOS. The Site Controller (AOS during aerial baiting operations) will direct the pilot by radio and remain visible to the pilot at all times during takeoff and landing.

1.10 Helicopter Fueling

During aerial baiting operations the helicopter will be shut down prior to fueling. Fueling operations will only be by certified personnel appointed by Pathfinder Aviation (pilot, and mechanic).

During external load operations the helicopter may be refueled without shutting down, this is referred to as hot refueling. Hot refueling is a high risk operation and only certified personnel shall remain within the staging area during hot refueling operations. Hot refueling follow an SOP according to the National Fire Protection Act (NFPA) Standards for Aircraft Fuel Servicing.

1.10.1 Helicopter Hot Fueling SOP

- Prior to initiating aerial operations requiring hot fueling the pilot, Air Operations Supervisor and ground crew will review this SOP and agree upon: locations for fuel, fire extinguisher, approach and departure of aircraft, positions and orientation of aircraft for hot fueling, radio communications during hot fueling and hand signals to use in the event that radios communications do not work.
- Aircraft will have appropriately certified and rated pilot at flight controls during hot refueling. Restraints will be unbuckled and pilot will be prepared to immediately shut down and egress aircraft.
- No passengers will be on board the aircraft during hot fueling operations.
- A 20 lb 120 B:C fire extinguisher will be staged at the fuel site outside of the rotor disc and within easy reach of ground personnel at all times during hot fueling operations. All personnel on site will be briefed in proper operation of fire extinguisher
- All personnel handling fuel will wear the following PPE: Long pants and sleeves, PCV or nitrile gloves, leather boots, safety goggles
- Fuel drums (maximum total 3) will be staged at a designated location well outside of the rotor disc.
- Prior to landing pilot will radio ground crew informing them the aircraft will be refueled upon the next landing. All personnel except the mechanic and fire extinguisher tender will clear the fueling site allowing 200 feet from the edge of the rotor disc.
- Two ground crew will be present for hot refueling. The mechanic will be responsible for all fuel handling and the second ground personnel (site controller) will tend the fire extinguisher and be prepared activate the fuel/chemical emergency shut off if necessary.
- Upon landing the pilot will signal the ground to approach the aircraft and begin fueling procedures.
- Before fueling, the aircraft will be bonded to the fuel source to equalize static electricity between the fuel source and the aircraft.
- An approved deadman-type nozzle will be used, flow rate will not exceed 10 gallons per minute.
- When fueling is complete and the area under the rotor disc is clear, the ground crew will give the pilot the “all clear”. The pilot will ensure seatbelt and shoulder harness are refastened prior to any aircraft movement.

2. PERSONNEL SAFETY

2.1 Personnel Experience

Inexperience with aerial operations could potentially present safety concerns, as well as reduce operational efficiency. Priority will be given to staffing aerial operation positions with personnel who possess significant aviation experience. Island Conservation personnel have completed a helicopter training program, ensuring all personnel possess a minimum level of exposure and experience. DOI and DNER employees, along with any personnel not required for the operation at the time will not enter LZs during helicopter operations. The Air Operations Supervisor for baiting ops and *Operations Section Chief* for staging ops will assign specific tasks associated with helicopter operations to appropriate personnel as required.

2.2 Personnel Transport

Standard safety procedures will be implemented when transporting personnel.

- All passengers will receive a safety and mission briefing prior to take-off.
- Only passengers essential to the mission will be onboard the helicopter.
- DOI and DNER employees will not be transported by helicopter.
- During passenger transport, load calculations and standards shall be adhered to.

2.3 Personnel Protective Equipment (PPE)

The following PPE will be required by personnel working within a LZ, or as passengers and will be provided by Island Conservation unless where indicated.

2.3.1 Working around Helicopters

Personnel working around operating helicopters will wear the following PPE:

- Fire resistant or all-natural fiber clothing (long-sleeved shirt and pants, or flight suit)
- Hardhat with chinstrap, or flight helmet
- Fire resistant or leather gloves (passengers only)
- Fire resistant or leather boots
- Eye protection
- Hearing protection
- During refueling operations, the *Helicopter Engineer* will wear appropriate PPE for dispensing aviation fuel

2.3.2 Helicopter Passengers and Pilot

The pilot and personnel traveling as passengers will require the following PPE:

- Fire resistant or all-natural fiber clothing (long-sleeved shirt and pants, or flight suit)
- Fire resistant or leather gloves
- Fire resistant or leather boots

- Personal flotation devices (provided by the vendor)
- Hearing protection
- Flight helmet or hard hat
- Eye protection

Wearing fire resistant clothing (such as a Nomex flight suit) in Puerto Rico's tropical climate, adds a significant risk of heat exhaustion or hyperthermia. Even without a clinical effect, personnel may function inefficiently in high temperatures due to tiredness, dehydration, and poor clarity of thinking. For these reasons, individuals may choose to wear all natural-fiber clothing (cotton, silk, wool) in replacement of a fire-resistant flight suit or coveralls.

2.3.3 Bait Handling and Loading

All personnel that handle bait or monitor the bait application in the field will meet all PPE requirements described on the EPA bait product label. The bait loading team will wear this in addition to the required helicopter PPE.