

Serious Accident Investigation: Factual Report

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Falling Fatality of NPS Rescue Climber On Emmons-Winthrop Glacier Within Mount Rainier National Park

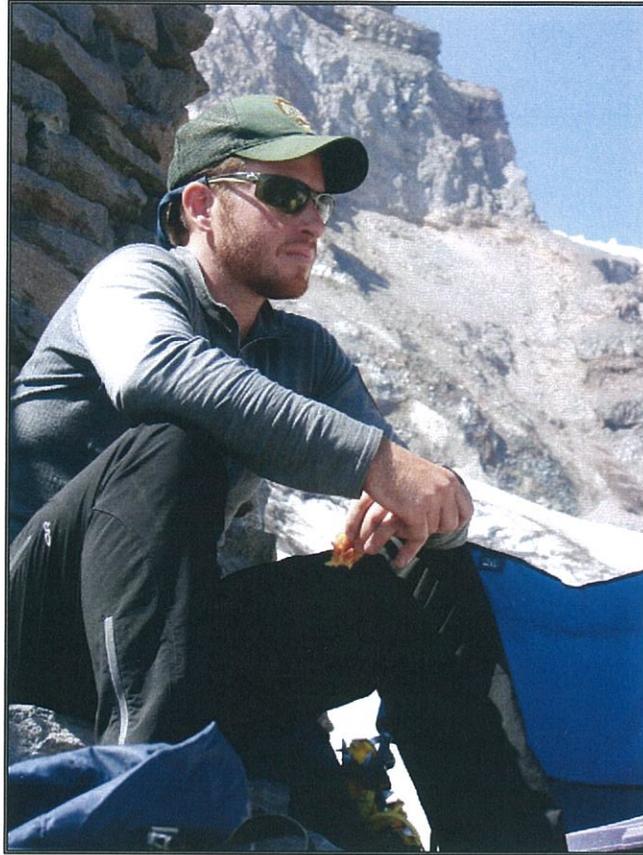
June 21, 2012



Photograph by [REDACTED]

In Memory of Nicholas (Nick) E. Hall

September 29, 1978 – June 21, 2012



Mount Rainier National Park

Ashford, Washington

Four private climbers who were injured in this incident *express their deep appreciation for the effort and sacrifice the MORA Upper Mountain Search and Rescue team made to save their lives.*

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SERIOUS ACCIDENT INVESTIGATION: FACTUAL REPORT

Accident: Falling Fatality of National Park Service (NPS) Rescue Climber

Location: Mount Rainier National Park

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Ashford, WA 98304-9751

Date: June 21, 2012

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Signature



Date

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February 22, 2012

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Preface

The goal of the Serious Accident Investigation Team (SAIT) was to gather all relevant facts related to the June 21, 2012 accidental death of Nicholas “Nick” Edward Hall, a seasonal park ranger (Mountaineering) at Mount Rainier National Park (MORA).

By reviewing these facts, the SAIT aimed to identify any contributing factors and root causes that will help the NPS prevent similar accidents within the national park system in the future.

The investigation team worked systematically and objectively to establish the accident chronology and identify findings and causes based on the facts, weight of evidence and relevant interviews. It analyzed the data to produce recommendations that will improve employee safety.

It is difficult to investigate the death of an NPS employee who made the ultimate sacrifice while performing his duty in service to his country. This team conducted this review and investigation with the utmost humility and sensitivity toward Nick Hall, his family, his friends and fellow mountaineering co-workers, as well as the other employees of MORA and the NPS who have suffered the tragic loss of one of their own. We hope to learn from Hall’s experiences, and trust what is learned will benefit all who follow in his footsteps.

Executive Summary

Nicholas “Nick” E. Hall, 33, originally of Patten, Maine, died on Thursday, June 21, 2012 at approximately 5:00 p.m., when he slipped and fell approximately 2,400 feet down the Emmons-Winthrop Glacier during a search and rescue operation to evacuate four injured climbers on Mount Rainier.

On the late morning of June 21st, NPS rangers assigned to Camp Schurman on the east side of the mountain reported four injured climbers at 13,800 feet on the upper Emmons Glacier and initiated search and rescue operations. A helicopter from Joint Base Lewis-McChord (JBLM) was asked to evacuate the injured climbers to Madigan Army Medical Center in Tacoma, Washington. A U.S. Army Reserve Chinook CH-47D was sent from JBLM to help locate, access, stabilize, and transport the injured climbers safely off the mountain.

Hall was selected by a lead NPS rescuer to coordinate and lead the aerial response team, and was transported by the Chinook helicopter to the accident scene. Once there, he and other members of the aerial-response team met two NPS rescuers who climbed up from Camp Schurman.

Hall was about 50 feet below the helicopter coordinating the lowering of an empty litter to be used to *hoist* the injured climbers when he lost his footing on a steep icy slope, slid uncontrollably, and fell approximately 2,400 feet to his death.

Background Information

Born in September 1979, Nicholas “Nick” Edward Hall, was 33 years old at the time of his death. He was in excellent physical condition. He had served in the U.S. Marine Corps as a Sergeant (E-5) and was a veteran ski patroller, and a mountaineering rescue ranger. He was in his fourth season as a park ranger (mountaineering) with the Upper Mountain Search and Rescue team on Mount Rainier and had approximately 10 months total experience as a non-restricted climbing ranger at the park (see Finding 59). He was originally hired as a park ranger—mountaineering (GS-7), in July 2009. Prior to his fourth season at MORA, he worked the winter season of 2011-2012 at Yellowstone National Park as a Meteorological Technician.

His duties as a seasonal park ranger (mountaineering) included backcountry patrols, issuing backcountry permits and educating visitors on rules and regulations related to backcountry travel. He provided emergency medical care to sick and injured climbers/hikers in a wilderness setting, conducted climbing patrols on Mount Rainier via various climbing routes, and maintained and updated a climbing information website to provide up-to-date information to the public. He also responded to emergency rescue incidents in a high-altitude environment. He typically worked 8 days on and 6 days off, and was assigned to Camp Muir on the west side of Mount Rainier as his primary patrol station.

On the day of his death, Hall was working in the Paradise area preparing for an upcoming rope-rescue course he was coordinating with his supervisor and Lead Park Ranger [REDACTED] who is a GS-9 subject-to-furlough mountaineering ranger.

Upper Mountain Rescue Team



Nick Hall is the Ranger on the far left, second row.

Photographs taken on June 21st, 2012



Photograph by [REDACTED]

Investigative note: Injured private climber **Injured#2** lying unconscious in *crevasse*. The photograph was taken before *snow anchors* were placed to secure the injured climber and before attempting to remove her from the *crevasse*. **Injured#2** was the first patient to be raised by *hoist/litter* into U.S. Army Reserve Chinook CH-47D helicopter "Hooker 66." NPS rescuer Nick Hall coordinated the *hoist* operation from the ground.



Photograph by [REDACTED]

Investigative note: Injured private climber **Injured#2** being raised from a *crevasse* by NPS rescuers. Private climber **#1** is secured by a *snow anchor* in the background. The red/blue climbing rope belongs to the fallen party. The blue climbing rope is a haul line. View is looking west towards the saddle between Columbia Crest and Liberty Cap.



Photo by [REDACTED]

Investigative note: Private climber #2 kneels next to injured private climber #1. PC#2 and private climber #1 were the first two citizen rescuers to arrive and assist Inj. #1. Private#1 was secured to a *snow anchor* while Private#2 provided assistance. View is looking north down the fall line of the Winthrop Glacier, with Russell Cliffs to the left.



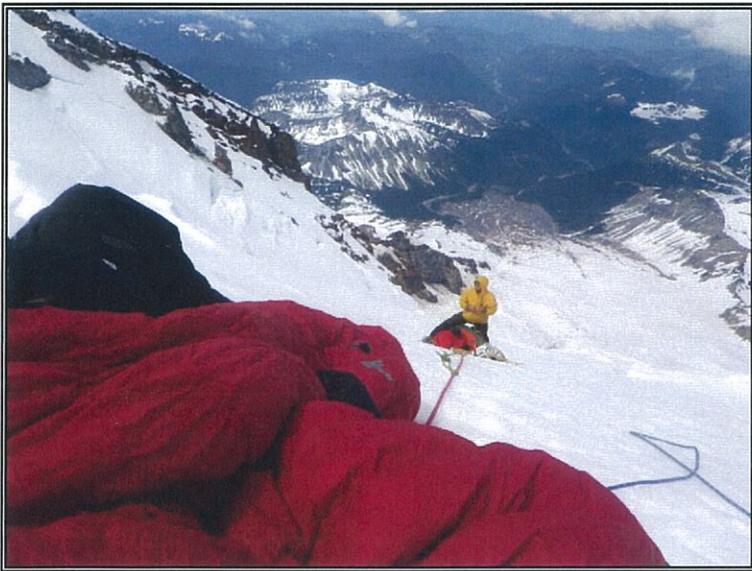
Photo by [REDACTED]

Investigative note (from left to right): Private climber Inj. #4, with yellow hood, sitting next to snow picket anchor; NPS rescuer NPS#2 wearing a yellow jacket and red climbing helmet; and private climber Private#2 sitting near NPS#2. According to private climber Private#1, NPS #2 and Private#2 are working to secure a fall victim. View is looking east at approximately 13,800 feet.



Photograph by [REDACTED]

Investigative note: NPS rescuer **NPS#5**, wearing green jacket and red helmet, arriving at the accident scene. The private climber to his left is unknown. View is looking east at 13,800 feet. Note edge of *bergschrund*, or *crevasse*, in the upper right corner.



Photograph by [REDACTED]

Investigative note: NPS rescuer **NPS#6** standing next to injured private climber **Injured#1**. View is looking north down the fall line of the Winthrop Glacier, with Russell Cliffs immediately to the left of NPS rescuer **NPS#6**.



Photograph by [REDACTED]

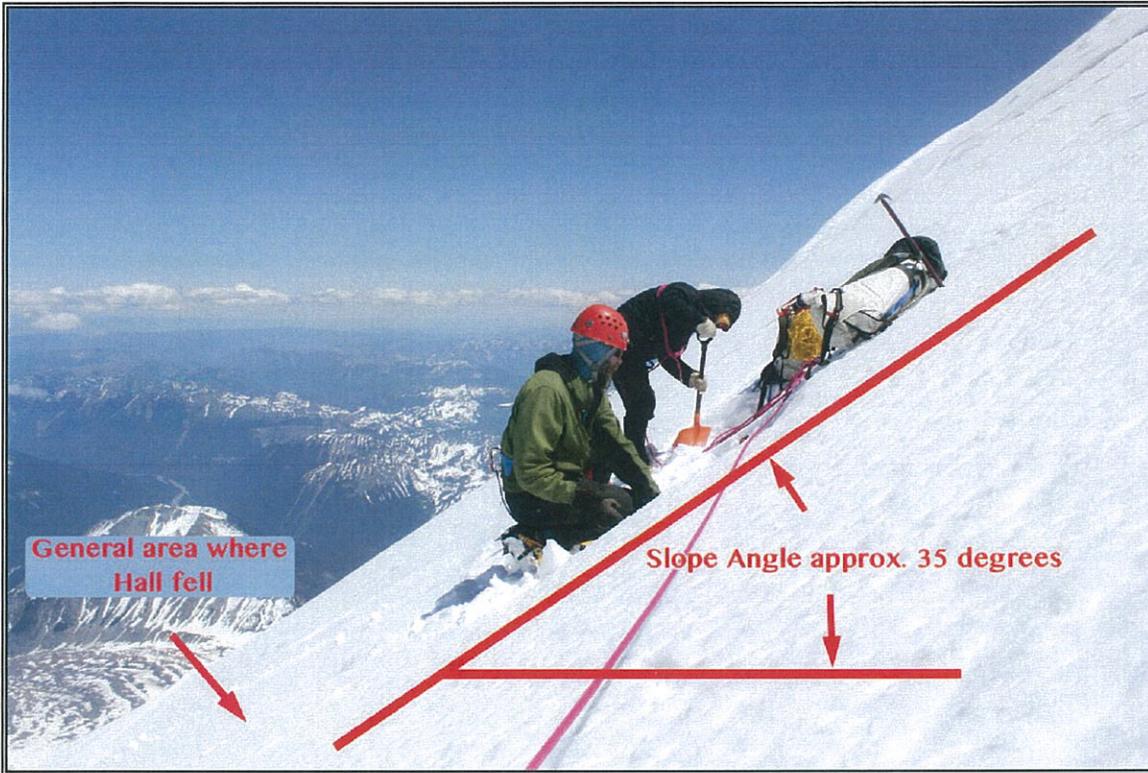
Investigative note: Private climber **Private#1** is secured by a *snow anchor* to upper Winthrop Glacier. Hooker 66 flying toward the saddle between Columbia Crest and Liberty Cap prior to inserting NPS rescue rangers Nick Hall and **NPS#2**. View is looking west.



Photo by [REDACTED]

Investigative note (from left to right): NPS rescuers **NPS#5** wearing green jacket and red climbing helmet; Nick Hall, wearing yellow SAR jacket and a white bandana; and private climber **Injured#4**, sitting next to snow picket anchor. As far as we know, it is the last known photograph of NPS rescuer Nick Hall before *hoisting* operations began. View is looking east at approximately 13,800 feet.

Photograph taken July 5th, 2012



Photograph by [REDACTED]

Investigative note: The photograph was taken during the recovery effort to remove climbing gear from the accident scene at 13,800 feet. NPS rescuers GRTE#1 [REDACTED], Ops [REDACTED], and NPS#6 [REDACTED] located and recovered snow-covered items. NPS rescuer Nick Hall's climbing pack was recovered. [REDACTED] GRTE#1 confirmed that the slope angle at the accident site was approximately 35-degrees, which is consistent with statements made by witnesses at the accident site on June 21, 2012.

Narrative

Pre-Accident Events

On Thursday, June 21, 2012 at approximately 11:30, a four-person climbing team fell above a *bergschrund*, or *crevasse*, at approximately 13,800 feet while descending the Emmons-Winthrop Glacier route from the summit of Mount Rainier. The members of the private climbing team are identified as Injured#1, Injured#3, Injured#2, and Injured#4

Three members of the private climbing team sustained major traumas, including limb fractures, spine and head injuries. The fourth climber received non-life threatening injuries.

Uninjured#5, a member of the private climbing team, was watching the team through binoculars and saw the climbing team's fall from Camp Schurman. Realizing they were in trouble, she immediately contacted NPS ground-response team members NPS#5 and NPS#6, and all three witnessed the end of the climbing team's fall.

NPS#5 notified NPS Rescuer Ops, who was on duty at the White River Ranger Station, and informed him of a possible Search and Rescue (SAR) incident high on the mountain. Ops instructed them to continue to watch to see if the private climbers got up and continued down the glacier.

NPS#5, NPS#6, and Uninjured #1 continued watching with binoculars to see if the climbing team recovered from the fall and got back on its feet. Once it was apparent the private climbers were not moving, a SAR response was initiated and NPS#5 and NPS#6 got their gear and began ascending Emmons Glacier.

At 11:46, Ops notified dispatch that a team of four private climbers had fallen at about the 13,000 foot level. According to the communications log, "Two of ours (NPS climbing rangers) are headed up now" from Camp Schurman.

By telephone, Ops talked to Lead Rescuer IC. Initially, Ops was the Incident Commander/Operations. After talking with IC, the decision was made that IC would assume the role of Incident Commander (IC), taking over from Ops. Ops assumed the role of Operations (OPS). As the operation developed, more staff members were added to the command structure. The transfer of command from Ops to IC was not broadcast over the radio to field personnel who were supporting the SAR effort.

At 12:26, Ops requested a military helicopter from Joint Base Lewis-McChord (JBLM).

At 12:43, MORA Dispatch received a 9-1-1 call from Injured#3 (Injured Climbing Team Member/Patient 2) that his private climbing team needed help on Mount Rainier.

At 12:48, an Incident Command Post (ICP) was set up at the Longmire/SAR Cache. Operations for the incident were setup at the White River Ranger Station.

At 13:19, Hooker 66, a U.S. Army Reserve Chinook CH-47D from Joint Base Lewis McChord, was enroute to Mount Rainier Kautz Helibase.

Between 14:00 and 14:30, NPS#5 and NPS#6 arrived at the accident scene and contacted the victims. Two private climbers, later identified as Private#2 and Private #1, were also on-scene with the injured climbers.

At 14:06, Hooker 66 arrived at Kautz Helibase with two pilots, two EMTs and three crew members on board—a total of seven. While at the Helibase, Climbing Rangers Nick Hall and NPS#2 were identified as the primary insertion team. Climbing Rangers NPS#3 and NPS#4 are identified as a secondary insertion team to support Nick Hall and NPS #2, if needed. NPS#8 is assigned as the Military Helicopter Operations Specialist (*MILHOPS*). A helicopter briefing was provided by the military before departure. A limited operations briefing was given by Nick Hall.

The ICP asked NPS#5 about “wind, snow, ice and weather” conditions. NPS#5 informed the ICP that the winds were “variable from the west, up to 15” and that the snow was “firm and icy.”

At 14:40, NPS#5 and NPS#6 called the ICP with patient updates; they confirmed the status of four patients as follows:

- 57-year-old male, chief complaint back and wrist injury Injured#1
- 32-year-old male, chief complaint right leg and hip pain, possible fracture Injured#3
- 22-year-old female, chief complaint “black out from hitting head” Injured#4
- 18-year-old female, chief complaint head, abdominal, and pelvic pain Injured#2

NPS#5 and Private#2 set a *snow anchor* to secure patients and rescuers at the accident scene.

NPS#5 requested four “litter iterations” to transport patients from the scene to a hospital.

At 14:54, Hooker 66 left from Kautz Helibase with five NPS SAR personnel onboard—NPS #8 as *MILHOPS*, Nick Hall and NPS#2 as the first insertion climbing/*hoist* team, and NPS#3 and NPS#4 as their backup or second insertion climbing/*hoist* team.

Hooker 66 located the accident scene on the upper Emmons Glacier then moved to a saddle between Columbia Crest and Liberty Cap to perform a “power check.” The original plan was to off-load NPS SAR personnel via an *aft landing*. However, if they arrived on scene and a *hoist* insertion via *jungle penetrator* was possible, it was the preferred method to insert the aerial-response team. After an aerial reconnaissance of the accident scene, Nick Hall used a white dry-erase board to ask NPS#2 (who was linked into the Hooker 66 Internal Communications System, also known as ICS) to have the pilot-in-command make this a “*hoist* insertion” operation. The pilot-in-command agreed, and a *hoist* was used to lower Nick Hall, NPS NPS#2 and assorted Emergency Medical Supplies (EMS) to the accident scene.

The mission objective was to *hoist* the four patients and transport them to Madigan Army Medical Center.

Ops attempted to radio (via Crystal repeater) NPS#8 (*MILHOPS*), who was onboard Hooker 66, several times without success.

At 15:13, Nick Hall radioed Ops that he and NPS#2 were on-scene at the accident scene.

Nick Hall told Hooker 66 to "go hover somewhere" while the NPS climbing rangers packaged the patients for hoisting.

The ICP attempted to contact NPS#8 (MILHOPS) by radio several times without success.

At 15:25, Ops requested an update from the ground team; NPS#5 told him: "two are on the ground from the craft, packaging and everything is good".

At 15:27, Hooker 66 was on the ground at the Sunrise Helispot; and did not shut down. By going to the helispot, which was 5-10 minutes from the accident scene, the helicopter could reduce RPMs and expend less fuel than hovering at altitude.

Nick Hall called law enforcement park ranger LE#1 at the Sunrise Helispot to relay the following message. Nick Hall told LE#1:

- He will be ready in 10-minutes
- Will give a 5-minute warning
- The hoist operations will be to raise one packaged patient by litter Injured#2, remove the patient, and send the same litter back down for a second patient Injured #3, who is already on a backboard.

LE#1 attempted to confirm this plan with Nick Hall, via the "Crystal" repeater, without success. LE#1 wanted to know if the helicopter was to stay on scene or come back for a second pass. There was no answer from Nick Hall.

Ops talked to NPS#8 and told him that communications were poor between him and the helicopter. NPS#8 told Ops that he "could not hear anything." Ops asked NPS#8 if "the device we got you with is not working well, is that correct?" NPS#8 replied, "Affirmative."

Ops and Nick Hall discussed the patient transport plan over the radio:

- Nick Hall told Ops it is "pretty hands-on here, won't be able to talk a lot," and said he needed approximately 15 more minutes to finish packaging patients.
- Nick Hall told Ops that the plan is to "load all 4 and send them to Madigan" (Madigan Army Medical Center). Nick Hall agreed that it would be a good idea to have an "ALS rig (Advanced-Life-Support ambulance) sitting at Sunrise" as a backup
- Ops told Nick Hall he had a "BLS" unit heading to Sunrise (A-4032 Basic-Life-Support ambulance stationed at White River Ranger Station)

Ops and Nick Hall discussed the patient transport plan again and agreed to transport critical patients by Airlift Northwest, an air ambulance helicopter affiliated with University of Washington Medical Center. Ops told Nick he would call him again in 15 minutes.

At 15:44, Ops ordered a medevac helicopter to Sunrise Helibase.

LE#1, who was still at the helispot, asked Ops to clarify that another helicopter was coming to Sunrise Helispot and to discuss the current patient transport plan. Nick Hall answered the radio call and relayed a new plan to LE#1:

- Hooker 66 is to load the two most critical patients into the helicopter, get to Sunrise, and transfer the patients to Airlift Northwest. Also, for Airlift Northwest, to wait for the “*second two to get packaged.*”

Ops asked Nick Hall “*how much longer do you want the Chinook on the ground?*” Nick Hall replied, “*at least 15*” more minutes.

Ops told Nick Hall that the medevac helicopter (Airlift Northwest) was enroute and would transport one patient at a time from the Sunrise Helispot.

At 15:52, Nick Hall told Ops to cancel the medevac helicopter after he was informed that it would only transport one patient at a time. He redefined the patient transport plan as: Load all four patients into Hooker 66 and transport directly to Madigan Army Medical Center.

At 15:55, Ops cancelled the Airlift Northwest medevac helicopter.

At 15:56, Nick Hall called Ops, who was onboard Hooker 66, to confirm the plan to *hoist* 3 patients by litter and 1 by JP (*jungle penetrator*).

At 16:09, Nick Hall called Ops and told him “*we are 10-15 minutes out from being ready to hoist.*”

At 16:15, Nick Hall confirmed the “*hoisting*” plan with Ops; the plan was to *hoist* three patients by litter, one patient by JP, and possibly one ranger to *hoist* up with miscellaneous gear. If not possible, the plan was to load the three patients and just go.

At 16:21, LE#1 relayed a 10-minute warning from Nick Hall to the pilots of Hooker 66.

At 16:30, Nick Hall told Ops he went direct with Hooker 66 and asked them to return to the accident scene; Nick Hall confirmed he had “*decent comms*” with Hooker 66.

At 16:31, LE#1 told Ops that Hooker 66 was off the ground and enroute to the accident scene.

At 16:35, MORA Dispatch told Ops that Medic 35 (an ALS Ambulance) was just past Crystal Mountain Boulevard (ski area).

Time-of Accident Events

At 16:53, Nick Hall told [Ops], via park radio, that [Injured#2] had been raised by *hoist* into the helicopter. (**Note:** when the litter was pulled into the helicopter through the hatch-door, the tagline was released to the ground by a crewmember.)

Nick Hall told [Ops] that when they attempted to lower the empty litter without the tagline, it was unsuccessful, and they would "*give it another shot.*" (**Note:** on-scene witnesses stated the empty, un-weighted litter without the tagline was striking the skis and possibly the fuselage of the helicopter.)

Nick Hall told [Ops] that the contingency plan was to perform an "*aft-landing and walk the litter off*" near the saddle between Columbia Crest and Liberty Cap if it failed again.

Hooker 66 moved slightly off-scene while crewmembers created another tagline and attached it to the litter.

Hooker 66 then moved back over the accident scene and hovered over the rescuers and patients at approximately 35-50 feet above ground level (AGL).

[NPS#5] said surface winds were 10–20 mph. [NPS#6] pegged them at 30 – 40 mph. [NPS#2] said there were gusts to 15 mph. [Private#2] said wind speeds were 15-20 mph with gusts to 50 mph. [Private#1] said wind speeds were 20-30 mph.

Rotor wash from Hooker 66 was described as being significant. [NPS#6] estimated it at 60–80 mph; [Private#1] described it as, "*if not tied in, would blow him off the mountain.*"

Hooker 66 began lowering the empty, un-weighted litter with the improvised tagline to Nick Hall, who was waiting to accept it.

Nick Hall, who was wearing a yellow XCR Arcteryx® rescue jacket, black OR® climbing pants, radio harness, sit and chest harness, leather gloves, and Scarpa® mountaineering boots with crampons, walked out from his dug-out platform to grab the tagline. He was not wearing a climbing helmet.

Nick Hall was not attached to any fall protection, such as a *snow anchor*, but had [Private#2's] Black Diamond Cobra® *ice tool* in his hand. (The *ice tool* is a specialized form of an ice axe—please see the definitions section in this report for more detail).

Nick Hall grabbed the tagline and began to guide the empty, un-weighted litter down to his location. At some point, Nick Hall planted the *ice tool* into the snow.

The litter made contact with the ground and Nick held the litter with both hands, unhooked it, and pushed the *hoist* cable away.

After seeing the *hoist* cable released, Hooker 66 began to reel in the *hoist* cable and move slightly away from the accident scene.

While Nick Hall was holding onto the litter, it began to slide downhill. The litter was buffeted by the cross-wind and *rotor wash*, and Nick struggled to maintain control of it.

Nick Hall spun around, trying to control the litter. He lost his footing and his balance, and let go of the litter.

Nick Hall began an uncontrolled slide downhill.

Nick Hall made several attempts to arrest his slide. After several hundred feet, he launched off a *serac*, a block or column of ice formed by intersecting *crevasses* on a glacier, which acted like a ramp. Nick was then out of sight of ground personnel.

At 17:01, NPS#2 described the accident he witnessed, by radio to Ops
(Note: This is a radio transcription taken immediately after the accident.):

NPS#2 :

"Operations....Operations this is NPS#2 on Crystal."

Ops :

"Go ahead NPS#2 ."

NPS#2 :

"Ok, this just got real serious, chopper 62 was lowering the litter down to Hall and Hall and the litter lost contact with the ground and he has gone for a slide down the Emmons Glacier. We no longer have contact with Hall."

Ops :

"You have contact with Hall?"

NPS#2 :

"Negative. He was traveling at an extreme high rate of speed, he was out of control, and I saw him launch off the serac at some point.... (Unreadable)"

Ops :

" NPS#2 I copy. Hold one."

Ops told NPS#2 to standby while he formulated an action plan. Ops confirmed with NPS#2 that a patient was not in the litter when it slid down the slope.

Post-Accident Event

At 17:05, Ops [redacted] told NPS#2 [redacted] to redirect Hooker 66 to search for Nick Hall. (**Note:** Upon seeing the litter and Nick Hall slide downhill, Hooker 66 immediately left the accident scene to locate him further down the glacier.)

At 17:08, Hooker 66 located Nick Hall and reported “no movement.”

At 17:09, Ops [redacted] requested a medevac helicopter to Sunrise Helispot.

At 17:10, Medevac helicopter ETA 35 minutes to Sunrise Helispot.

At 17:23, Hooker 66 performed an *aft landing* and dropped NPS#3 [redacted] on the ground below the point-of-rest of Nick Hall (11,400 feet). NPS#3 [redacted] solo climbed through the ice fall to Nick’s location.

Hooker 66 reported being low on fuel and said it had to return to Joint Base Lewis-McChord (JBLM) with its one patient.

At 17:39, Ops [redacted] called NPS#3 [redacted] and asked if a “medevac” of Nick Hall was urgent.

NPS#3 [redacted] replied: “*not urgent at this time.*”

At 17:43, Medevac helicopter, Airlift Northwest, arrived at Sunrise Helispot.

(**Note:** The search and rescue incident has now expanded into two primary locations: the original accident site, where three patients remained with three NPS climbing rangers and several private climbers at 13,800 feet, and Nick Hall’s point-of-rest, where one climbing ranger was standing by at 11,400 feet on the Winthrop Glacier.)

NPS#5 [redacted] told Ops [redacted] he would descend to Camp Schurman with several “ambulatory” climbers. NPS#5 [redacted] was instructed to check in every 15 minutes on the way down.

After NPS#5 [redacted] departure, NPS#2 [redacted] and NPS#6 [redacted] remained with the three injured climbers: Injured#1, #2 and #4 [redacted].

Ops [redacted] told NPS#3 [redacted] to wait for the return of Hooker 66; the priority would be to extract him first, then Nick Hall, if possible.

(**Note:** While waiting for the return of Hooker 66, Ops [redacted] routinely conducted “status checks” on all three parties on the Emmons-Winthrop Glacier; NPS#5 [redacted] descending with several private climbers to Camp Schurman; NPS#2 [redacted] and NPS#6 [redacted] with three patients at the accident scene; and NPS#3 [redacted], who was with Nick Hall on an ice shelf.)

At 18:54, Hooker 66 arrived to Kautz Helibase. NPS SAR personnel were identified for mission #2, and included: NPS#9 [redacted] as MILHOPS; NPS#10 [redacted] as team lead; and NPS #4 [redacted] as a rescuer.

Climbing rangers NPS#11 [redacted], NPS#12 [redacted], and NPS#13 [redacted] were standing by at Camp Muir.

NPS#6 gave Ops an update on weather conditions at the accident scene, noting the air temperature at 28° F, wind gusts up to 15-20 mph, erratic winds “wrapping around from the south then coming from the saddle,” and clouds beginning to move in.

Ops relayed this information to Kautz Helibase.

Hooker 66 departed Kautz Helibase enroute to the accident scene at 13,800 feet to extract three patients by *hoist*; two by back-board/litter and one by *jungle penetrator* (JP).

Hooker 66 arrived at the accident scene and lowered two litters to NPS#2 and NPS #6.

At 20:15, Airlift Northwest told Ops that they must depart to return to their base. Airlift Northwest departed Sunrise.

Ops told NPS#3 that the plan was for Hooker 66 to remove the three patients and two climbers at the accident scene, then fly down and get him next. If there were any problems, NPS#3 was instructed to leave Nick Hall behind.

NPS#2 told Ops that all three patients were packaged and ready to go. Hooker 66 was enroute to their location. The plan was to *hoist* the two litters first (Injured#1 and Injured#3), and then *hoist* the third patient (Injured#4) by JP.

If there was enough time, NPS#2 would ask Hooker 66 to *hoist* them as well. If not, NPS #2 and NPS#6 were prepared to descend together to Camp Schurman.

Hooker 66 arrived to the accident scene and raised the two “packaged” patients, Injured#1 and Injured#3, by *hoist*. While preparing to raise the third patient, Injured#4, by JP, Hooker 66 lost ground reference and began to settle down towards the rescuers and patient. In a panic, NPS#2 told Hooker 66 by radio to “get out of here, get out of here.”

Hooker 66 responded and moved away from the accident scene. NPS#2, NPS#6 and Injured #4 and the *jungle penetrator* were left behind.

At 20:52, NPS#2 told Hooker 66, “I think you guys should call it quits for the day. That was too close of a call for me and NPS#6 with the wind, the sun coming down.” He also told Hooker 66 that, “like I said, you almost took our heads off with those rotors.”

Hooker 66 left the accident scene and descended down the Winthrop Glacier to pick up NPS #3.

At 20:58, NPS#5 and the “ambulatory” group arrived safely at Camp Schurman.

According to the MORA Daily Report, sunset was officially at 21:05.

At 21:06, Hooker 66 picked up NPS#3 and headed to Madigan Army Medical Center with two injured climbers (Injured #1 and #3) on board.

Before NPS#3 departed, he secured Nick Hall’s body in the original litter that slid down the glacier earlier that day and anchored him to the glacier with a snow picket.

NPS#2, NPS#6 and Injured#4 planned to spend the night at the accident scene. NPS#2 told Ops that they had "enough stuff to make it through the night." ICP arranged to monitor the radio throughout the night.

At 21:13, BLS ambulance, A4032, informed ICP that they were enroute to White River Ranger Station from Sunrise.

At 21:14, all units were clear at Sunrise.

(Note: Preparations began at the ICP to safely get NPS#2, NPS#6 and Injured#4 off the upper Emmons Glacier early the next day before weather conditions changed.)

On July 5, 2012, the MORA Upper Mountain Rescue Team, with the assistance of a Chinook CH-47D from Joint Base Lewis-McChord (JBLM) and a search-cadaver dog named "Cirrus," successfully located and removed NPS rescuer Nick Hall from Mount Rainier. His body was transported by *long-line* to the Sunrise parking lot and subsequently escorted to the Pierce County Medical Examiner in Tacoma, Washington by NPS ambulance/personnel.

At the Medical Examiner's office, NPS rescuer Nick Hall's body was removed from the Cascade rescue litter and preserved at the morgue. The rescue litter and associated climbing hardware and rescue cords were turned over to NPS Special Agent Steve Demske to be secured as evidence. (Note: The rescue litter is being stored until needed by the MORA Board of Review.)

On July 6, 2012, an autopsy of Nick Hall's body was performed by Chief Medical Examiner . During this procedure, the following personal protective equipment (PPE) and personal items were removed from NPS rescuer Nick Hall:

1. Climbing Boot, right, red, Scarpa® brand, no crampon (boot was found near body)
2. Climbing pants, black, OR® brand
3. Glove, left, leather
4. Radio harness
5. Climbing waist/sit harness
6. Climbing chest harness
7. Gortex® Rescue Jacket, yellow, XCR Arcteryx® brand
8. MORA Climbing Ranger Pocket Guide_v11

Medical Examiner's Report

Synopsis: This case will be closed as an accidental death.

- Date of Death: 06/21/2012
- Time of Death: pronounced at 17:23
- Manner of Death: ACCIDENTAL FALL
- Cause of Death: Death is due to multiple traumatic injuries sustained in a fall
- Toxicology testing is negative for alcohol and other drugs
- Pierce County Medical Examiners Record: Case # 12-0921 (ISB-PW-12-217)

End of report.

The following timeline provides a more detailed sequence of events that led to Nick Hall's tragic death.

Timeline of Event

Schrund- Emmons Glacier Incident Timelines

(Source: Incident Command Post (ICP) radio log, MORA Dispatch Log, personal photos and interview comments)

Timeline Recreational Climbers from Camp Schurman - Climbing Rangers response from Camp Schurman

Thursday, June 21, 2012

- 10:06** Climbing team of four recreational climbers summited Mount Rainier (14,410 feet) via the Emmons-Winthrop Glacier Route; Injured#1, #2, #3, #4 [REDACTED].
- 10:56** Climbing team descended towards Camp Schurman via the Emmons-Winthrop Glacier Route.
- 11:30** Climbing team fell above a *bergschrund* at approximately 13,800 feet, injuries sustained—3 ALS, 1 BLS.
- [REDACTED] Uninjured#1 [REDACTED] witnessed the start of the climbing team fall, immediately called to NPS#5 and NPS#6 [REDACTED], witnessed the end of the fall.
- [REDACTED] NPS#5 and NPS#6 [REDACTED] notified [REDACTED] Ops [REDACTED] climbing ranger at White River Ranger Station.
- 11:46** [REDACTED] Ops [REDACTED] notified dispatch that a team of four climbers took a fall at about 13,000 foot level. "Two of ours (NPS climbing rangers) are headed up now."
- 11:46** Over the telephone, [REDACTED] ICS [REDACTED], Lead Climbing Ranger, took over as Incident Commander (IC) from [REDACTED] Ops [REDACTED]. Transfer of command was not broadcast over the radio net. [REDACTED] NPS#3 [REDACTED] was told to report to the IC at the Longmire Emergency Operations Center (EOC).
- [REDACTED] OPS [REDACTED] was identified as Operations (OPS)
- 12:00** [REDACTED] NPS#5 and NPS#6 [REDACTED] left Camp Schurman and began hiking to accident scene.
- 12:43** 9-1-1 call from [REDACTED] Injured#3 [REDACTED] received by MORA dispatch.
- 12:48** Incident Command Post (ICP) set up at Longmire/SAR Cache, OPS at White River Ranger Station.

13:19 Hooker 66 (U.S. Army Reserve Chinook CH-47D from Joint Base Lewis-McChord) was enroute to Mount Rainier Kautz Helibase.

14:00 – 14:30 NPS#5 and NPS#6 arrived at the accident scene and made contact with victims. Private climbers (Private#1 and #2) were on-scene with injured climbers.

14:06 Hooker 66 arrived at Kautz Helibase.

- Before flying, Nick Hall and NPS#2 were identified as the primary insert team.
- Before flying, NPS#3 and NPS#4 were identified as secondary insert team.
- NPS#8 as the MILHOPS.
- Helicopter and operations briefings occurred.
- Limited operation briefing was led by Nick Hall.

14:40 NPS#5 and NPS#6 called ICP with patient update; confirmed four patients:

- 57-year-old male, chief complaint back and wrist injury (Injured#1)
- 32-year-old male, chief complaint right leg and hip pain, possibly fracture (Injured#3)
- 22-year-old female, chief complaint “black out from hitting head” (Inj. #4)
- 18-year-old female, chief complaint head, abdominal, and pelvic pain (Injured#2)

NPS#5 requested four “litter iterations.”

14:54 Hooker 66 left from Kautz Helibase with five NPS personnel onboard—NPS #8 (designated the MILHOPS), Nick Hall, NPS#2, NPS#3, NPS#4.

Hooker 66 performed a “power check” in the saddle between Columbia Crest and Liberty Cap.

Nick Hall, through NPS#2, asked the Hooker 66 pilot-in-command to make this a *hoist* insertion; the pilot agreed.

Mission Objective—transport four patients to Madigan Army Medical Center.

15:13 NPS#2 and Nick Hall arrived via *hoist* insertion with a rescue litter, two backboards, and patient packaging equipment; they joined NPS#5 and NPS#6 at the accident scene.

On-scene: four victims, two private climbers, and four rescue rangers.

15:27 Hooker 66 was on the ground at Sunrise Helispot; it did not shut down.

OPS talked to [NPS#8] (MILHOPS) and said communication was poor between OPS and helicopter. [NPS#8] told OPS he "could not hear anything." OPS asked [NPS#8] if "the device we got you with is not working well, is that correct?" [NPS#8] responded, "affirmative."

Planning between Nick Hall and OPS to coordinate patient extraction/transport was as follows:

- Nick Hall initial plan—load all four patients into helicopter, two patients need ALS.

Nick Hall relayed a new plan: load two most critical patients into helicopter, get to Sunrise, and transfer to Airlift Northwest (air ambulance helicopter affiliated with University of Washington Medical Center)

- Hooker 66 would then return for the other two patients.
- OPS: BLS ground ambulance was to stage at Sunrise.
- OPS; confirmed the new plan; to transport two patients to Sunrise, transfer to ALS care, wait for the other two.

15:44 [Ops] ordered medevac helicopter to the Helibase.

15:52 Nick Hall cancelled the medevac helicopter. He again redefined the plan to load all four patients into Hooker 66 and transport to Madigan (Army Medical Center).

15:55 [Ops] called to cancel medevac helicopter.

15:56 Nick Hall confirmed the new plan to *hoist* three patients by litter, one by JP (*jungle penetrator*), and transport them to Madigan.

16:09 Nick Hall said, "we are 10-15 minutes out from being ready to hoist."

Nick Hall confirmed the plan with OPS to *hoist* three patients by litter, one patient by JP, and possibly one ranger to *hoist* up with miscellaneous gear. If not possible, the plan was to load the three patients and go.

16:21 Hall attempted to contact Hooker 66. Ranger [LE#1] relayed for Hall. A 10-minute warning was given to Hooker 66.

16:30 Nick Hall reported to OPS and called for Hooker 66 to return to accident scene. Said he had "good comms" with Hooker 66.

16:31 Hooker 66 was enroute from Sunrise Helispot to scene.

16:35 Update: Medic 35 was at Crystal Mountain Boulevard (ski area).

16:53 Hall to OPS: one patient is raised by *hoist* into helicopter, (tagline was released to ground). Attempted to lower litter without tagline, unsuccessful, will "give it another shot." Hall's stated contingency was an aft-landing near the saddle (Liberty Cap) if it failed again.

Helicopter moved slightly off scene while creating a tagline.
Helicopter moved back over accident scene.
Helicopter hovered at 35-50 feet above patients and rescuers.
Lowered litter again with tagline to Nick Hall.

17:01 NPS#2 to OPS: "Operations....Operations this is [REDACTED] on Crystal."

OPS to NPS#2: "Go ahead NPS#2."

NPS#2 to OPS: "Ok, this just got real serious. Chopper 62 was lowering the litter down to Hall and Hall and the litter lost contact with the ground and he has gone for a slide down the Emmons Glacier. We no longer have contact with Hall".

OPS to NPS#2: "You have contact with Hall?"

NPS#2 to OPS: "Negative. He was traveling at an extreme high rate of speed, he was out of control, and I saw him launch off the serac at some point.... (Unreadable)"

OPS to NPS#2: "NPS#2 I copy. Hold one."

OPS to NPS#2: confirmed that a patient was not in the litter.

OPS to NPS#2: standby to formulate a plan of action.

17:05 OPS to NPS#2: redirected helicopter to search for Nick Hall (Helicopter had immediately left accident scene to locate Hall).

17:08 Hooker 66 located Nick Hall on glacier, near Russell Cliffs; no movement.

OPS: requested NPS#3 to be inserted near Nick Hall.

17:09 Requested medevac helicopter to Sunrise Helispot.

17:10 Medevac helicopter ETA 35 minutes to Sunrise Helispot.

17:23 NPS#3 was on the ground; Hooker 66 was low on fuel, must return to Joint Base Lewis-McChord (JBLM).

17:39 OPS called NPS#3 and asked if medevac of Nick Hall was urgent; answer was: not urgent.

17:39 NPS#3 called OPS and declared "not urgent" to medevac Nick Hall.

17:43 Medevac helicopter arrived at Sunrise Helispot.

End of timeline.

Findings

Human, Material, or Environmental Factors

Note: All times are approximate and reflect dispatch logs, witness statements, and other incident documentation.

Finding 1: (Human)

Between 11:00–11:05, four private climbers fell on the upper Emmons Glacier on Mount Rainier from approximately 14,000 feet.

Investigative Findings: Private climber **Injured#4** took her last photograph, which was time-stamped at 10:56. According to **#4**, she was the fourth climber in a four-person rope team. **Injured#3** was in the lead. After “cleaning” a snow picket and securing it to her sit harness, she began to walk downhill when she lost her footing on the icy slope and fell.

Finding 2: (Human)

At 12:26, **Ops** requested a military helicopter (Hooker 66) from Joint Base Lewis McChord.

Investigative Findings: According to the MORA communication log for 6/21/2012, **Ops** called JBLM to request a military helicopter capable of conducting a high-altitude air operation.

Finding 3: (Material)

At 14:06, U.S. Army Reserve CH-47D “Hooker 66” arrived at Kautz Helibase.

Investigative Findings: According to the MORA communication log for 6/21/2012, Hooker 66 arrived at Kautz Helibase. According to MORA Incident communication log, Hooker 66 “landed at Kautz, shutting down to communicate plan of action.”

Finding 4: (Human)

Five NPS rescuers were identified for helicopter MISSION #1—**NPS#8**, Nick Hall, **NPS#2**, **NPS#3**, **NPS#4**.

Investigative Findings: According to **NPS#8** and **NPS#2**, the first mission included **NPS#8** as MILHOPS, Nick Hall, **NPS#2**, **NPS#3**, and **NPS#4** as rescuers.

Finding 5: (Human)

The Team leader was never clearly identified among the climbing rangers.

Investigative Findings: According to NPS#8, Nick Hall was assigned as the “team lead” of the ground team on the first mission.

NPS#2 stated: *“We did not talk about who was gonna be in charge, really, on the ground, or who was gonna do what, really as far as packing patients or whatever. We didn’t even really know a lot about the scene at the time. Me and Nick-didn’t even know NPS#6 & NPS#5 were on the scene.”*

NPS#6 states that he and NPS#5 never determined who the team leader was when they (Nick Hall and NPS#2) arrived and that it was assumed that Nick Hall would be the team leader of the team that was inserted by Hooker 66. NPS#6 felt it was not established that Nick Hall was the air team leader. However, it was more of a force of personality due to Nick Hall’s character.

NPS#5 stated: *“I wouldn’t so much say that we had like, ‘I’m this, you’re that’ kind of thing. But the communication was flowing really well. Nick being the most experienced and most seasoned one of us, he kind of became the default leader a little bit...”*

Finding 6: (Human)

Helicopter and a limited operations briefing was provided to all passengers onboard Hooker 66. The limited operations briefings were led by Nick Hall.

Investigative Findings: According to NPS#8, the military crew went through their “standard” helicopter briefing at Kautz Helibase. Nick Hall then briefed his team on what they were doing and what their assignments were.

Per the interview with Army Reserve personnel a detailed helicopter briefing specifically tailored for Search and Rescue operations was conducted to include who would stand where and who was getting off the helicopter.

Per the MORA Operation Plan, *“Prior to a hoist mission the NPS helicopter manager, IC and USAR pilot in command (PIC) will conduct a mission briefing as in depth as time allows.”*

NPS#2 stated: *“We talked about how we were gonna actually—the sequence in which—how we were gonna load the patients, and then send the litter back down. We didn’t discuss, really any contingencies to that, and we didn’t—we didn’t talk about how we were gonna be organized on the ground...”*

Finding 7: (Human)

Nick Hall through NPS#2 asked the Hooker 66 pilot-in-command to make this a *hoist* insert; the pilot said yes. Nick Hall, NPS#2 one rescue litter, two back-boards and EMS gear were inserted near injured private climbers.

Investigative Findings:

Per MORA Operation Plan: *"The aircraft pilot-in-command (PIC) and Air Mission Command (AMC) will have the final decision on the use of the rescue hoist."*

NPS#2 stated: *"Nick told me to get on the radio and ask if we could actually do a cable hoist insertion at the scene. So I got on the ICS system and talked to the flight crew and asked them if we could insert on the scene, and they said that yeah, we could try to do that. So we kind of lifted off again, and came down over the scene, hovered there briefly, and decided to go ahead and do an insertion right at the scene. So they opened up the hatch. Nick decided to go first..."*

"So again, our plan was—because we only had one specialized litter set up for that cable hoist, the plan was to lower that out with all the equipment, which we already had packaged on board—things like we had two backboards in there, I believe.

"We had a bunch of—some medical equipment, but a lot of patient packaging stuff, like sleeping bags and sleeping pads, and then two of the technical Chinook hoist kits, which have the litter bridle and patient restraint equipment, like carabiners and webbing and stuff for actually restraining the patient in the litter. So we lowered all that down..."

NPS#5 stated: *"We got a medical kit, just the basic BLS kit, full-body vacuum splint, three backboards, and all of the parts for backboards, the straps and the C collars, head beds. I believe that's it. Yeah, and I think there was packaging supplies as far as sleeping bags and things like that."*

Finding 8: (Material)

The rescue litter was manufactured by Cascade Rescue Company with a fiberglass bottom and metal railing. The weight is approximately 25 lbs.

Investigative Findings: The Cascade rescue litter with its associated climbing hardware and climbing cord weighed approximately 25 lbs. The rescue litter had a park-made, adjustable four-leg litter harness secured with four large locking carabiners.

See photographs of rescue litter taken at the Pierce County Medical Examiner's office in the Maps, Illustrations and Photos section of this document.

Finding 9: (Human)

It was not clearly established or communicated who the accident scene team leader was. Nick Hall was assumed to be the defacto leader by those on scene.

Nick Hall, NPS#5, Private#2, NPS#2, and NPS#6 provided patient care.

Investigative Findings:

NPS#2 stated: *"We did not talk about who was gonna be in charge, really, on the ground, more who was gonna do what, really as far as packing patients or whatever. We didn't even*

really know a lot about the scene at the time. Me and Nick didn't even know NPS#6 and #5 were on the scene."

NPS#6 stated that he and NPS#5 never determined who the team leader was when they arrived and that it was assumed that Nick Hall would be the leader of the team that was inserted by the CH-47. NPS#6 felt it was not established that Nick Hall was going to be the rescue team leader; however, it was more a force of personality due to Nick Hall's character.

NPS#5 stated: "I wouldn't so much say that we had like, 'I'm this, you're that' kind of thing. But the communication was flowing really well. Nick being the most experienced and most seasoned one of us, he kind of became the default leader a little bit..."

Finding 10: (Human)

The plan on how to extract patients changed numerous times.

Investigative Findings: According to radio communications between Nick Hall and Ops, the plan to extract the injured climbers changed three times from 15:27 to 16:31. This is also noted in the radio log.

Finding 11: (Human)

Nick Hall and Ops agreed to a final plan to raise three patients by litter, one patient by jungle penetrator (JP), and possibly one ranger by JP.

Investigative Findings: Just prior to Hooker 66 leaving Sunrise, Ops confirmed with Nick Hall the plan to extract the injured climbers and possibly one NPS rescuer. This is also noted in the radio log.

Finding 12: (Human)

Crew members on board Hooker 66 raised patient #1, Injured#2, by litter into the helicopter.

Investigative Findings: According to NPS#8, military crewmembers raised the rescue litter by hoist into the helicopter. He watched them pull the rescue litter, with Inj. #2 securely packaged inside, through the "hole" in the helicopter.

Finding 13: (Human)

Per training, the tagline was unhooked and dropped from the helicopter to the ground.

Investigative Findings: NPS#8 stated he saw a military crewmember unclip the tagline from the litter and throw it back down to the ground. According to NPS#8, this is the way they practiced and typically during a rescue they only hoist one "patient" at a time. The crewmembers are taught to drop the tagline once the litter is inside the helicopter.

According to the interview with Army Reserve personnel, *hoist* operations on the pad at Joint Base Lewis McChord are usually only one litter rotation and the military are trained to unclip the tagline as soon as the litter is brought on board.

Per 2011 MORA *Hoist* Training Project Aviation Safety Plan (PASP):

LITTER RAISING

1. The patient is packaged securely and litter is fitted with proper *hoist* rigging. 2. The *hoist* cable (sometimes with the JP attached) is lowered to Ranger. 3. Ranger waits until the JP hits the ground then grabs the cable. 4. Ranger clips the litter into the *hoist* cable (removing the JP first if necessary) 5. Ranger signals with a tap on the helmet that the litter is ready to go. 6. The litter is raised into the helicopter while a ranger on the ground controls a tag line attached to the back of the litter (tag line always goes toward front of the ship) 7. Rangers inside the helicopter haul the litter inside, attaching it securely to the floor of the helicopter. 8. Rangers unclip the litter from the *hoist* cable.

Note: SAIT was unable to find or obtain a 2012 PASP for *Hoist* Operations or Training nor an approved *Hoist* Training PASP for any preceding years, including 2010.)

Finding 14: (Human)

Hoist cable was attached to the head of the empty, un-weighted litter and the aircrew began to lower the litter to the ground.

Investigative Findings:

NPS#2 stated: *"They opened up the belly hatch of the helicopter and started lowering the litter out. It was moving around violently, spinning all over the place, bouncing around swinging around under there, not really something that we would have been able to receive effectively without getting injured..."*

NPS#5 stated: *"So the litter starts to come down... but the litter was really whipping around. I mean, I've never seen anything like that. It was pretty scary. And it was whipping around so much that it was going up and hitting the Chinook and hitting the skis. And it was really dangerous because they kept lowering it, and it was swinging around over us and stuff."*

NPS#6 stated: *"The second litter came down. They didn't even get it to us because it caught so much wind and it looked like it was going to get tangled with their wheels, their landing gear. So they pulled it back up connected a tag line to it. Dropped the tagline, and it was dancing around on the ice..."*

Finding 15: (Material)

While being lowered, the empty, un-weighted litter began to be whipped around by wind and rotor-wash, hitting the helicopter.

Investigative Findings:

According to NPS#8 he saw the un-weighted rescue litter lowered through the “hole” without a tagline. When the rescue litter got about 20 feet or so below the helicopter, the wind caught it and it began to spin “*all over the place.*” He became very worried about the rescue litter, which was spinning out of control under the helicopter. The military crewmembers immediately pulled the rescue litter back into the helicopter.

According to Army Reserve personnel, the litter was rigged so it hung at an angle, instead of perpendicular, in order to make it easier to maneuver into the helicopter and onto the floor. The first patient extraction went smoothly and the un-weighted litter began to be lowered to the ground. At approximately 25 to 30 feet below the helicopter, the litter was caught by the wind, “*like a kite in a wind storm,*” and was swung forward and around. It briefly lodged between the helicopter ski and the airframe.

Finding 16: (Human)

Crew members pull back the empty, un-weighted litter into the helicopter. Hooker 66 moves away from accident scene.

Investigative Findings:

According to the Army Reserve Flight Engineer, as the litter came back around in its swing, the cable-in function was used on the *hoist* to return the litter to the inside of the helicopter.

NPS#5 stated: “*And so Nick and I both stood up and gave them one of these, called them off, said, ‘Go back. Come back and try again. And when you do put a tagline on it, so that way, when the tagline comes down, we can grab the tagline and guide the litter in.’*”

NPS#2 stated: “*I can’t remember if it was me or Nick—I think that Nick wasn’t wearing his flight helmet, at that point, so it must have been me on the radio—told them that they needed to bring the litter back in, and the we’d have to insert it with a tagline—put a tagline on it.*”

NPS#6 stated: “*So they pulled it back up, connected a tag line to it. Dropped the tag line...*”

Finding 17: (Human)

Military crew members improvised a tagline inside the helicopter. The tagline was connected to the litter.

Investigative Findings:

According to NPS#8, he saw military crewmembers gather and tie two lengths of rope together to make an improvised tagline for the un-weighted litter.

According to the Army Reserve Flight Engineer, a blade rope, which is used to secure the rotor blade of the helicopter when it is parked, and a length of climbing rope used to secure the *Jungle Penetrator* inside the helicopter were tied together to form an improvised tagline that was long enough to reach all the way to the ground.

NPS#2 stated: "So they brought it back in. They put a tagline on it. I'm trying to remember what they connected to it. It wasn't what we typically use—a rope or anything—but it was adequate. It was a 20-foot length of rope with something hanging on the end..."

Finding 18: (Material)

Hooker 66 returned to the accident scene; began to hover approximately 35-50 feet AGL (above ground level) over rescuers and patients.

Investigative Findings:

NPS#2 stated: "I think we were at about 30 feet when me and Nick inserted onto the scene. All of the other insertions and hoists and things that we did were varying elevations or altitudes above the heights above the ground. But when we inserted initially, yeah, about 50-feet, which is what we train for."

NPS#6 stated: "I'd say 40 feet."

NPS#5 stated: "Well, with the first patient and when they were over us for the second iteration, pretty low. I would say 30 feet. That's just a rough guess, pretty low. I would say 30-feet. That's just a rough guess just looking up at it, but it did feel a little lower than normal. But I could be wrong on that. I mean I trust those pilots completely. They're super dialed in, but it did feel close."

Per US Army Training Circular 1-240, Aircrew Training Manual Cargo Helicopter, CH-47D/F "TASK 2059 PERFORM RESCUE-HOIST/WINCH OPERATIONS: "neither a minimum nor maximum *hoist* height for operations over land are defined except to: (d) Maintain appropriate hover altitude ± 5 feet."

Note: No Standard Operating Procedures (SOPs) could be found for *hoist* operations overland; the aircraft was equipped with a *hoist* cable that was 150 feet long, although the military standard was to use no more than 100 feet of *hoist* cable.

Finding 19: (Environmental)

Winds at the time of the accident ranged from 10 to 40 mph with gusts up to 50 mph.

Investigative Findings:

Surface winds were identified by NPS#5 as 10–20 mph; by NPS#6 as 30–40 mph; by NPS#2 as gusts up to 15 mph; by Private#2 as 15-20 mph with gusts to 50 mph; and by Private#1 as 20-30 mph.

Finding 20: (Environmental)

Ground personnel indicated *rotor wash* was significant.

Investigative Findings:

NPS#6 estimated it as 60–80 mph; Private#1 described it as: *“If I had not been double-anchored in, it would have blown me.”*

Citation from military manual, US Army Manual FM 55-450-22; *rotor wash* up to 120 knots. (Note: 120 knots is equivalent to 138 miles per hour).

According to the Department of Army, U.S. Army Pathfinder School “Sling Operations Advance Sheet” dated 03 January 2011, “Large helicopters, such as the CH-47 and CH-53, can generate *rotor wash* in excess of 120 knots. This strong wind may cause ground crew personnel difficulty in walking or standing and its force can move unsecured material.”

NPS#6 stated: *“Oh, probably you know, it picks it up to gusting between 60 and 80 at that moment. It can get worse, but I believe it was 60 to 80 then.”*

Private#2 stated: *“And you can tell when that chopper came that the situation intensified as people were covering patients not only from potential icfall from the suction of being blown around but also from making sure that people aren’t gonna get blown aside or off, anyone trying to take shelter. But the winds were definitely stronger at that—my friend although anchored couldn’t keep his balance—in a small stance, he felt like he was getting blown back and out of balance.”*

Private#1 stated: *“Yeah, literally, the very first time the helicopter came above me, I felt like it was just gonna blow me off the hill. If I had not been double-anchored in, it would have blown me. I don’t know if it’d have blown me off the hill, but it would have blown me.”*

Finding 21: (Human)

Military Aircrew personnel lowered an improvised tagline.

Investigative Findings:

According to the Army Reserve Flight Engineer, the tagline was lowered from the helicopter to the ground.

NPS#2 stated: *“So they started to lower out and Nick—again, the helicopter was kinda hovering maybe 15 feet off to the right of where the actual patient was. So the tagline made contact with the ground.”*

NPS#6 stated: *“Dropped the tag line, and it was dancing around on the ice, they struggled to get it to our location for about three or four minutes, hovering above us.”*

NPS#5 stated: *“They came back. They dropped the tagline. The tagline was spinning pretty bad in the rotor wash. It’s whipping all around. It came to rest...I would say the tagline comes down. I would say, about 8 feet off to my right.”*

Finding 22: (Human)

Nick Hall had to walk out of the dug-out platform to grab the tagline.

Investigative Findings:

According to the Army Reserve Flight Engineer, a small bench built by ground personnel could be seen from the helicopter and Nick Hall was not in it when he received the tagline.

NPS#5 stated: *"The tagline comes down, I would say, about 8 feet off to my right to the west, hits the ground. Nick goes out there with his ice tool, traverses out there, grabs the line."*

NPS#2 stated: *"Nick went out after the tagline—kinda traversed out across the slope."*

Finding 23: (Human)

Nick Hall was not attached to any fall protection, but had Private#2's ice tool in hand.

Investigative Findings:

The SAIT Investigators asked Private#1, "Did you ever know a time when either NPS#2 or Nick were tethered or in any way anchored in?"

Private#1 stated: *"No, sir."*

NPS#5 stated: *"The tagline comes down, I would say, about 8 feet off to my right to the west, hits the ground. Nick goes out there with his ice tool, traverses out there, and grabs the line like normal."*

NPS#5 also stated: *"And I think as climbing rangers, we're all used to walking in crampons and that kind of stuff, and it's just an everyday thing. But as far as being on your knees and sitting down sometimes, I personally did not feel comfortable without that ice axe sunk into the ground, and he (Nick Hall) didn't have any sort of personal anchor once he grabbed the litter."*

NPS#2 stated: *"I can't say either way, whether he did or didn't have an ice axe. But I remember being a little bit concerned at the time 'cause I knew how icy the slope was..."*

NPS#2 added: *"I don't know why Nick wasn't tied in. I wasn't tied in. NPS#5 wasn't tied in. NPS#6 wasn't tied in..."*

Finding 24: (Human)

Nick Hall put the ice tool in the snow.

Investigative Findings:

NPS#5 stated: *"And as he unclips it, the litter starts to kind of slide downhill a little bit. And then at that point, he had sunk his ice tool into the snow..."*

NPS#6 stated: *"He was on his back trying to turn over and it didn't look like he had an ice axe in his hand at that time."*

Finding 25: (Human)

As the empty, un-weighted litter was lowered by *hoist*, Nick Hall guided it down using the tagline.

Investigative Findings:

According to the Army Reserve Flight Engineer, Nick used the tagline to control the litter all the way to the ground as it was lowered the second time.

NPS#2 stated: *"He (Nick) got out there and got a hold of the tagline and kinda guided the litter to, got a hold of the litter, and then my memory of what happened next is he got the litter onto the ground..."*

NPS#6 stated: *"(Nick) grabbed the rope about 30, 20 feet from the spot, and successfully brought it down with the tagline..."*

Finding 26: (Human)

Nick Hall received the litter. The litter made contact with the ground.

Investigative Findings:

NPS#5 stated: *"That's when Nick left the flat spot we had dug out, the ledge, and grabbed the rope about 30, 20, feet from the spot and successfully brought it down with the tagline and the hoist load."*

NPS#2 stated: *"He (Nick) got out there and got a hold of the tagline and kinda guided the litter to, got a hold of the litter, and then my memory of what happened next is he got the litter onto the ground..."*

Finding 27: (Human)

Nick Hall took control of the litter, unhooked it, and pushed the *hoist* cable away.

Investigative Findings:

According to the Army Reserve Flight Engineer, Nick disconnected the *hoist* cable from the litter and threw the cable out of the way to his left to avoid being tangled in it.

NPS#2 stated: *"So he had the litter in his hands; he disconnected the cable hoist from the litter bridle and pushed it away from him..."*

NPS#5 stated: *"Litter hits the deck, and he (Nick) immediately unclips it from the cable hoist."*

NPS#6 stated: *"When he unhooked the litter, the rotor wash and the winds grabbed the litter..."*

Finding 28: (Human)

While Nick Hall was holding the litter with both hands, the litter began to slide downhill.

Investigative Findings:

According to the Army Reserve Flight Engineer, as the cable was being pulled back into the helicopter the litter began to slide on the slope.

NPS#2 stated: *"You could see Nick was kind of starting to struggle holding the weight of the litter. The litter was moving around quite a bit. The way that I saw it, the litter slipped and started to move..."*

Finding 29: (Human)

The litter was buffeted by the wind and *rotor wash* and Nick Hall struggled to maintain control of the litter.

Investigative Findings:

According to the Department of Army, U.S. Army Pathfinder School's "Sling Operations Advance Sheet," dated January 3, 2011, *"The greatest rotor wash velocity occurs between 20 and 60 feet outside the rotor disc and will diminish once the aircraft is over the ground crew."*

According to the Army Reserve pilot, Hooker 66 was operating near its power limits at the time the Flight Engineer made the ICS call that Nick Hall had started sliding down the slope.

NPS#2 stated: *"They started to raise the cable back up. There was a lot of downdraft at that point. It was pretty obvious. You could see Nick was kind of starting to struggle holding the weight of the litter. The litter was moving around quite a bit..."*

NPS#5 stated: *"He (Nick) took kind of one step back, kind of to stabilize himself as the litter went down the hill. And then one more step, and he was kinda really off his axis at that point holding onto the litter. The litter got caught in the rotor wash and became a sail and literally flew down the mountain. It flew away."*

NPS#6 stated: *"When he unhooked the litter, the rotor wash and the winds from the saddle grabbed the litter and spun it downhill, pivoting, and he had a hand of it, and it pivoted him around with it."*

Finding 30: (Human)

Nick Hall spun around trying to control the litter. He then lost his footing and his balance. Nick fell and began an uncontrolled slide downhill and subsequently let go of the litter.

Investigative Findings:

According to the Army Reserve Flight Engineer, from the air it looked like Nick Hall did a backward somersault, tumbled, and began to slide. The crew of the Hooker 66 began to follow him immediately based on its capability to maintain its rate of descent.

NPS#2 stated: *"The litter was moving around quite a bit. The way I saw it, the litter then slipped or started to move, and Nick held onto the litter, basically, and tried to keep the litter from going, and lost his footing, essentially. He slipped on the surface of the snow and started to slide with the litter."*

NPS#6 stated: *"When he unhooked the litter, the rotor wash and the winds from the saddle grabbed the litter and spun it downhill, pivoting and he had a hand of it, and it pivoted him around with it. And 'cause he lost his balance and both (he and the litter) took off and within a second, they were both over the first crevasse."*

Finding 31: (Human)

Nick Hall made several attempts to arrest his slide.

Investigative Findings:

According to the Army Reserve Flight Engineer, Nick Hall was able to get his feet downhill in front of him and it looked like he was slowing down as the mountain seemed to plateau.

NPS#2 stated: *"After sliding about, I don't know, maybe 200 or 300 feet, he rotated around. I could see him trying to self-arrest. I could see him trying to dig his crampon points into the snow and get into self-arrest position, but without an axe, that obviously hard to do."*

NPS#5 stated: *"Nick was on his butt facing up the hill and picked up speed really rapid. Pretty scary rate how fast he started accelerating. He was spinning around while sitting upright, and he made a lot of attempts to reach out and stop himself but with no axe."*

Finding 32: (Human)

After sliding several hundred feet, Nick Hall launched off a serac that acted like a ramp. He went out of sight of ground personnel. His body was later discovered 2,400 feet below the accident site.

Investigative Findings:

According to the Army Reserve personnel, Nick Hall went out of their sight when he launched off the serac. Hooker 66 immediately descended the slope in an attempt to follow closely behind him but lost sight of him. Based on the aircraft's descent capability, the Hooker 66 crew had to fly away from the mountain and descend in an arc. This allowed them to fly back up the mountain surveying the slope in front of them for Nick Hall. As they climbed they located Nick Hall. Hooker 66 attempted to locate a hoist location near Nick Hall, but none could be found. They descended far enough to locate a suitable location for a one wheel *aft landing* at which point a single NPS Rescuer was off loaded and made his way to Nick Hall's location. Immediately after off loading the NPS rescuer, Hooker 66 had to return to Joint Base Lewis McChord for fuel.

NPS#5 stated: "So it was an incredibly hard surface. So he was sliding down trying to stop himself. Then he started to catch some air, and he was bouncing around pretty good, and he hit a big sloping serac, and it launched him probably 30 or 40 feet in the air. And he went in the air out of our sightline. And that was the last of it."

Finding 33: (Environmental)

NPS Rescuers reported that the slope angle at the accident scene was approximately 35 degrees.

Investigative Findings:

NPS#5 stated: "It was a 35- to 40-degree slope that we were actually on."

NPS#6 stated: "I'd estimate it at 35 (degrees) or so."

Note: See also the photograph with slope angle depicted in red in the Background section of this document.

Finding 34: (Environmental)

The ambient temperature at 13:00 at Camp Muir (10,500 ft elevation) was 37 degrees Fahrenheit.

Spot weather forecast at 17:04 was 34 degrees Fahrenheit at White River drainage (13,200 feet elevation).

Investigative Findings:

According to the MORA Daily Report, the air temperature at Camp Muir (10,188-foot elevation) was forecast at 38 degrees Fahrenheit. The summit (14,411-foot elevation) was forecast at 23 degrees Fahrenheit.

Finding 35: (Environmental)

Visibility: Horizontal visibility was observed to be clear with broken clouds in the distance.

Investigative Findings:

Photographs taken by Injured#4 and Private#1 at the accident scene indicate horizontal visibility was good, and that the sky was fairly clear with scattered clouds in the background.

NPS#5 stated: "But there was a cloud bank, and then there was some strange lenticulars (stationary, lens-shaped clouds that build at high altitudes, normally perpendicular to the wind direction) building out to the east as well. And the cloud bank was probably twelve-five-ish

(12,500 feet). And just kind of wrapping around the Emmons and then dissipating down over the Winthrop.”

Finding 36: (Environmental)

Glacier conditions—the glacier was covered with hardened snow with a thick ice crust.

Investigative Findings:

NPS#5 stated: *“So it was super icy above 12,500-feet. And below that was kind of exothermic and kind of mushy because I think it was Saturday or Sunday. It rained really hard. Pretty much it rained...”*

NPS#2 stated: *“We could see, immediately, looking out the helicopter, that it was gonna be icy terrain. It was really—the surface was really shiny, and we knew it was cold up there.”*

NPS#6 stated: *“From the summit down to about 13,000-feet is super extremely icy, hard dense ice...”*

End of human, material, and environmental findings.

Additional Findings

(Note: as an investigative group, we elected to use the eight categories of the Green-Amber-Red (GAR) Risk Assessment tool to further categorize our additional findings.)

Supervision

Finding 37:

Incident Command structure (team) was not consolidated in one location.

Investigative Findings:

Ops ██████████, after talking with NPS#5 ██████████ and NPS#6 ██████████, assumed the role of Incident Commander (IC). He then contacted IC ██████████ at the Longmire Incident Command Post (ICP). The two of them agreed that IC ██████████ would assume the role of Incident Commander and Ops ██████████ would assume the role of Operation Section Chief (OPS) for the Schrund search and rescue incident.

In an interview with Ops ██████████, OPS, he indicated that as an Incident Command System (ICS) was being put in place and he wanted to transfer the whole ICS to Longmire but was asked to keep the role of Operations even though he was at White River Ranger Station. Ultimately he and the Incident Commander were conducting their business by telephone. Another employee was involved in a conference call using the speaker phone function, making it difficult for Ops ██████████ to use speaker phone for his needs. So he moved to the front desk to use that telephone, which meant he was receiving calls and walk-in visits from the public during the incident.

Finding 38:

The on-ground team leader was not clearly identified to all resources.

Investigative Findings:

According to NPS#8 ██████████, Nick Hall was selected as the "lead for the ground team." In actuality, Nick Hall was selected as the "lead" for the aerial rescue team, which was made up of four NPS rescuers; Nick Hall, NPS#2, #3 and #4 ██████████. The aerial rescue team's role and function was not relayed via the Crystal repeater to the two NPS rescuers already at the accident scene.

According to NPS#3 ██████████, he was assigned to support Nick Hall and NPS#2 ██████████ on the helicopter. Nick Hall and NPS#2 ██████████ were the first to be inserted if needed. Although NPS #3 ██████████ was told by IC IC ██████████ to "get ready to climb," he was not expected to "get out of the Chinook" helicopter.

NPS#2 ██████████ stated: *"We did not talk about who was gonna be in charge, really, on the ground, more who was gonna do what, really as far as packing patients or whatever. We didn't even*

really know a lot about the scene at the time. Me and Nick didn't even know NPS#6 and #5 were on the scene."

NPS#6 stated that he and NPS#5 never determined who the team leader was when they arrived and that it was assumed that Nick Hall would be the team leader of the team that was inserted by the CH-47 helicopter. NPS#6 felt that it was not established that Nick Hall was the team leader; however, it was more a force of personality due to Nick Hall's character.

NPS#5 stated: "I wouldn't so much say that we had like, 'I'm this, you're that,' kind of thing. But the communication was flowing really well. Nick being the most experienced and most seasoned one of us, he kind of became the default leader a little bit..."

Finding 39:

Incident personnel did not know who the IC was.

Investigative Findings:

According to NPS#8, the Incident Commander was IC. NPS#8 was aware of this prior to departing Kautz Helibase as the MILHOPS on board Hooker 66. According to NPS#3, he was told by Ops to report to IC at the Longmire Emergency Operations Center (EOC), who was the incident commander. NPS#3 was told to get further instructions from him.

When asked if he knew who the Incident Commander was, NPS#2 stated: "Good question. I have no idea. At the time, I thought IC in ICP was either the Incident Commander or operations, but it was never made clear to me, and I never asked anybody. I knew #9 was the aviation or #8 was the aviation manager, although actually, I don't even know if that's true. It could have been NPS#14 or NPS#9. So that information was never made clear, either. We did have communication with the ICP, but like I said, I don't know who was actually the Incident Commander at the time."

NPS#6 stated: "I guess, you know, Ops and #9 were there, but as well as the field team. And the leadership hadn't really been discussed yet. No one had declared an incident command. So not quite yet known to me if it was. Whatever we were doing, we were consulting with Ops and #9 at the moment, who was on the side of the mountain and easy to communicate with, with radios."

NPS#5 stated: "Mostly out here, yeah. But it just depends on where the incident is. But I think with this situation, it ended up being over at White River just because it was Camp Schurman rangers, north side of the mountain. Ops was at White River. He came in a day early. And Ops being one of our more senior people, he's a great go-to."

Finding 40:

There was not a qualified aviation manager in the park (MORA).

Investigative Findings:

A review of MORA aviation training records on July 2, 2012 in the Interagency Aviation Training database determined no one at the park meets the currency requirements of an aviation manager as required by the NPS departmental aviation training requirements per *Operational Procedures Memorandum No. 11-04, Aviation User Training Program*.

Though park management assigned NPS#15 and NPS#9 as Park Aviation Managers, neither employee met training qualifications for the position. NPS#15 was last current in 2005 and NPS#9 was last current in 2006.

The Mountaineering District Ranger, NPS#15, indicated in his interview that he has performed as the Park Aviation Manager over many of the last number of years. He eventually insisted he not perform that function any longer, but allowed one of the GS-9 Lead Rangers, NPS#9, to perform in that role until he was furloughed, at which time NPS#15 picked up the duties once again for the winter.

Planning

Finding 41:

An operational risk analysis was not documented for the mission.

Investigative Findings:

According to the Incident Commander, he did a risk assessment using the Green, Amber, Red (GAR) method but didn't do it on paper for documentation. The assessment came out "yellow" due to four patients, four people (responders), and aviation on scene.

Finding 42:

The mission briefing was incomplete, it did not include ground operations at the accident scene.

Investigative Findings:

According to NPS#8, Nick Hall briefed his aerial rescue team after the "standard military helicopter" briefing. The aerial rescue team was divided into two groups; Nick Hall and NPS#2 were to be "inserted with a litter package that was ready to go," and NPS#3 and NPS#4 were assigned to "assist the medics in the back."

According to NPS#3, Nick Hall gave the aerial rescue team their "ground team briefing" prior to departing Kautz Helibase. They discussed "a preliminary plan" such as location, assignments (NPS#3 and #4 were to assist the medics in the aircraft) and communications. They knew NPS#5 and #6 were at the accident site and discussed patient management. A patient update was received from NPS#5 and #6 and knew

they had three patients that needed to be extricated. They performed a “comms check” and felt they were ready to go.

NPS#2 stated: “We did not talk about who was gonna be in charge, really, on the ground, more who was gonna do what, really as far as packing patients or whatever. We didn’t even really know a lot about the scene at the time. Me and Nick didn’t even know NPS#5 and #6 were on the scene.”

Finding 43:

There was not an operational requirement for rescuers to be roped in or secured to a *snow anchor* for fall protection.

Investigative Findings:

The SAIT found other incidents of rangers travelling unroped during other SAR missions as well as on the descent the day after Nick Hall’s fall.

The Climbing Ranger Pocket guide allows for and provides direction for solo climbing decision-making. It states that it is dangerous and often unnecessary. Climbers should seek approval from their supervisor.

According to NPS#15 there are no SAR SOPs.

Interviews with NPS#6, #5 and #2 confirm that after Nick Hall fell they did rope in and were able to successfully evacuate the remaining non-ambulatory patients.

Finding 44:

Accident scene safety was not discussed.

Investigative Findings:

The briefing at Kautz Helibase covered roles in the helicopter.

NPS#2 stated: “We didn’t really discuss anything about what was going on on the ground.”

In interviews with NPS#6 and #5, they only talked about patient care to administer help on the scene.

According to Private#2 interview, he said he setup fall protection for people because of the icy conditions, but nobody used it. He was a little surprised, but thought they knew what they were doing.

Finding 45:

The ground rescue team was unaware the rescue helicopter (Hooker 66) was enroute from Kautz Helibase.

Investigative Findings:

According to NPS#5, he looked and there it was, flying up. He knew the Chinook was coming but didn't know they were enroute.

Per the MOU-Operation Plan

"VI. Resource Ordering. B. Receiving Orders: Prior to leaving departure location the USAR shall receive the following information from Mount Rainier NP:

- 1. Whether it is a rescue or search mission*
- 2. Communication frequencies for incident and flight following*
- 3. Incident legal location, latitude /longitude and/or geographic description*

A. Communications 4. The Air Mission Advisor AMA (MILHOPS) will communicate the following actions from the aircraft upon any; departure, landing, before hoist operations commence and/or when searchers depart the aircraft."

Finding 46:

Helicopter personnel did not know that NPS ground rescuers were at the accident scene.

Investigative Findings:

NPS#2 stated that they didn't know people were on the scene giving patient status reports.

The Communications Log specified: The patient update came in from NPS#5 when the Chinook helicopter was preparing to launch at 14:51. There were communications problems on the Chinook.

It appeared that information was going to ground personnel and not being re-broadcast to helicopter crew.

NPS#5 stated: *"And I didn't even hear that the Chinook had come into the park or had come in hot to us. We just heard it coming up to the valley and saw it come up to the valley."*

NPS#2 stated: *"I attempted to call NPS#5 on the radio and tell him that we were flying in route. Obviously, I'd want my fellow rescuers on the ground to know that a Type I helicopter is coming in, so tried to make contact with them, but weren't able to establish contact."*

Incident Complexity

Finding 47:

NPS ground rescuers were at patient ratio of 1 to 1.

Investigative Findings:

Everyone was committed to patient care. Nick Hall was also with a patient. The NPS ground team was overloaded taking care of three critically injured patients. There were two more resources (the second insertion team) on the helicopter. (NPS#3 and #4 [REDACTED] had the initial role of helping medics in the back of helicopter) Choices were limited by the number of people on hand at the scene and in the helicopter.

The Incident Commander stated in his interview that he conducted an undocumented risk assessment in which he recognized that there were four patients and four NPS Rescuers negatively affecting the risk rating of the overall operation.

According to NPS#6 [REDACTED]: If they had more people on the scene they might have been able to put fall protection in place. They were too busy with patient care.

Finding 48:

The operation plan required multiple *hoist* iterations using one litter.

Investigative Findings:

Ops [REDACTED] stated his original plan was to use one litter and have the two ground rescuers package patients. The litter would be *hoisted* into Hooker 66, the patient removed from the litter, and the litter would then be lowered for the next patient, similar to a “yo-yo” action. This yo-yo action was ultimately put into action after the two-person aerial rescue team was inserted by *jungle penetrator*.

During an interview with Army Reserve personnel, it was stated that the military aircrew and the *MILHOPS* came up with a plan for how to get all the patients up with one litter, not requiring them to use the emergency litter on board the helicopter.

Finding 49:

Rangers reported four patients; three non-ambulatory, two of whom were critical patients needing Advanced Life Support (ALS) level of care.

Investigative Findings:

Communications Log: 15:39 - BLS for two patients and ALS for two patients. The entry confirms that there was a plan to load all four patients.

Finding 50:

Rescue training was not adequate for the mission complexity; multiple litter-hoist iterations.

Investigative Findings:

There is no record of any training that simulated this type of terrain. The only other training of this type was in a field. Hoist operation: Project Aviation Safety Plans (PASP) only include procedures for lowering personnel using a *Jungle Penetrator*, not lowering a litter.

According to NPS#3, they trained with a mannequin in the litter, it was always loaded. No training with crosswinds. They also trained on good weather days.

According to NPS#2: "No not even close, not even in training." Then he goes on to talk about being inserted for a live rescue on an icy slope and how difficult it was—slipping, sliding, scary, learning how to use the *ice tool*.

According to NPS#6, with litter training, the number of training iterations depends on the individuals desire to do it. It's always done with a weighted litter.

The NPS crew never had to deal with a spinning litter. They were always weighted with gear when training and in exercises. Usually on relatively flat locations and not as icy.

According to Ops: Litter training is a weakness, the focus is on insertion. There is maybe one insertion evolution on the litter, and people aren't brought in on days off to do it. It's also done in the role of either in the helicopter hoisting in or on the ground loading the litter, not both roles.

Climbing Ranger Patrol Log: Record of training in hoisting operations shows two groups a day, one hoist operation in the morning with one group and one in the afternoon with another group. All training to date was conducted at JBLM.

May 8, 2012 : Nick Hall did get training on the hoist operations (Chinook Hoist and Litter Hoist Competency Mock up and Live Deployment training). It's not clear whether he was in role in the helicopter or on the ground. Training was done at JBLM. He would lower full litter to the ground and then lift it back up.

According to NPS#2 and NPS#5, they usually trained with the helicopter at Kautz Helibase or JBLM. When they did insertions on the mountain it was only with the *Jungle Penetrator*.

From a 2007 SAR briefing paper written by the NPS Aviation Branch Chief: "*Analysis of historical accidents involving the use of AASAR activities, whether military or commercial in nature, show that SAR units continue to overestimate the capabilities of the available aircraft in*

the operating environment. While this tends to indicate a lack of adequate training, a secondary review indicates that the initial training is often not followed up with adequate recurrent training and or operational proficiency.”

Finding 51:

Training protocols as listed in 2010 and 2011 PASP only outlined raising a litter by hoist but not lowering a litter.

(The SAIT was unable to find hoist training PASP for 2012.)

Investigative Findings:

2010 and 2011 Project Aviation safety plans for hoist training. Personnel hoisting and raising with the *Jungle Penetrator* is covered in detail, but under the litter section it only has raising protocols.

Taken from the 2010 and 2011 PASP:

“Rangers also trained and practiced with hoisting a litter into the Chinook. This consisted of using the hoist in the Chinook to raise a litter from the ground into the helicopter. The steps taken are as follows:

LITTER RAISING

1. The patient is packaged securely and litter is fitted with proper hoist rigging. 2. The hoist cable (sometimes with the JP attached) is lowered to Ranger. 3. Ranger waits until the JP hits the ground then grabs the cable. 4. Ranger clips the litter into the hoist cable (removing the JP first if necessary) 5. Ranger signals with a tap on the helmet that the litter is ready to go. 6. The litter is raised into the helicopter while a ranger on the ground controls a tag line attached to the back of the litter (tag line always goes toward front of the ship) 7. Rangers inside the helicopter haul the litter inside, attaching it securely to the floor of the helicopter. 8. Rangers unclip the litter from the hoist cable.”

This reference was also in the unsigned draft Operating Plan between the Mount Rainier National Park and the U.S. Army Reserve, “B” Company, 1st 214th General Support Aviation Battalion GSAB at Joint Base Lewis-McChord, Washington.

Finding 52:

Rescuers never trained with an empty, un-weighted litter.

Investigative Findings:

According to NPS#3, while training with the litter, it is always weighted with a mannequin. Other interviewees noted that the litter is always weighted with gear or EMS supplies.

According to NPS#6, the litter is always weighted.

According to NPS#5, they used a cargo nets once, and another time they used a rescue dummy (mannequin).

Contingency Resources

Finding 53:

NPS Rescuers did not deploy with appropriate equipment to allow for variations/contingencies.

Investigative Findings:

The initial mission used one fiberglass Cascade rescue litter and two backboards, but they had three patients they intended to backboard and raise in the litter. Once a patient is packaged on a backboard they typically remain there for transport to the hospital. There was one more “emergency backup” litter in the helicopter, a standard wire basket “stokes litter.” The military crew made a decision not to use it.

According to NPS#2, the MORA search and rescue team modified the Cascade litter by removing the rails off the bottom so that it could slide into the Chinook helicopter, but that also made it slide more easily on the snow.

A wire basket stokes litter has more traction and weight and would not have slid on the ice/snow as much as the Cascade litter.

A desirable characteristic of the Cascade litter is that it can be broken in half and carried by rescuers to an accident scene, which would have made sense if the aerial rescue team members were unloaded from the Chinook helicopter near Liberty Saddle and intended to hike down to the accident scene.

According to Ops, it was difficult for him (OPS) to communicate directly with the rescuers on the helicopter. He attempted to communicate several times on the Crystal repeater and “Comms 2” with no results. The aerial rescue team members did not carry a backup communication system such as a satellite telephone.

There was no overnight gear for rescuers and patients. Rescuers at the accident site had to borrow overnight gear from a private climbing party to safely spend the night.

NPS#3 was dropped off below Nick Hall with little equipment other than his personal climbing gear. His task was to locate Nick Hall and check on his medical condition and possibly arrange for an emergency extraction—what’s called a “load and go”—for medical treatment. NPS#3 had to be picked up near sunset (officially 21:05) because he had little to no gear to spend the night on Winthrop Glacier. Hooker 66 had to extract him at 21:06 by hoist cable since the *jungle penetrator* was at the accident scene.

Communications

Finding 54:

MILHOPS communication system failed. *MILHOPS* could not transmit to NPS personnel.

Investigative Findings:

According to NPS#8 and NPS#3, the “homemade pigtail” (dual switch communications inside the helicopter to switch between Military and NPS frequencies) failed.

NPS#8 stated he could communicate with military personnel inside the helicopter but was not receiving NPS radio transmissions over the park net. He stated he was unfamiliar with the “pigtail” communication system on the helicopter, having only been a *MILHOPS* two times before—once in training. Not having the ability to receive NPS radio transmissions, he relied on a whiteboard to communicate to NPS rescuers inside the helicopter.

Finding 55:

The Crystal repeater was used for non-emergency radio traffic during the incident.

Investigative Findings:

Only after Nick’s accident, at 17:20, did Mount Rainier dispatch broadcast and restrict radio traffic to emergency traffic only. Up until then, it was being used by multiple people for non-emergency use (same frequency).

At approximately 17:20, MORA dispatch broadcasted a park-wide message “*Emergency traffic only.*” (Nick Hall’s accident occurred at approximately 17:01).

Finding 56:

OPS could not talk to Hooker 66 directly.

Investigative Findings:

Ops said he was frustrated by communications. He tried to establish communications but couldn’t. IC also expressed this same frustration. People were screaming into the radio to be heard.

Radio Log: 15:07, 15:10—No contact with the ship.

Radio Log: 15:19—broken transmissions.

Radio log: 15:24—no response calling ship. Tried repeatedly to talk with “671” MILHOPS (NPS#8)

At one point there was a direct “comm” link on “comm 2” between OPS (Ops) and MILOPS. “Comm 2” is a direct line of sight communications frequency.

According to Ops and IC, communications were such that when Ops couldn’t make contact with them he advised IC that the two of them would have to “trust the NPS Rescuer’s training.”

Ops had communications with NPS#6 on the Crystal Repeater, but no communication with the CH-47 helicopter.

It is unclear if a communications plan was ever discussed or established in terms of when to use the Crystal repeater, etc.

Finding 57:

It was never clearly articulated to all personnel who had been designated as IC, OPS, and Aviation Manager.

Investigative Findings:

The individuals in those roles knew, but it was not clearly communicated to the field staff.

NPS#2 stated that he had no idea who the incident commander was. He knew NPS #9 or NPS#8 was aviation (helicopter aviation manager), but didn’t really know who was the IC.

NPS#9 was appointed Aviation Manager at the time. He was in transit a portion of the initial phase of the operation transporting the “pigtail” communications box to Kautz Helibase.

The Operations Plan, part of the MOU between MORA and JBLM, identifies the role of a NPS-provided “helicopter manager” and an “Air Mission Advisor” (the MILHOPS). The 2010 Climbing Ranger Pocket Guide states a helicopter manager must be ordered for air operations and the SAR document which the park provided as the “MORA SAR Protocols” states “...*incident command is frequently divided into various components. These components include...aviation...*” However, no protocol can be found that an “Aviation Manager” must be assigned nor are the roles and responsibilities of that person defined.

Team Selection

Finding 58:

Nick Hall had 10 months of non-restricted, full performance duty time as a MORA climbing ranger.

Investigative Findings:

According to Nick Hall's Official Personnel Folder (OPF), he had a total of 10 months of non-restricted, full performance duty time as a MORA mountaineering park ranger.

In 2009, Nick Hall worked half a season from 7/20/09 to 10/7/09. In 2010, he worked from 4/4/10 to 9/11/10, but missed the first part of the climbing season due to an on-the-job injury. In 2011, Nick Hall worked from 4/24/11 to 10/2/11 with no loss time. In 2012, he reported to his duty station on 4/15/12.

Prior to his first season in 2009, Nick Hall was a ski patroller at Stevens Pass Ski Area, a climbing ranger for the U.S. Forest Service at Mount Baker, a river ranger and recreation technician for the Bureau of Land Management, a ski patroller at Northstar Ski Area in Lake Tahoe, California, and an "E 5" aircraft maintenance controller and avionics technician with the U.S. Marine Corps.

Finding 59:

The ability to deploy senior climbing rangers as rescue team members was hampered by filling ICS overhead roles from within the ranks of the climbing program.

Investigative Findings:

According to [Ops], he is most useful as a Technical Specialist to the Operations Section Chief or even better as a field team leader.

In an interview with the Mount Rainier Safety Officer, [redacted], who had recently transferred to Yellowstone National Park, his greatest concern with the Climbing Ranger Program, and the Ranger program in general, was a lack of ICS training and trying to do too much internally instead of putting expertise in the field.

[NPS#15] stated, [NPS#9], [LE#2], and he were qualified to be ICs on complicated Type 4 or Type 3 SAR incidents.

The Deputy Chief Ranger position was not filled (vacant). The Wilderness Supervisor position was not filled (vacant). Position vacancies left few people to fill critical leadership roles competently.

Finding 60:

The position, roles, responsibilities and qualifications of the Park Aviation Manager are not understood by park staff and management.

Investigative Findings:

The Operations Plan, part of the MOU between MORA and JBLM, identifies the role of a NPS-provided "helicopter manager" and an "Air Mission Advisor" (the MILHOPs). The 2010 Climbing Ranger Pocket Guide states a helicopter manager must be ordered for air operations and the

SAR document which the park provided as the "MORA SAR Protocols" states "...*incident command is frequently divided into various components. These components include....aviation...*" However, no protocol can be found that an "Aviation Manager" must be assigned nor are the roles and responsibilities of that person defined.

This has been exhibited by park management delegating Park Aviation Manager responsibilities to unqualified employees since the departure of Deputy Chief Ranger, Alison Robb (approximately five years ago).

Team Fitness

Finding 61:

Work-related fatigue was not a contributing factor for Nick Hall and NPS#2 .

Investigative Findings:

Nick Hall and NPS#2 were scheduled to work 8 days on and 6 days off. They were on their first day of their scheduled work period after 6 days off. Work related fatigue was not a contributing factor on their first day back to work.

Finding 62:

IC NPS#11 NPS#3 and NPS#4 were on their last day of an eight-day shift.

Investigative Findings:

It is standard operating procedure for rescue rangers to work 8 days on and 6 days off. There did not appear to be any work assignments in previous days that would lead to work fatigue. There were no SAR missions in the previous 8 days. Work/Rest scheduling appeared to be appropriate.

Environment

Finding 63:

The incident took place at high altitude—the accident scene was reported at 13,800 feet.

Investigative Findings:

High Altitude is defined at 8,000 ft (2,400 meters) above sea level.

Finding 64:

Strong crosswinds were reported by on-scene personnel.

Investigative Findings:

According to on-scene witnesses, the surface winds were identified as: NPS#5 as 10–20 mph; by NPS#6 as 30–40 mph; by NPS#2 as gusts to 15 mph; by Private#2 15-20 mph with gusts to 50 mph; and by Private#1 as 20-30 mph. A low pressure system was moving into the area, which could have created the appearance of the wind switching from downhill to crosswind.

Finding 65:

A firm, very icy slope was reported by on-scene personnel.

Investigative Findings:

A number of on scene witness statements.

NPS#2 stated: *"I remember being a little bit concerned at the time 'cause I knew how icy the slope was..."*

NPS#5 stated: *"So it was super icy above 12,500 feet".*

Finding 66:

There was a 35-degree slope.

Investigative Findings:

Thirty-five degrees was the average observation made by on-scene personnel.

See photograph. Courtesy of NPS rescuer GRTE#1 overlaid with slope angle.

Finding 67:

Rotor wash and *outwash* caused by the helicopter exacerbated environmental hazards, conditions, and operational complexity.

Investigative Findings:

See investigative finding number 20.

Citation from military manual. US Army Manual FM 55-450-2: *rotor wash* up to 120 knots (**Note:** 120 knots is equivalent to 138 miles per hour).

According to the Department of the Army the U.S. Army Pathfinder School "Sling Operations Advance Sheet" dated 03 January 2011, depending on one's location, *rotor wash* underneath CH-47 helicopters can be significant: "d. *Rotor wash* is the high velocity air movement under a hovering helicopter. Large helicopters, such as the CH-47 and CH-53, can generate *rotor wash* in excess of 120 knots. This strong wind may cause ground crew personnel difficulty in walking or standing and its force can move unsecured material.

Per US Army Training Circular 1-240, Aircrew Training Manual Cargo Helicopter, CH-47D/F "TASK 2059 PERFORM RESCUE-HOIST/WINCH OPERATIONS" neither a minimum nor maximum hoist height for operations over land are defined except to "d. *Maintain appropriate hover altitude ±5 feet.*" However, general overwater operations require the pilot to "Terminate the approach at a 100-foot hover, 20 feet before reaching the patient. Deploy the recovery device and allow it to contact the water before reaching the patient."

Finding 68:

Weather conditions included clouds coming in, according to on-scene personnel.

Investigative Findings:

US Army Reserve Air crewmembers: Weather made the mission difficult, but did not hamper the operations.

At 16:23, Ops [REDACTED] reports to the ICP that a "few clouds are forming low, not effecting OPS (the operations)".

At 19:10, NPS#6 [REDACTED] told Ops [REDACTED] that "it's about 28 degree F, gusts up to 15 and 20, erratic and the clouds are moving in like they want to cover us" from the accident scene.

Finding 69:

Climbing Program staff has not completed Operational Leadership training.

Investigative Findings:

Per records provided to the Serious Accident Investigation Team none of the Climbing Program staff have attended NPS Operational Leadership training. Records are from 2008, 2009, and 2012.

Finding 70:

Required Department of the Interior (DOI) Interagency Aviation Training has not been completed by park managers and supervisors.

Investigative Findings:

Reference Interagency Aviation Training chart. (Appendix A).

Finding 71:

Reports over the past decade have highlighted many of the current deficiencies in the aviation program at Mount Rainier.

Investigative Findings:

Draft Departmental Aviation Program Evaluation (Aviation Management Directorate), February 22, 2012 (Appendix B).

Recommendations-Interior Aircraft Mishap Review Board #03-01, May 2003 (Appendix C).

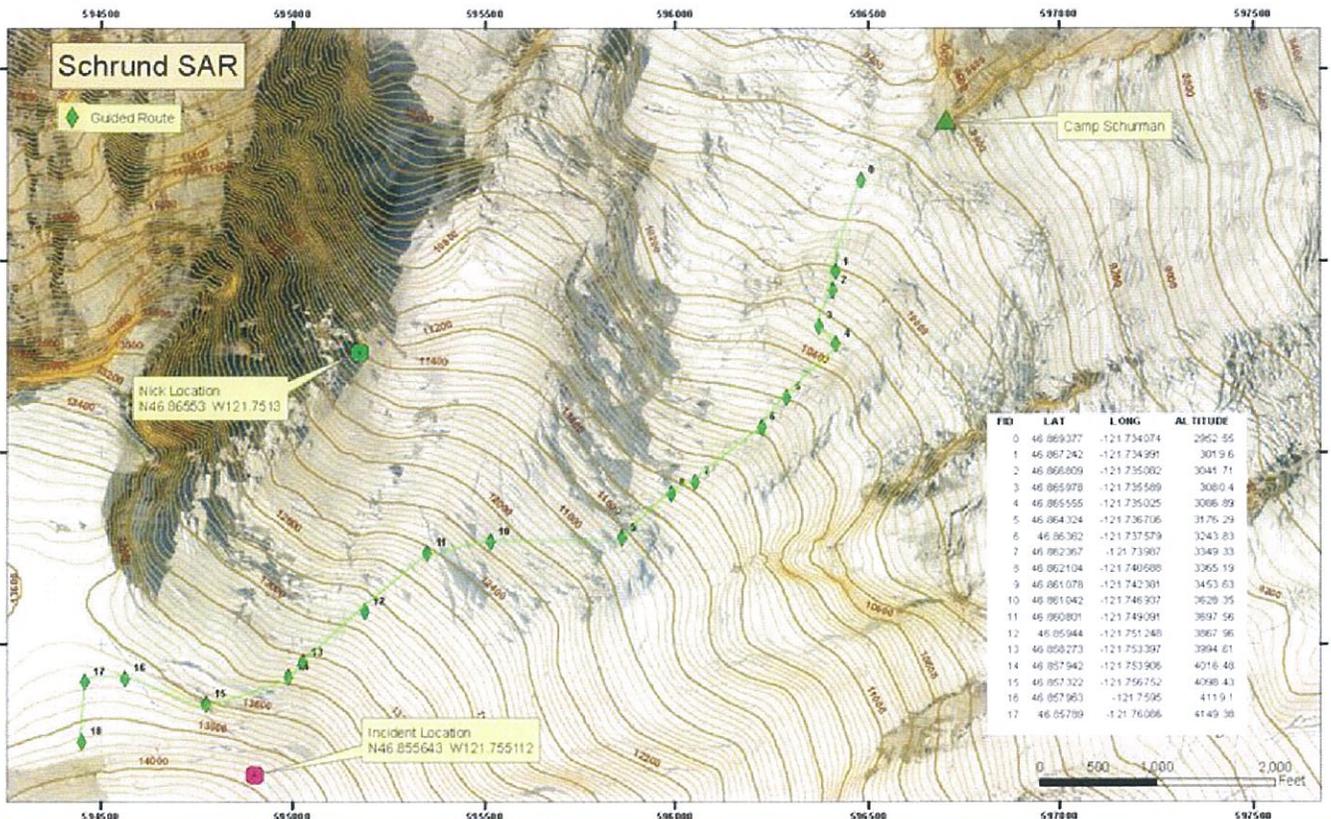
July 23, 2003 Chief Ranger Briefing Paper (Appendix D).

Rainier 07 NPS Aviation Program Evaluation Notes 6-12-2007 (Appendix E)

End of additional findings.

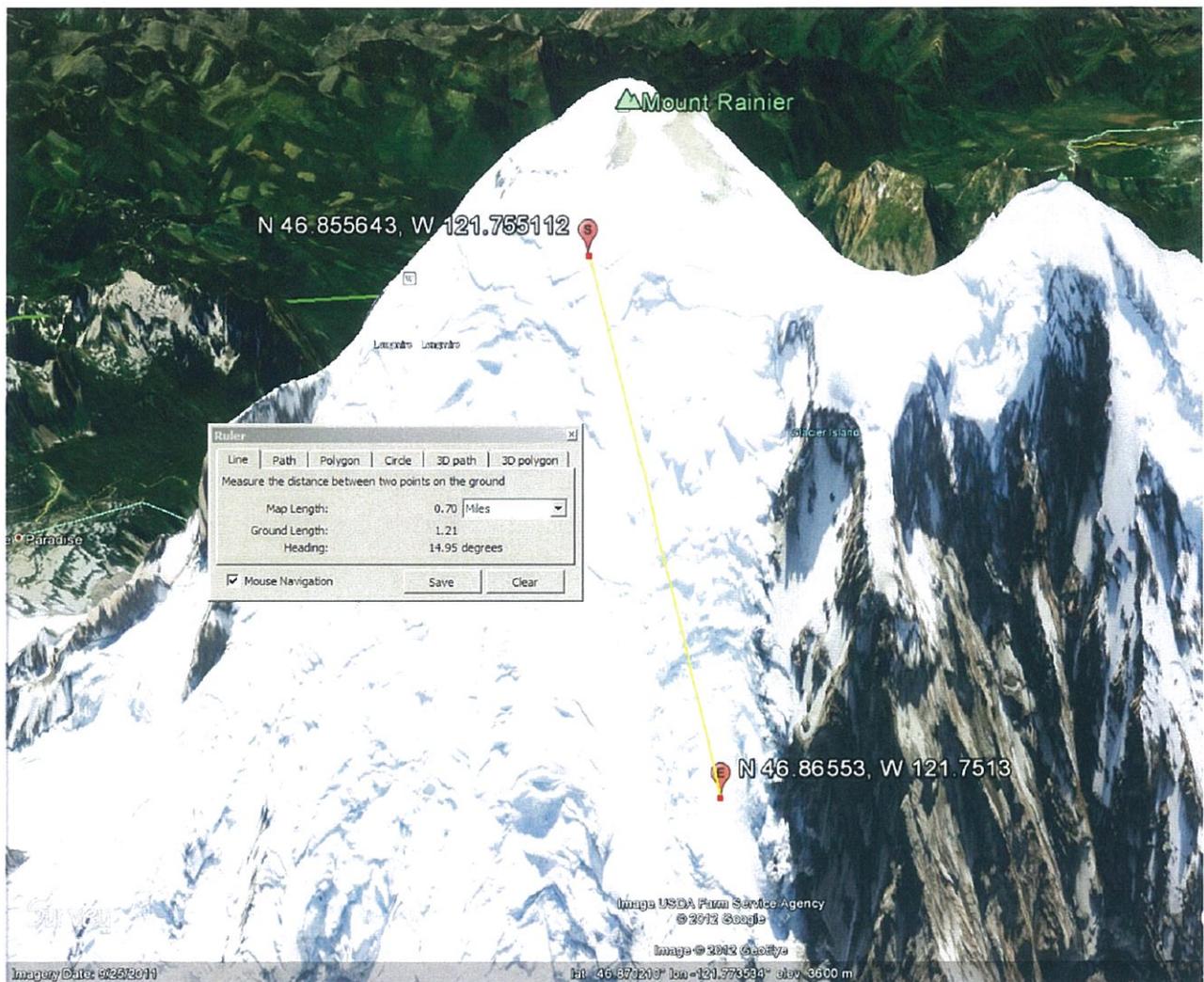
Maps, Illustrations and Photographs

Map- Schrund SAR with Waypoints showing accident location and Nick Hall's point-of-rest



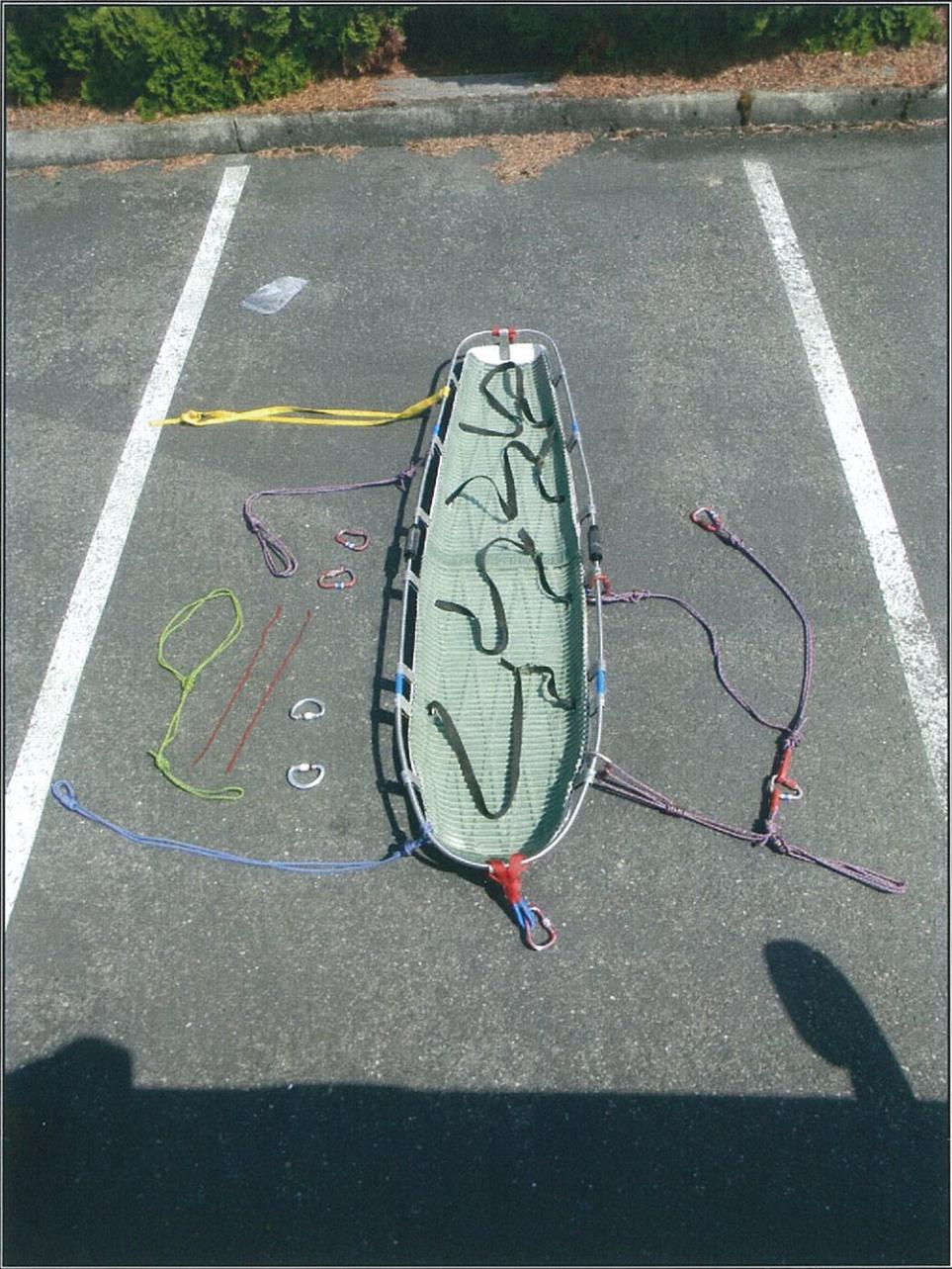
- Incident Location: 13,800 ft. elevation
- Nick Hall's point-of-rest: 11,400 ft. elevation
- Difference in elevation: 2,400 ft.

Glacier Map – Distance from accident scene to Nick Hall’s point-of-rest



Note: Ground length reflects total distance travelled; 1.21 miles. (Photo not to scale)

Finding 8 – Photograph of the Cascade rescue litter used on the incident.



Litter with restraining straps, accessory cord, webbing, and climbing hardware.

Definitions

Aft Landing - CH47 Chinook Helicopter performing an Aft Landing

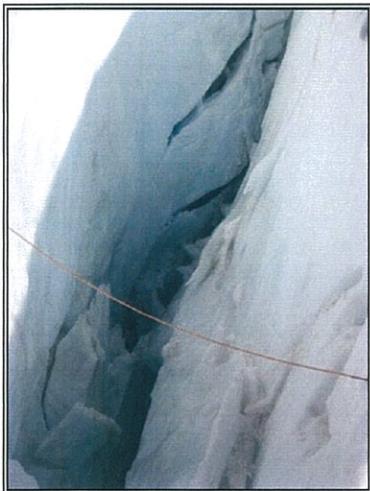


Anchor, Snow Anchor or “Deadman’s Anchor”

This is a type of anchoring system used in snow and ice by mountaineers to secure a rope, cord, or webbing, for fall protection.

Bergschrund

A bergschrund (from the German for mountain cleft) is a crevasse that forms where the moving glacier ice separates from the stagnant ice above. It is often a serious obstacle for mountaineers, who sometimes abbreviate "bergschrund" to "Schrund."



Crevasse

A crevasse is a deep crack in a glacier that is formed by the glacier’s movement across irregular and rough terrain. View is looking down into a crevasse.

Hoist Operations



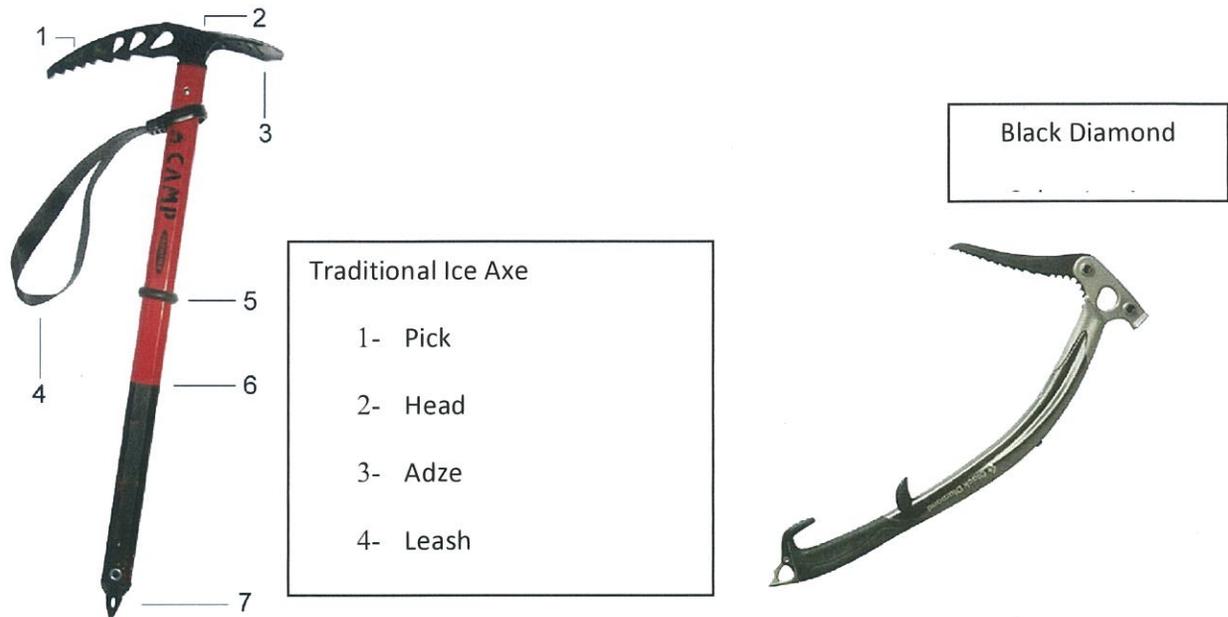
Lowering and raising of personnel and equipment from a hovering helicopter. See photograph of hoist operation below.

Ice Tool



An **ice tool** is a specialized elaboration of the modern ice axe (and often described broadly as an ice axe or **technical axe**), used in ice climbing, mostly for the more difficult configurations. Ice tools are used two to a person for the duration of a pitch, and thus in some circumstances, such as top-rope-anchored climbs, a pair may be shared among two or more people, where only one of them at a time is climbing. In contrast a classical "ice axe" is used one to a person for the hours or days a party is traveling across snow or glacier. In communities where it is common to refer to an "ice tool" simply as an "ice axe", classic "ice axes" are often referred to as "traveling axes", "walking axes", or "general mountaineering axes" to distinguish them from "tools."

Ice Axe

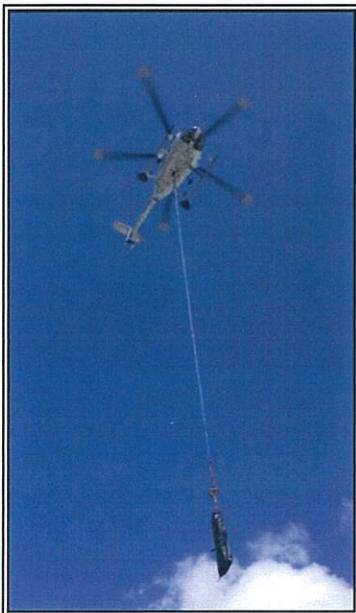


An **ice axe** is a multi-purpose ice and snow tool used by mountaineers both in the ascent and descent of routes which involve frozen conditions. It can be held and employed in a number of different ways, depending on the terrain encountered. In its simplest role, the ice axe is used like a walking stick in the uphill hand, the mountaineer holding the head in the centre, with the pick pointing to the rear. It can also be buried pick down, the rope tied around the shaft to form a secure anchor on which to bring up a second climber, or buried vertically to form a stomp belay. The adze is used to cut footsteps (sometimes known as pigeon holes), as well as scoop seats in the hillside and trenches to bury an ice axe belay. An ice axe is not only used as an aid to climbing, but also as a means of self-arrest in the event of a downhill slip.

Jungle Penetrator



The **jungle penetrator** (aka forest penetrator) was used extensively in Vietnam War Search and Rescue efforts to hoist a survivor from the jungle floor to a hovering helicopter. A three armed anchor like seat, lowered by winch and cable from hovering helicopter down through the jungle canopy, with the arms folded up against the cable to permit it to penetrate the vegetation. Two or three men could sit on the extended arms and hook straps around their backs to be winched up out of the jungle into the waiting helicopter.



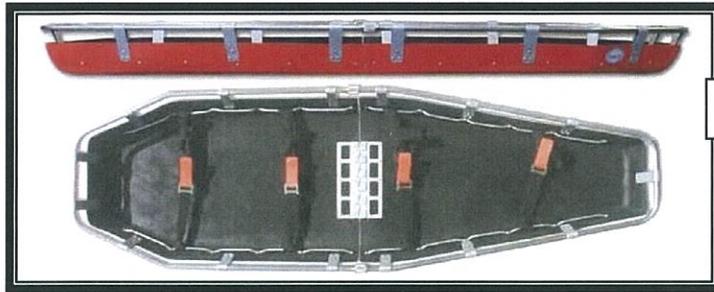
Long-line

Helicopter arrangement for lowering external loads (or removing loads) into areas not available for landing, using a long cable suspended from a hard point on the belly of the aircraft.

MILHOPS (Military Helicopter Operations Specialist)

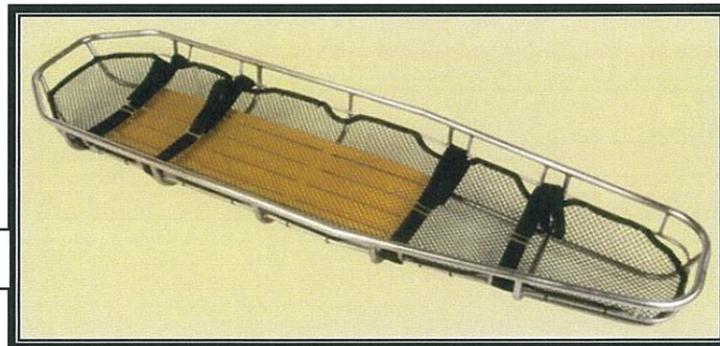
A Military Helicopter Operations Specialist (MILHOPS) is a member of the helicopter crew and is responsible for communicating to the pilot and ground personnel. They manage two radios, one to communicate with the pilot, and one to communicate to ground personnel. MILHOPS and the pilot will determine the best flat spot to land. They observe weather, wind and terrain. MILHOPS ensures all SAR team members are certified and equipped for disembarking.

Rescue Litter



Cascade Rescue Litter

A **rescue litter** is a stretcher or basket designed to be used where there are obstacles to movement or other hazards: for example, in confined spaces, on slopes, in wooded terrain. Typically it is shaped to accommodate an adult in a face up position and it is used in search and rescue operations. The person is strapped into the basket, making safe evacuation possible. The person generally is further protected by a back board and a cervical collar, so as to immobilize the person and prevent further injury.

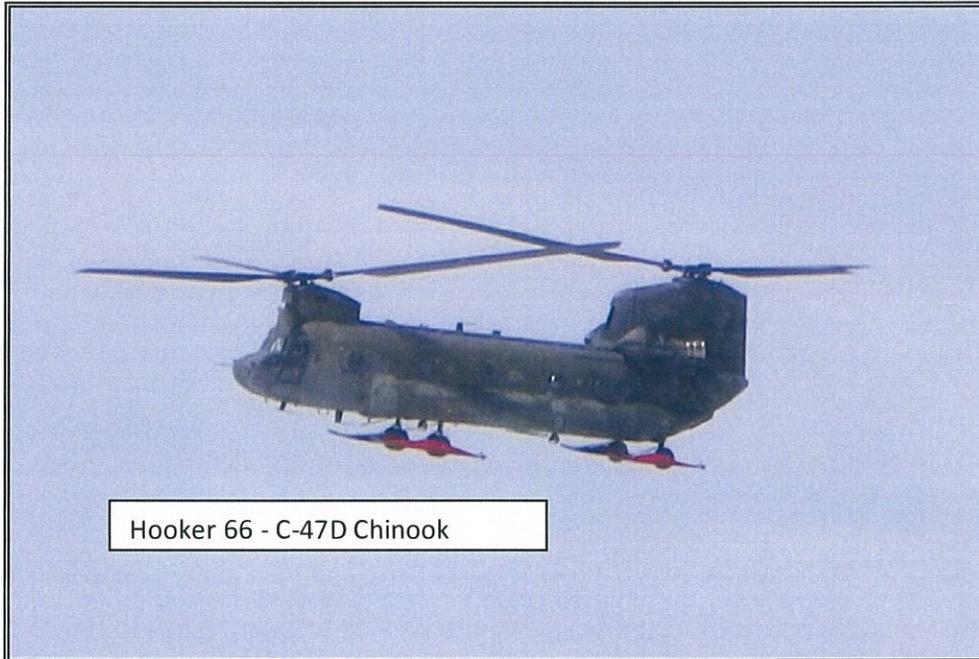


Stokes Litter

A **Stokes basket**, also called a **Stokes stretcher** or **Stokes litter**, is a metal wire or plastic litter widely used in search and rescue. Its key feature is that it can be disassembled for transport in backpacks or by pack horse. Originally designed by Lowell Stokes. Design improvements have included using multiple attach points, separate hold-down cables, and powered extension hoists to help save more lives.

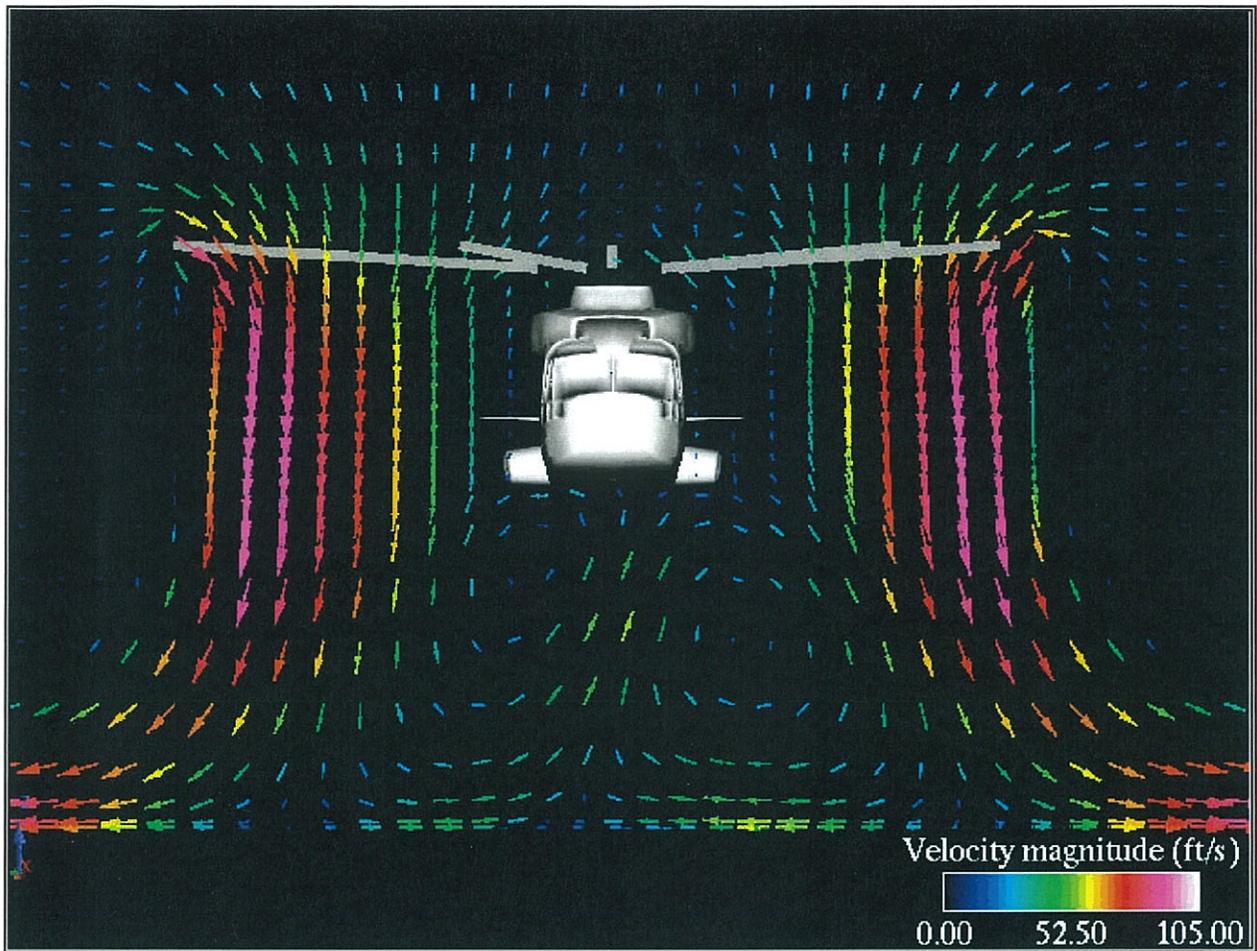
Rotor Wash; CH-47 Chinook

Rotor wash is the high velocity air movement under a helicopter. Large helicopters, such as the CH-47, can generate rotor wash in excess of 120 knots. This strong wind may cause ground crew personnel difficulty in walking or standing and its force can move unsecured material. The greatest rotor wash velocity occurs between 20 to 60 feet outside the rotor disc. (Field Manual 55-450-2; Department of the Army).



Rotor downwash is the vertical movement of air through the rotor system; **Rotor outwash** is the horizontal movement of air once in contact with the ground:

“Rotorcraft operating in ground effect (IGE) generate complex and unsteady flowfields that can present potential hazards to nearby ground personnel, equipment, landscaping, and to the aircrews themselves in the case of brownout. In simplest terms, these flowfields arise from the transition of the rotor induced flow from predominantly vertical (downwash) to radial outflow (outwash) through interaction with the ground plane, with strength governed to first order by disk loading. The persistence of rotor tip vortices and the interactions between rotors, airframe, and ground plane, however, all contribute to give rise to a very complex and unsteady flowfield which only recently has begun yielding to non-empirical treatment. Full-scale outwash surveys remain the most viable means of characterizing the outwash flowfield.” From CH-47D Tandem Rotor Outwash Survey by Mark J. Silva, Applied Aerodynamics Branch NAVAIR Air Vehicle Department and Robert Riser, UAS Mission Systems Senior Engineer, 2011

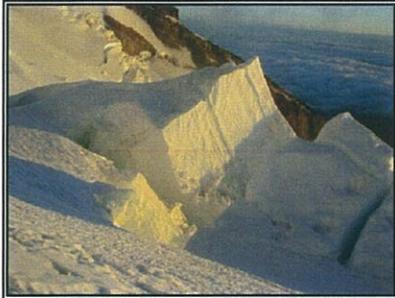


This image show the velocity magnitude for an EH-101 fuselage and rotor (medium lift helicopter) note the flow recirculation beneath the fuselage. "Helicopter Brownout Research" NASA Ames Research Center (unknown height above ground)

Serac

A **serac** (originally from Swiss French *sérac*), is a block or column of ice formed by intersecting *crevasses* on a glacier. Often house-sized or larger, they are dangerous to mountaineers since they may topple with little warning. Even when stabilized by persistent cold weather, they can be an impediment to glacier travel.

Seracs are found within an icefall, often in large numbers, or on ice faces on the lower edge of a hanging glacier.



End of Report