

Rediscovery and Initial Exploration of RCAF B-24 Liberator Plane Wreck in Gander Lake

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Figure 1: Consolidated Liberator bomber 595 “X” of No. 10 Bomber Reconnaissance Squadron based in Gander. This aircraft had the same design and markings as Liberator 589 “D” that crashed into Gander Lake.

Photo: Library & Archives Canada.

Introduction

In 1943, a B-24 Liberator bomber from No. 10 Bomber Reconnaissance (BR) Squadron of the Royal Canadian Air Force (RCAF) crashed into Gander Lake shortly after take-off. The four RCAF airmen on board were killed in the crash. In 2022, members of the Shipwreck Preservation Society of Newfoundland & Labrador Inc. (SPSNL) set out to determine the current location of the bomber wreck in Gander Lake and to conduct initial diving surveys of the wreck site. This report will summarize SPSNL activities and findings in 2022.

Background on the Aircraft and the Crash

Liberator 589 “D” was one of the first 15 Consolidated Liberators GR Mk. V (Canada) delivered to the RCAF in April 1943 (Figure 1) (Vincent 1975). (It was a B-24D under the American USAAF classification system.) It joined No. 10 (BR) Squadron at Gander in late April, 1943, to carry out very-long-range anti-submarine patrols and convoy escorts over

the western North Atlantic (Vincent 1975). The bomber was fitted with an Air-to-Surface Vessel (ASV) centimetric radar in the chin position (under the nose of the fuselage) (Vincent 1975). This radar was used to locate U-boats on the surface of the ocean, day or night. Liberator 589 was armed with six .50 caliber Browning M2 machine guns when it crashed but carried no depth charges or bombs (RCAF 1943a).

Early on September 4, 1943, Liberator 589 “D” took off from the Gander air station with four RCAF personnel on board for a “local night practice” flight (RCAF 1943b). The bomber’s pilot was Wing Commander John Maitland Young from Oakville, ON (the commanding officer of No. 10 (BR) Squadron). The co-pilot was Flying Officer Victor Edward Bill from Winnipeg, MB and the aero-engine crewman was Leading Aircraftman Gordon Ward from Toronto, ON. Squadron Leader J. Grant MacKenzie from Lucknow, ON was a passenger on the bomber,

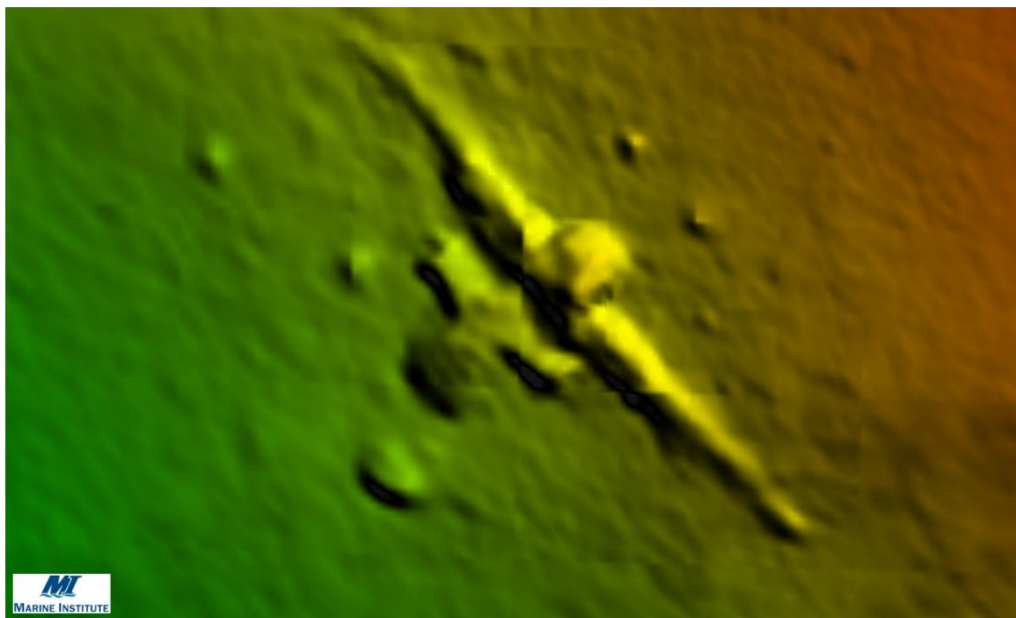


Figure 2: Multibeam echosounder image of the plane wreck site on the bottom of Gander Lake. Photo: Kirk Regular, Marine Institute.

from the wreck on September 10, 1943 (Annis 1943). The divers described the bomber as “very seriously damaged” (RCAF 1943a). Diving operations continued until September 16, when they were called off due to the “strong danger” to the Navy divers (Annis 1943). They were unable to recover the plane wreckage for the crash investigation or the other three bodies from the bottom of Gander Lake (RCAF 1943a). Efforts continued to recover some or all of the plane wreck using grap-

pling hooks from the surface of the lake but with no success (Annis 1943).

doing medical research on hearing loss among RCAF aircrew (RCAF 1943a,b; CVWM 2023). The bomber took off at 12:06 am local time (01:36 GMT) on runway 27. Eyewitnesses said that as the bomber climbed from the runway “the port wing dropped and the aircraft rolled over 3 or 4 times, finally stalled and dove into the water of Gander Lake, still turning” (RCAF 1943c). The RCAF crash investigation concluded that “the cause of the accident is obscure and from the evidence may have been due to the outboard port engine failing with resultant loss of control” (RCAF 1943a, c). All four airmen were initially designated “missing presumed killed” and their next of kin were notified (RCAF 1943b).

The approximate location for the plane wreck was included in the RCAF crash documents as “150 yards off shore north side Gander Lake 1 mile southwest of west end of runway 27” (RCAF 1943b) or “approx. 2 miles W[est] from end of runway” (RCAF 1943c).

Recovery Efforts in 1943

Hard-hat divers from the Royal Canadian Navy were flown into Gander the day after the crash. It took them three days of diving to locate the Liberator bomber wreck (Annis 1943), despite it leaking fuel to the surface of the lake. They found the wreck at a depth of 42 m (138 feet) (RCAF 1943a). The divers recovered the body of Squadron Leader MacKenzie

from the wreck on September 10, 1943 (Annis 1943). The divers described the bomber as “very seriously damaged” (RCAF 1943a). Diving operations continued until September 16, when they were called off due to the “strong danger” to the Navy divers (Annis 1943). They were unable to recover the plane wreckage for the crash investigation or the other three bodies from the bottom of Gander Lake (RCAF 1943a). Efforts continued to recover some or all of the plane wreck using grap-

Relocating the Bomber Wreck in Gander Lake

On June 21, 2022, staff from the Centre for Applied Ocean Technology at the Marine Institute were conducting bathymetric surveys of western Gander Lake with a multibeam echosounder under contract to New Found Gold Corp. With the approval of New Found Gold, they moved their survey vessel to the eastern half of Gander Lake, to search for the wreck of Liberator 589. Using the approximate location found in the RCAF crash documents (RCAF 1943b, c), a multibeam echosounder survey (Kongsberg EM2040P operating at 400kHz) soon located the bomber wreck on the lake bottom at a depth of approximately 38 – 46 m. The exact location of the bomber wreck was determined with a Differential Global Navigation Satellite System (DGNS), positioning the wreck within 10 cm accuracy. From the multibeam sonar images, the bomber’s wings and a portion of the fuselage appeared to be fairly intact but the rest of the fuselage and tail assembly seemed to be broken apart (Figure 2). The four engines did not appear to be attached to the wing.

ROV Dive on the Bomber Wreck

On June 30, 2022, the team from the Marine Institute used a remotely operated vehicle (ROV; Deep Trekker Pivot) to examine the bomber wreck.

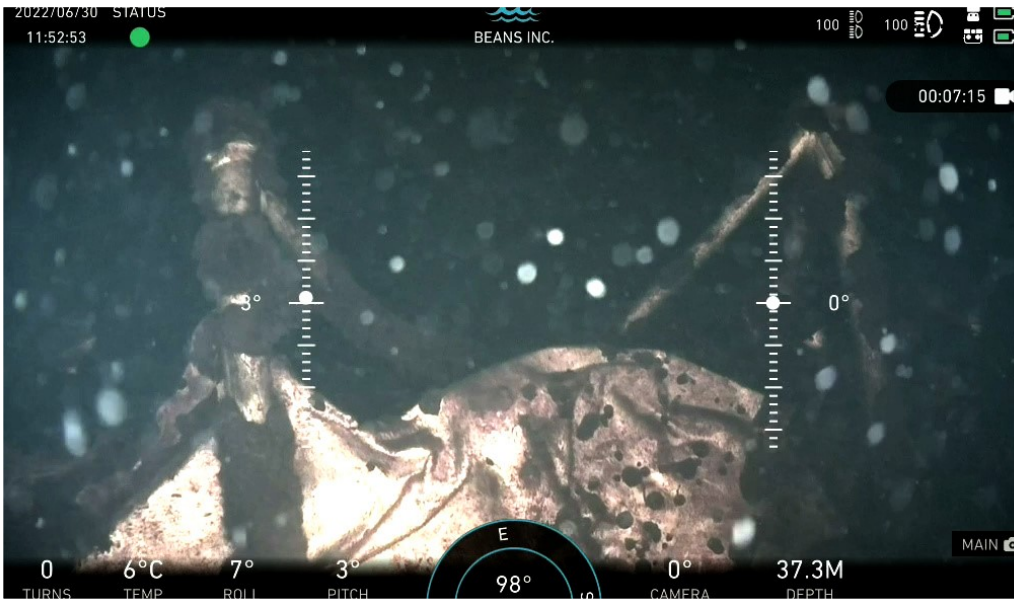


Figure 3: Frame from underwater video collected using a remotely operated vehicle (ROV) in Gander Lake. The photo shows the engine mount piping on the wing of the Liberator bomber wreck. Frame from video: Adam Templeton, Marine Institute

Video collected by the ROV showed parts of the heavily damaged fuselage and the wing with the exposed piping of an engine mount (but no engine) (Figure 3). Particulate matter stirred up by the ROV's thrusters impaired the visibility of the video images as did the brown colour of the lake water. The limited visibility resulted in the ROV images showing only small portions of the plane wreck.

Initial Scuba Surveys of the Bomber Wreck

The first diving surveys of the Liberator bomber wreck occurred on September 5 & 6, 2022 by divers from SPSNL and a team of underwater videographers, technical divers and recreational divers taking part in the Great Island Expedition, organized by dive operator Ocean Quest Adventures and supported by the Royal Canadian Geographical Society. The depth of the plane wreck (39 m) was at the very limit for recreational scuba diving, so the technical divers on the

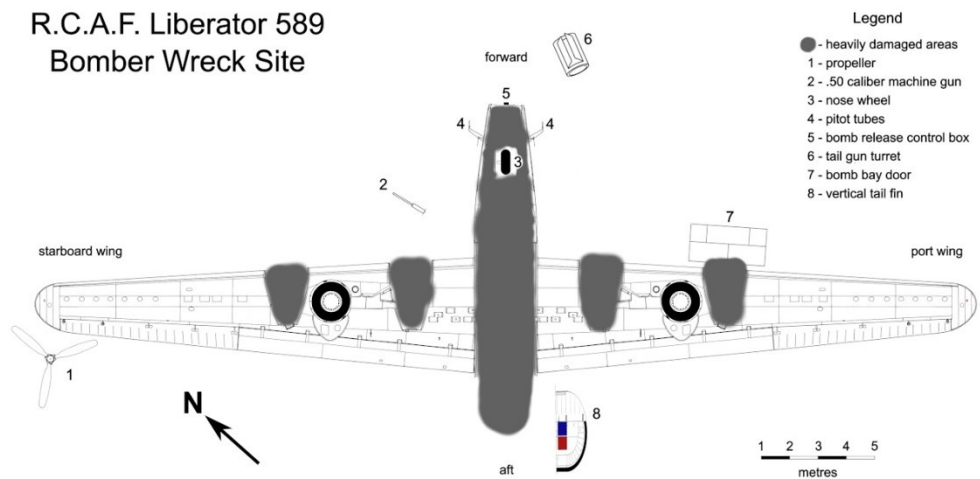
with powerful dive and video lights, to about 2 m. Nevertheless, we were able to collect 113 min of video and dozens of photos of the plane wreck.

During the dives, it was apparent that the plane wreck was upside-down with the wings intact, the landing gear partially extended and the fuselage heavily damaged (Figure 4). The forward section of the fuselage was attached to the leading edge of the wing, but the bottom of this part of the fuselage was

team conducted decompression dives to extend their bottom times on the wreck. One member of the team used a rebreather for the same purpose. Underwater video and photographs were collected with the goal of confirming the identity of the plane wreck as Liberator 589 "D".

Using the DGNSS coordinates determined in the June sonar survey, we were able to dive onto the plane wreck and temporarily attach a buoy line. The dark brown water in Gander Lake reduced the visibility underwater, even

Figure 4: Preliminary site map of RCAF Liberator bomber wreck site in Gander Lake. The wreck site extends beyond the area shown and has yet to be fully explored. Locations of the outlying objects are approximate. Portions of this drawing are adapted from Liberator GR Mk. V (Canada) plans contained in Vincent (1975). Map: Neil Burgess



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torn open, exposing bent aluminum structural frames, electrical cables, hydraulic lines and jumbled machinery. A belt of .50 caliber ammunition was also visible, presumably for the upper turret machine guns. The plexi-glass windows and their frames in the front of the nose (also called the “greenhouse”) (see Figure 1) were ripped out, but some of the windows along the sides of the forward fuselage were intact or broken. Since the plane wreck was upside-down, the cockpit and upper gun turret were buried in the



Figure 5: Nose wheel of landing gear in the extended position. Metal pieces on the left are the two nose wheel doors that close when the wheel is retracted into the fuselage after take-off. Frame from video: Jill Heinerth

lake bottom and were not visible. The nose wheel of the landing gear was extended (Figure 5) but the two larger wheels on the underside of the wings were almost fully retracted.

All four engines were torn from their mounts on the wings. However, the pipes of the four engine mounts remained on the leading edges of both wings. The four engines were not found during these or subsequent diving surveys in 2022.

Several markings on the exterior of the forward fuselage and underside of the wing were visible. A vertical red propeller warning stripe (about 5 cm wide) was seen on either side of the forward fuselage. Similar horizontal red stripes were located outboard of the outboard engine mounts on the underside of each wing. These stripes can be seen in Figures 1 & 6.

The aft half of the fuselage and most of the bomb bay were no longer attached to the wings. We did not locate the aft fuselage, most of the tail assembly or the four engines during our diving surveys. With limited dive time on the wreck because of the depth, the poor visibility impaired our ability to visu-

Figure 6: Vertical red propeller warning stripes on the port side of the forward fuselage. Frame from video: Maxwell Hohn



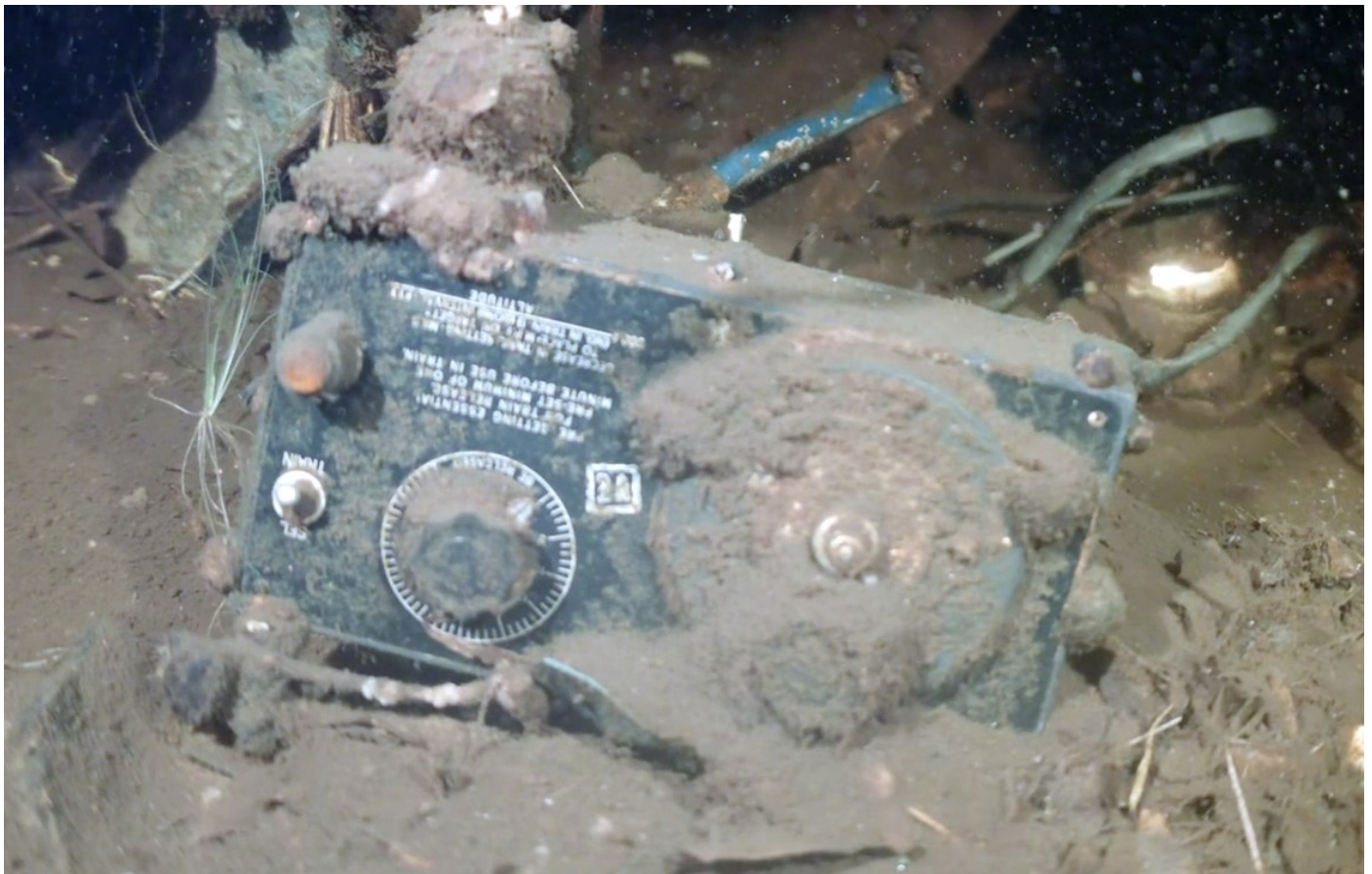


Figure 7: Bomb release interval control box in the open nose of the bomber wreck. Frame from video: Maxwel Hohn

ally search and determine the full extent of the wreck site.

Several parts of the plane were dislodged from the main wreck (Figure 4). A single .50 caliber machine gun and some of the ammunition feed track was partially buried in the lake bottom just forward of the inboard starboard engine mount. With the heavy damage to the nose of the plane, the contents of the bombardier's and navigator's compartment were in disarray. However, one of the bombardier's controls was sitting on top of a debris pile at the very nose of the plane wreck. This was the bomb release interval control box (or intervalometer), which controlled the number of bombs dropped and their spacing (Figure 7) (Consolidated Aircraft 1942). Near the nose of the plane wreck, the tail machine gun turret was displaced from the fuselage and found lying on its front on the lake bed (Figure 8). One of the bomb bay doors was lying flat on the lake bottom just forward of the outboard port engine mount. One of the vertical tail fins was partially imbedded in the bottom just behind the inboard port wing. A RCAF fin flash (red and blue

flag) was clearly marked on the side of this tail fin (see Figures 1 & 9). What looked like a second bomb bay door lay crumpled beside the tail fin.

Follow-up Scuba Surveys

On October 16 & 17 2022, additional diving surveys were carried out to collect more video of the bomber wreck. These surveys focused more on the starboard wing and fuselage. One three-bladed propeller assembly was found near the starboard wingtip (Figure 10). Two of the propeller blades were bent. There were masses of bent tubing and wiring still attached to the starboard engine mounts, but not on the port side. An engine oil cooler and oil tank were also found connected to the inboard starboard engine mount only.

Limitations

The multibeam echosounder survey clearly identified the wreck site and DGNSS coordinates allowed our team to dive directly onto the plane wreck. However, the resolution of the multibeam images did not provide adequate detail to identify parts of the aircraft away from the main bomber wreck. Nor were



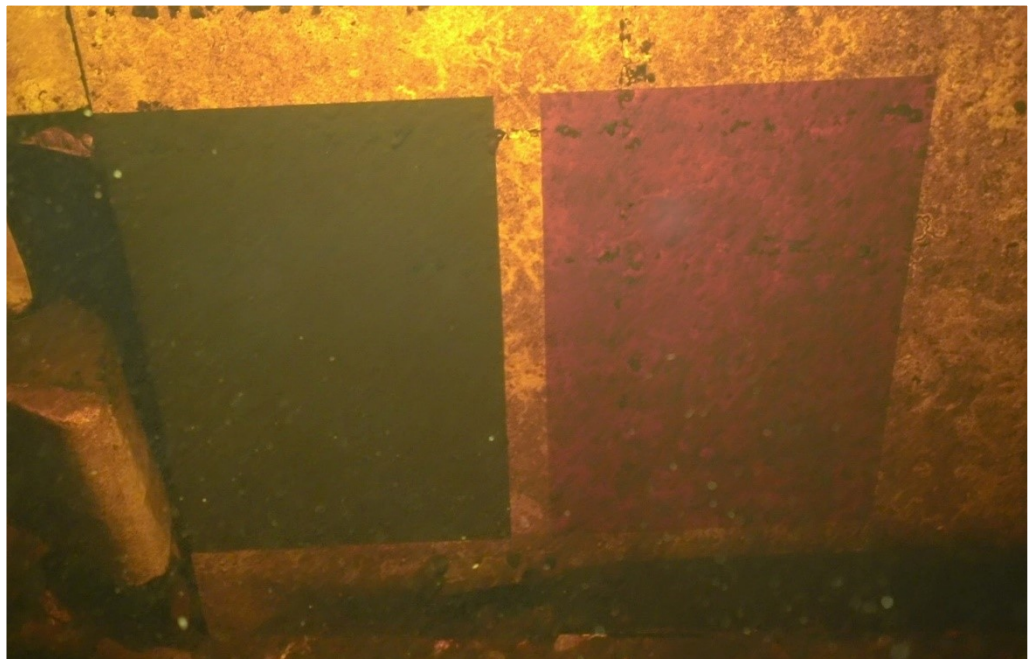
Figure 8: Tail machine gun turret lying on the lake bed near the nose of the bomber wreck.
 Frame from video: Jill Heinerth

they clear enough to provide much detail for mapping the wreck site beyond the wings. Without accurate DGNS coordinates, it would be next to impossible to locate the wreck site by diving, given the limited visibility underwater. The plane wreck was also not visible to boaters using consumer-grade echosounders (fishfinders).

The diving surveys of this bomber wreck faced several significant limitations: i) dark brown waters with limited visibility, ii) deep dives with limited bottom time, iii) nitrogen narcosis, and iv) cold water temperatures. The dark brown colour of the water in Gander Lake is the result of the inflow of dissolved humic acids in runoff from bogs in the upstream watershed. It limited our visibility by absorbing light from dive and video lights within 2 m. Visibility was also ham-

pered by an easily-disturbed layer of light sediment on the surface of the plane wreck. The fin kicks of the dive team tended to suspend this sediment in the water around the wreck. The combined impact of the brown water and suspended sediment made it impossible to view the entire wreck site from one location, difficult to navigate around the site and hard to collect high-quality video and photos of the wreck. On these initial surveys, very little time was available to search away from the main plane wreck for dislodged parts, such as the tail assembly, the aft fuselage and the four engines. The depth of the wreck (39 m) meant that dive times were limited. The no-decompression dive time limit for recreational divers on this wreck was only 8 min. Decompression divers in our team limited their bottom time to roughly 20 minutes and

Figure 9: RCAF fin flash on vertical tail fin of Liberator bomber wreck.
 Frame from video: Neil Burgess





**Figure 10: Propeller with three blades near the starboard wingtip.
Frame from video: Rick Stanley**

Interpretation and Discussion

Examination of the many features of and markings on the plane wreck in the underwater videos and photos confirm that this is the wreck of a Consolidated Liberator bomber. The markings on this aircraft are consistent with those of Liberator bombers used by the RCAF and RAF for anti-submarine patrols. The features and markings of this bomber wreck match those of Liberator GR Mk. V (Canada) bombers that belonged to No. 10 (BR) Squadron of the RCAF in 1943 (see Figure 1). The wreck cannot

then took another 20+ minutes ascending and decompressing before reaching the surface. At 39 m depth, all divers breathing air or nitrox (oxygen-enriched air) experienced impairment caused by nitrogen narcosis. This narcosis inhibits mental abilities such as cognition, memory and decision making. These effects have a negative impact on data collection, situational awareness and diver safety. These risks can be mitigated by adding helium in the diver's breathing gas (trimix), but this is expensive and requires additional technical dive training. Trimix was used by one survey diver on October 16 to successfully mitigate narcosis risks. The cold water temperatures year-round on this wreck in Gander Lake (6°C) put added stress on the divers' comfort, mental acuity, manual dexterity and safety. The cold water can also limit the length of decompression dives, in order to avoid hypothermia. Appropriate diving equipment, training and experience can reduce the risks associated with cold water temperatures, deep depths and nitrogen narcosis. Strong safety awareness, preparation, equipment, training and experience, along with adequate dive boat support, are essential to safe diving operations at this depth.

be conclusively identified as Liberator 589 until unique serial numbers or identification markings are found on the wreck, which has yet to be done. However, the location and depth of the bomber wreck match exactly those given in the RCAF crash reports (RCAF a, c) and historical records indicate that Liberator 589 was the only Liberator bomber to crash in Gander Lake. Thus, we are almost certain this bomber wreck is RCAF Liberator 589.

The bomber sustained extensive damage from its crash into Gander Lake and perhaps also from subsequent recovery efforts in September 1943. The current state of the bomber indicates the wings were the strongest part of the aircraft. The heavy damage to the forward fuselage has displaced most of the features from their original configuration. Yet, many components of the aircraft's armaments, aviation, hydraulic, communication and life-support systems can be identified in the wreckage.

The preservation of the plane wreck appears to be excellent. Corrosion of the aluminum structure of the aircraft appears to be limited. Metal tubing, electrical equipment and fabric objects on the wreck all seem to be in good condition, aside from the damage sustained during the crash. Slow deposition of

sediment on the wreck is evident everywhere, but this poses no risk of burial in the foreseeable future. There was little or no biological growth attached to the bomber. Despite contrary statements in the RCAF crash reports, the plane wreck (to the extent surveyed here) is not located on a steep slope with any danger of it slipping into deeper waters.

This plane wreck site offers numerous opportunities for the recovery, study and museum display of artifacts from a Second World War RCAF bomber. However, no recovery of artifacts can be considered without prior discussion and approval from the relevant regulatory authorities. Development of a conservation plan for the preservation of the artifacts and an exhibit strategy for their display would also be essential. Any recovery of artifacts should only be undertaken by divers with the appropriate archaeological training in data collection and recording.

The wreck site is a war grave, since the remains of three RCAF airmen are likely still in the plane wreck. The fate of those human remains falls within the mandate of the Department of National Defence. The body of Squadron Leader MacKenzie was recovered by Navy divers in 1943 and was buried in the Commonwealth War Graves cemetery in Gander.

SPSNL has plans for additional non-disturbance sonar and dive surveys of this bomber wreck site (assuming the necessary approvals are obtained). If the needed funding can be raised, we would like to use sidescan sonar to obtain higher resolution imagery of the plane wreck and outlying parts. This combined with future diving surveys would enable us to accurately map the entire wreck site and identify additional parts of the aircraft. SPSNL would also like to collect additional video of the bomber wreck that is suitable for interpreting the site to the public. Finally, we would like to confirm that this plane wreck is RCAF Liberator 589 “D” by locating unique serial numbers or identification markings on the remains of the bomber.

The rediscovery and exploration of this RCAF bomber wreck provides a unique opportunity to raise public awareness of the important role played by Canadian airmen in protecting Allied shipping and attacking German U-boats in the Battle of the Atlantic. It brings home the dangers faced by operational

aircrews flying out of Newfoundland & Labrador in the Second World War.

Potential Risks to the Site

This RCAF bomber wreck and all its associated artifacts (and human remains, if any) are the property of the Department of National Defence (DND). The wreck site is a war grave. It is also an archaeological site regulated by the Provincial Archaeology Office. As such, it is strictly illegal to disturb or remove any artifacts or remains from the site under the Historic Resources Act. Thus, we limited our dive operations to non-disturbance surveys only on this wreck site.

Despite all these protections, this plane wreck is vulnerable to looting by recreational divers. Without accurate GPS coordinates for the wreck, it would be virtually impossible for divers to locate it visually due to the poor visibility in the lake. However, covert monitoring of future diving operations on the wreck site may reveal its location to others. There is an abundance of artifacts on this wreck that would be valuable to unscrupulous collectors. Efforts to strengthen the stewardship of this plane wreck by the local community would be worthwhile.

The RCAF crash reports list only machine gun ammunition and no larger ordnance on the aircraft when it crashed. So, there should be little danger from unexploded ordnance at this site. However, the .50 caliber ammunition and machine guns would probably be attractive to looters.

Project Outcomes

Through this project, SPSNL has met its goals of locating, documenting and promoting public awareness of a historically significant plane wreck in Gander Lake. Outcomes include:

1. conducting years of historical research on this RCAF bomber, its crew and the crash in 1943,
2. locating and collecting multibeam sonar images of the RCAF Liberator bomber wreck in Gander Lake by the Marine Institute,
3. initial exploration and video survey of the wreck using an ROV by the Marine Institute,
4. examining a partially restored RCAF Liberator bomber also from No. 10 (BR) Squadron, courtesy of the Avalon Historical Aircraft Recovery Association,
5. assembling a technical diving team for the first diving surveys of the plane wreck in September

2022. The team included SPSNL members, professional videographers, technical and recreational divers with the Great Island Expedition organized by Ocean Quest Adventures and supported by the Royal Canadian Geographical Society,

6. assembling a smaller team of technical divers to conduct follow-up video surveys in October,
7. technical diving teams collecting underwater photos and videos that confirm the identity of the plane wreck as a Consolidated Liberator bomber,
8. sharing photos, sonar imagery and videos of the bomber wreck on social media, TV and radio to increase public awareness of this wartime plane wreck and appreciation of its importance to provincial heritage,
9. participating in interviews for the news media and documentary filmmakers to further raise public awareness,
10. establishing new partnerships with New Found Gold Corp. and the Avalon Historical Aircraft Recovery Association to promote awareness of this aircraft wreck and our wartime aviation history,
11. strengthening our existing partnerships with the Marine Institute and Ocean Quest Adventures,
12. collaborating with Ocean Quest Adventures to identify and document a new wreck diving opportunity in the province, to help augment the adventure tourism economy in an archaeologically responsible and environmentally sustainable manner, and
13. Producing this report of our findings.

Next Steps

There are several activities which SPSNL is planning for the future:

1. further historical research on this bomber wreck,
2. submitting a report of SPSNL activities on this Liberator bomber wreck to DND,
3. fundraising to carry out future sidescan sonar surveys of this plane wreck,
4. further non-disturbance diving surveys to explore, record and map the entire plane wreck site (and hopefully conclusively identify the wreck as Liberator 589),
5. continue our public education activities on our website and social media channels, and
6. explore possible interpretative partnerships for this RCAF bomber wreck with the North Atlantic

Aviation Museum, The Rooms Museum Division, the Canadian War Museum and the Department of National Defence.

Acknowledgements

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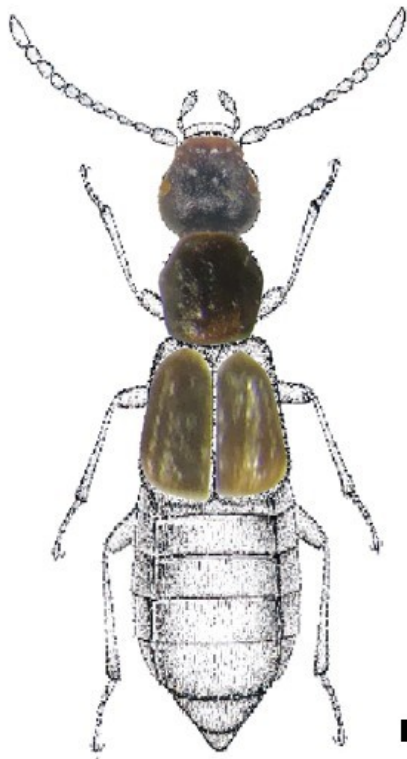
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