RESEARCH REPORT

PAPUA NEW GUINEA'S AVIATION ICON: WWII BOMBER B-17 "SWAMP GHOST"

Report For the PNG National Museum's
Director, Curators and Board of Trustees
By Justin Taylan ©2003

The world's ONLY intact, un-restored WWII B-17 bomber lies undisturbed in a swamp in PNG. No other aviation relic like it exists anywhere else in the world. For sixty years, it has remained undisturbed where the war left it.

Over the decades, many 'proposals' and organizations have been proposed to the PNG Museum to recover and restore this relic from its resting place. There are many questions the PNG Museum must consider before accepting such a proposal. This report provides historical, technical financial information to assist in the staff and board of trustees' in their decision-making process.

Overall, the evidence shows that it is doubtful that the "Swamp Ghost" can be successfully recovered from its resting place, by anyone. Also, it provides proof that the value of this relic is 'priceless' as an intact aircraft in the swamp, and should be treated as an historical asset unique to this country and the entire world.

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1) "SWAMP GHOST" BACKGROUND INFORMATION

WWII HISTORY OF "SWAMP GHOST"

The wartime history of this one airplane could be the topic of an entire book itself. For the purposes of this report, only a brief overview of its history is provided, with emphasis on its service within Papua New Guinea.

B-17E 41-2446 BACKGROUND

This plane was built by Boeing Aircraft Company, in Seattle, Washington. It was accepted into the US Army on December 6, 1941, the day before the surprise attack on Pearl Harbor. It was an "E" model of the B-17 "Flying Fortress" and assigned the serial number, 41-2446, one out of a total of 512 B-17E Models built. Later, thousands more "F" and "G" model B-17's would be built during WWII.

When B-17E 41-2446 was built, it was the largest and most sophisticated bomber in the world. The B-17's were nicknamed "Flying Fortress" in America, for two reasons: their enormous size – its wingspan is nearly 32 meter wide[1]. In 1941, it was the largest airplane most people had seen in their lives. The second reason were the many gun positions bristling with machine guns, to defend the bomber.

It was sent to Hawaii in January of 1942, where it was assigned a crew from the United States Army Air Force's 7th BG, 22nd BS including pilot Fred C. Eaton. The aircraft was then flown by the crew overseas to Australia, with several stops along the way to refuel. Finally ending up at Townsville, Queensland, Australia where it joined the 'front lines'. The B-17 took off on its first, and only combat mission on February 23, 1942 to attack Rabaul.

One of a six B-17 bombers sent on the mission, the planes were flying all the way from Australia, because Port Moresby was in range of Japanese aircraft. Over Rabaul's Simpson Harbor, B-17 41-2446, flown by Fred C. Eaton attempted to attack Japanese ships. The plane had to make a second bomb run, due to a problem with the plane's bomb bay doors. On its second pass, it dropped all its bombs onto a freighter of 10,000 tons.[2] An anti-aircraft shell from below passed thru the rightwing without exploding. Then, Eaton's bomber was intercepted by Japanese fighter planes[3] and maneuvered to escape them, using up extra fuel.

[1] Wingspan was exactly 103' 10" according to Boeing

[2] It is unclear if any of the bombs from the B-17 hit due to overcast.

[3] A5M "Claudes" and A6M "Zeros" two types of Japanese fighter planes

The tail gunner claimed one enemy plane, and waist gunner, two more. Their plane was hit by Japanese bullets. After the battle, they flew as far as the north coast of New Guinea, before running short on fuel.

The plane set down with the landing gear up, on the flat surface of the Agaiambo Swamp. The only thing they took from the plane was the bombsight, and destroyed it.[4] The crew walked away from the crash site, but it took them several days before they were able to walk out of the area. With the assistance of Australians, eventually get back to their home base.

For the rest of the war, it was forgotten. As the months and years of aerial combat wore on in New Guinea, many other planes crashed and forced landed, and this B-17 became, just one of many 'wrecks'.

It is interesting to note the aircraft did not have a wartime nickname or nose art. This nickname "Swamp Ghost" was coined decades later, after its discovery.
[See Discovery & Nickname Section Below]

"Swamp Ghost" Today (Photo Jack Mierzejewski)

[4] Destroying the bombsite was standard procedure for downed airplanes, in case the Japanese found them.

CONTEMPORARY HISTORY OF "SWAMP GHOST"

There are many wrecks in New Guinea from WWII, and each has its own history and importance. The three greatest reasons why this wreck has attracted more attention over the decades since WWII, is because:

a) It is an intact and complete airplane
b) Because it's a B-17 "Flying Fortress", a well known airplane of WWII.
c) It is perceived to be of value

REDISCOVERY & NICKNAME "SWAMP GHOST"

The wreck has always been known to local landowners and hunters in the Agaiambo swamp area. For them, it was only a curiosity and a landmark on their territory. They did not disturb the wreck, and never reported the wreckage, for in their eyes, it was just another relic from the "Bigpela Piat" (WWII).

For the outside world, it was known until 1972, when the Royal Australian Air Force (RAAF) was carrying out helicopter exercises in the area of the Ambiago Swamp. From the air, they spotted a large aircraft. It is unknown whether they set down to investigate, but they did report the discovery.

After it was discovered, the airplane was nicknamed "Swamp Ghost". It is unclear who coined the name, Few knew its WWII history, and this nickname aptly described the site of this massive bomber resting in the kunai swamp. This nickname began appearing in media articles after interested parties in the US first raised the possibility of salvaging the aircraft.

REMOVAL OF SMALL ARTIFACTS FROM THE BOMBER

After rediscovery 1972, word spread about the existence of the aircraft. When it was first rediscovered, the bomber had all its instruments, and internal gear in place, just as the war had left it. New Zealand expatriate Charles Darby visited the wreck in 1974, and published photographs of the aircraft in his 1979 book "Pacific Aircraft Wrecks… And Where To Find Them". These photographs made the wreck known to a much wider audience around the world.

Around the same time, unidentified person(s) removed artifacts from the aircraft, such as cockpit instruments, oxygen bottles, serial number plates, bullets and other objects that were easy to remove with hand tools. Each of these objects were probably taken for their souvenir value, or in the hopes of reselling them. The whereabouts of these objects are unknown today.

According to local landowner, Lomas Jijiroba:
"A group of arrived by ship and were taken to the bomber by us in canoes. They then "broke in through the cockpit and removed 'some things' ".

PAST ATTEMPTS TO SALVAGE

Beginning in the 1980's a number of organizations and individuals from America have taken an interest in the "Swamp Ghost", and sought to recover it. One group even wanted to make a movie about it, staring Hollywood actor, Patrick Swayze! Each of these proposals or parties have come and gone.

The section list each of the known 'Swamp Ghost" recovery proposals. Some information and details of are unknown, but the outcome for each is the same: To date, no one has succeeded in getting permission from the PNG Museum, or following thru with their own plans to recover the bomber from the swamp.

TRAVIS AIR FORCE BASE 1985-7

Travis AFB was the first to attempt to gain permission to salvage the "Swamp Ghost". At the time, Bruce Hoy was the PNG Museum's Modern History Department. Curator. Recently, he commented on the proposal:

"Two Air Force fellows, Major Peter Kaminski and SMS Theodore Liston came out for a preliminary inspection and flew to the aircraft on 19 December 1985. Then on 20 August 1987, two volunteers from the Travis Air Force Museum visited the aircraft. "

Then curator of the PNG Museum, Bruce Hoy, reported to the Minister responsible for cultural affairs, recommending that the group should be granted salvage rights if they:

1) Fully Restore B-17 "Swamp Ghost" to flying condition, but never have it fly.
2) Fully Restore the Museum's P-38[5] and B-25[6] at Popondetta (to static display)
3) Donate a restored Stinson L-5[7] for the Museum

Permission was not granted on the following grounds:

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[5] **P-38 Lightning Serial Number 42-12647**
This was an American aircraft, salvaged from outside Port Moresby in 1978 by Bill Champan, and displayed at the PNG Museum intact from 1984 – early 2002. Currently, pieces have been removed (engines, tail, outer wings) by Robert Grienert / HARS for restoration for the PNG Museum.

[6] **B-25 Mitchell Serial Number 42-64835**
Found abandoned at Girua Airfield, it is displayed at the airport (Poponodetta's main airport) since the early 1970's. It is missing its engines and tail.

[7] **Stinson L-5**
This is an American light aircraft that flew in New Guinea during WWII, from all the locations wherever the Allies fought. They engaged in scouting and spotting activates primarily. A restored aircraft of this type is valued at $35 – 50,000 USD, depending on the history, condition and quality of restoration.

1. If the Americans want it so bad, it must be worth a lot of money.
2. We could fly tourists there, and use the aircraft as a unique attraction.
3. We could get the RAAF to recover it and put it at the airport at Popondetta."

Of all the proposals made since the discovery, this one seems the clearest and well presented. In the next years, proposals get more vague about who would own the wreck, and what benefit, other than offers for "money" that the PNG Museum would get in return.

PNG MUSEUM AUTHORIZES REMOVAL 1993

In 1993, six years after the first proposal was rejected; the PNG Museum's next Modern History Curator authorized the removal of the "Swamp Ghost". It is unclear if there was any organization or individual to actually recover the plane, or if this was simply a policy decision.

It is unclear what exactly caused this decision to be made. The aircraft was never removed, and the Curator of the Modern History Department was given a public service charge and questioned by his superiors.

According to the Post-Courier Newspaper, "There seems to have been a question over the legitimacy of the war museum, as whether such a body had the lawful authority to enter into an agreement to recover the stricken aircraft and take it to America."

MILITARY AIRCRAFT RESTORATION CORPORATION (MARC)

MARC is founded by David Tallichet, a WWII veteran who flew in Europe. He is owner of Military Aircraft Restoration Corporation (MARC) and since the early 1970's has purchased, collected, resold and restored wartime aircraft from all over the world.

MARC's Background & Previous Work In PNG

Tallichet had an association with PNG before his interest in the "Swamp Ghost". Previously, his company MARC was known as "Yesterday's Air Force". In 1972-74, he had funded the recovery of over a dozen intact aircraft from the Aitape area of West Sepik (Sandaun) Province, from the wartime airfield called Tadji.

It is important to note that this recovery operation was done in ideal conditions at Tadji – a location where the ground is dry, flat and there is road access to the wharf at Aitape is only a short drive down a sealed road. Only trucks and a barge (for export) were used for the operation, the main reason the cost of the recovery was so low.

The aircraft recovered were abandoned planes, without engines or other gear, (rather than a plane that had force landed on a combat mission, like "Swamp Ghost") which did not require any special recovery techniques to remove. Also, the largest airframe recovered were twin-engined aircraft, including an A-20 and Beaufort, minus their engines, and other wartime equipment. Both of these types weigh far less than a B-17E. At the time of recovery (1972-74) the aircraft had only been abandoned for 25 - 27 years. None had the same problems of corrosion and deterioration seen in relics that are now 58-61 (from 1942 – 1945) years old in today. Although aircraft relics of today still look impressive, as restorable aircraft, they are in most cases not suitable for flight, and at worst only as templates for the remanufacture of parts.

This was before PNG independence and the existence of the National Museum. These aircraft were recovered and money paid to the local people on whose land the aircraft resided. The exact amount is unknown, but reportedly the sum was enough to "pay the villages taxes for a year"[8].

Shipped by boat to America, the aircraft removed included American fighters and bombers, and Australian aircraft as well. At the time, their recovery was regarded as an aviation history goldmine. Still to this day, it was the largest single recovery of wartime planes, anywhere in the world. After the aircraft were returned to America, they were resold to eager buyers, for thousands of times the profit.

Today, these former PNG aircraft from Tadji are in the hands of private collectors, museums, or on display in the United States or Australia. Only one aircraft from those recovered has been restored to flying condition. The rest are either in storage or displayed unrestored. This indicates the difficulty and cost of restoring WWII aircraft, even under ideal circumstances.

MARC's First Proposal, 198?

The background, or exact date of MARC's first proposal to recover the bomber is unclear. One sources state that it was begun by the former crewmembers of the B-17, who approached David Tallichet and asked him to recover the plane for them.[9] Others, say that MARC knew about "Swamp Ghost" from Charles Darby's photographs and had always been interested in the bomber themselves. It is unknown what their proposal asked for, or offered the museum initially.

[8] Quote from Charles. Darby's book, "Pacific Aircraft Wrecks… And Where To Find Them", page 59

[9] Post Courier Article, October 31, 2003

It is not clear which former crew members, if any were involved. In the interviews conducted for this report, the bombardier of the plane, Richard E. Oliver did not mention any knowledge of such involvement of any crew member. The decedents of the tail gunner (also deceased) expressed their desire to see the bomber stay in the swamp as a memorial. The initial proposal seems to either have been rejected, or abandoned by MACR

MARC Second Proposal, 2000-2001

Around 2000-2001, MARC had a renewed interest in the bomber, utilizing new personalities to achieve its recovery. It is not clear who exactly was involved, but the group included Alfred Hagen and Glen Spieth.

Alfred Hagen began traveling to PNG in the late 1990's, and located the crash sites of several WWII aircraft. These wrecks were later identified and investigated by the US Army CILHI as American Missing In Action (MIAs). Hagen is the great-nephew of a pilot, Major Bill Benn who served in New Guinea. During his visits, Hagen visited the "Swamp Ghost" and according to MARC, was employed by them between 1999-2001 to coordinate the recovery of the "Swamp Ghost". He submitted another proposal on behalf of MARC / Hagen in 2001, the exact details of which are unknown. This proposal was not granted approval by the PNG Museum.

Hollywood & "Swamp Ghost", 2000-2001

Coincidently, in August 2000, 200, a Hollywood production company, named "Flights of Angels" expressed interest in recovering the bomber as the basis for a movie, that would also star actor Patrick Swayze!

According to the news release on the film, it described the movie as:
"A major motion picture project using the wreck of a World War II American bomber as the peg on which is hung a story that travels back to the burgeoning war with Japan in 1942. The film, staring Patrick Swayze centers in 1972, the time of the plane's discovery in a remote swamp in Papua New Guinea"

The movie would also, according to the news release, include the recovery and speedy restoration of the bomber, to be used to promote the movie. Again, from their news release:

"Jerry Price, Principle and Chief of recovery and restoration on the project says that "The film's story incorporates a spectacular recovery of the B-17E from the swamp itself. The film will also use some, if not all of her restoration. Although we are in early negotiations with the government of PNG, our intent is that the restored War Bird, while being used highly in the film's promotion and release, will remain the property of the government of Papua New Guinea to be enjoyed as a national treasure." A year later, this proposal never got its 'act' together, and disappeared into obscurity.

ALFRED HAGEN, 2003

After the second MARC proposal, which was rejected in 2001, the group lost interest in recovering the "Swamp Ghost". Alfred Hagen, one of the people previously involved with MARC has now taken over the entire project himself, and is currently seeking permission to recover the "Swamp Ghost". It is unclear what museum, or resources he has aligned for the project, or what exactly he is proposing to do.

CONSIDERATIONS FOR FUTURE PROPOSALS

To the present date, no proposal to recover the "Swamp Ghost" has been granted permission to move forward.

The Museum's policy, to recover of aircraft on the basis of a "museum to museum basis" is a good policy. The reason for this proposal is to ensure projects will only be undertaken with legitimate museums that are actively involved in aviation restoration, and have a level of expertise in these matters. Furthermore, the museum must demonstrate that it has the resources and comprehensive plan to complete what they propose.

To add to that policy, this report also demonstrates how any attempt to recover the "Swamp Ghost" would be a difficult task, at best. And, there is strong evidence showing how such a recovery could destroy or damage the aircraft. Additionally, the report shows alternate ideas for the bomber that allow the museum and PNG to benefit by leaving the wreck where the war left it – undisturbed.

"Swamp Ghost" from tail looking forward (Photo Jack Mierzejewski)

2) WOULD ITS RECOVERY BE POSSIBLE?

Is it POSSIBLE to recover the Swamp Ghost?
Would Recovery Possibly Damage or Destroy It?
The answer to these question, is “YES”

Has an intact B-17 ever been recovered?
The answer to these questions is “NO”

IS IT POSSIBLE TO RECOVER THE SWAMP GHOST?

Yes, but it would also be possible to destroy or damage the aircraft. Also, a recovery of this nature has never been done before. And, the cost, to do the job right would be high for even the most wealthy of millionaires or companies. Evidence of each of these points is presented below.

WOULD RECOVERY POSSIBLY DESTROY OR DAMAGE IT?

Without a successful recovery of an intact B-17 to study as a prior example, no one knows exactly what would happen during the attempted recovery of the aircraft. What can be agreed upon is that it would certainly be possible for the aircraft to be damaged, or destroyed in the recovery process.

The aircraft has sat in a swamp for 61 years, more than half a century. If the aircraft is lifted, or disassembled, it its not clear what will happen. It is certain, that if the airframe is lifted it will at best be weaker in its strength than it originally was, or at worst, be damaged or destroyed. means, as soon as it is lifted, or dried, that the metal might then break or fall apart. Additionally, the stresses of transport, either in helicopter or other means are added stress calculations that could damage the aircraft more.

There is no firm scientific data as to how long the wreck will last, but photos of the wreck between 1974 and 2002, (28 years) show no signs of exterior deterioration from the way it looked when it was ‘discovered’. Rather, the wreck is cocooned by the same forces that have corrode it. All the damage, such as the rusting of metal, fading of paint, and rotting of fabric surfaces happened within the first months or years in the swamp, and now, at least externally, the airplane is unchanged after nearly three decades. The aircraft is not falling apart by staying in the swamp. On the contrary, by leaving the aircraft in the swamp, it will remain intact and unchanged well into the distant future.

HAS AN INTACT B-17 EVER BEEN RECOVERED?

The answer is “No”.

Parts of B-17s have been recovered in different places around the world, as well as other smaller WWII aircraft, but no one, anywhere has successfully recovered an intact B-17 Bomber.

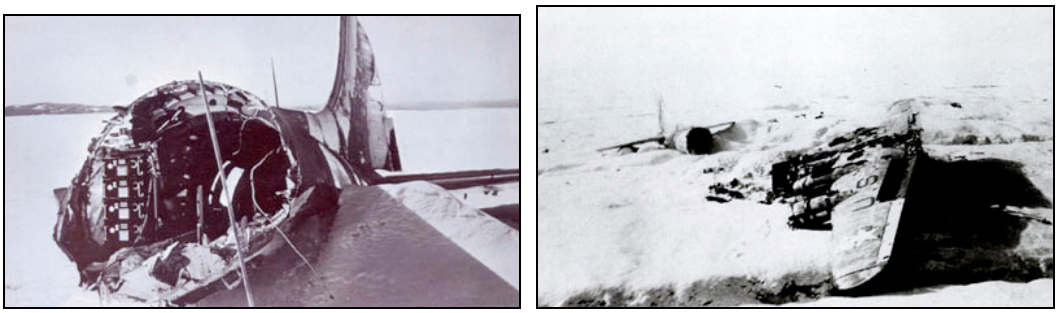
The idea that this aircraft could be successfully removed from its swampy landing ground is an idea that has never been successfully completed, and would certainly cost millions to attempt properly. Other recovery operations of B-17’s or similar aircraft are presented here as case studies in what happened with other large-scale WWII recoveries:

GREENLAND B-17 DISCOVERED, DEEMED TOO HARD (1989-1990)

Another case, one of two B-17E[10] were discovered in the Greenland icecap, by the “Greenland Exploration Society” (GES), an organization started by two wealthy aviation enthusiasts and pilots from America, Pat Epps and Richard Taylor. It was deemed too difficult to recover, because of the tremendous size of the airplane, and the fact that its body was crushed by the weight of ice. Only small artifacts were recovered from the plane. The group was able, in 1992 recover a P-38 Lightning that force landed on the same mission, also under ice because it was a smaller and lighter aircraft.

GREENLAND B-17 “My Gal Sal” WRECKAGE RECOVERED (1990’s)

This B-17 force landed on the Greenland ice cap in 1942. It was broken up by strong wings and ice. In the 1990’s the rear section of the tail and wing section (minus one wing) were present. These larger pieces were recovered in the 1990's and stored at the Tillamook Air Museum, in Oregon. According to the owner, this aircraft is currently being restored in the united states, to ". . . display her sifting on her belly where she came to her final rest on, June 27, 1942."



B-17E “My Gal Sal” wreckage in 1964 (USAF)

[10] B-17E 41-9090 (located, decided not to recover) and B-17E 41-9101 (never located)

ALASKA B-17F CRASH RECOVERED, SECTIONS ONLY (1996-2001)

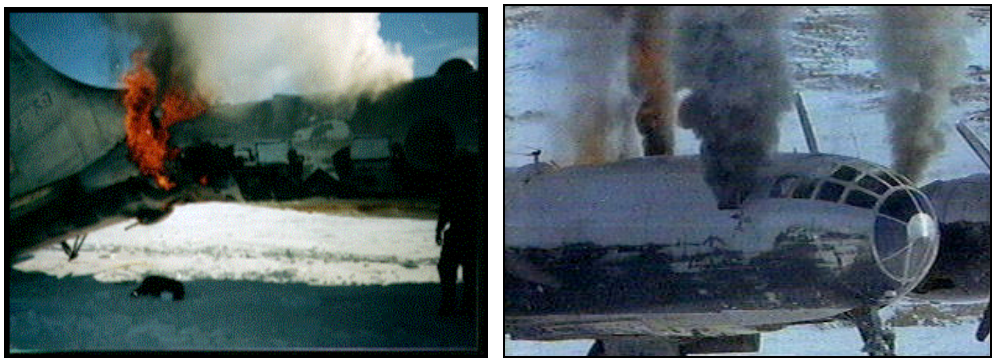
The B-17F 42-3068 was a crash site, not an intact airplane. Recovery by American Gary Larkins, beginning in 1996. All that was recovered were the broken fuselage section, inner wings, and tail gunner's section of the bomber. During the recovery, the helicopter they were using developed a mechanical problem cutting their recovery short. It was not until June 2001 that Larkins returned to retrieve the rest of the parts. This B-17, with parts and materials from other aircraft is currently being restored in Oregon.

Recovery of B-17F in Alaska (left) tail section (right) fuselage remains (Photos Larkins)

B-29 RECOVERY ATTEMPTED, DESTROYED (1995)

Another example was a B-29 "Kee Bird", also abandoned intact in Greenland in 1947. A B-29 is much larger than a B-17 in size and weight. A recovery team headed by 'experienced salvager"[11] Darryl Greenamyer, to repair and then fly the aircraft off the ice cap. Before it took off, the plane caught fire and burned, destroying it within minutes. The camera crews documenting the story that later aired on television around the world captured this tragic outcome on video. At the time, the US Airpower Museum described the tragedy as: "The fire consumed the fuselage B-29 "Kee Bird" an irreplaceable treasure of aviation history and with it goes years of planning and hard work by so many dictated airmen."[12]

[11] NOVA's Television documentary "B-29 Frozen In Time"
[12] US Air Power Museum Journal, 2001



B-29 “Kee Bird” burning (Photo NOVA “B-29 Frozen In Time” Documentary)

3) PROBLEMS ANY RECOVERY WOULD FACE

There are a range of problems any recovery team would face to successfully recover the “Swamp Ghost”, beyond those of just getting a permit for recovery from the PNG Museum. This section explores some of those problems and challenges, and shows why each, or certainly as a collective list the notion that recovering this aircraft would be easy, or even possible are come into doubt.

Problem #1 – Time & Money Required

The first question is how much money, and time would be required to complete a recovery of the ‘Swamp Ghost”? The answer is, no one knows.

It is safe to say that the time required, even with unlimited funds would be weeks, even under the most ideal conditions. The money involved is less certain. First, there is no one in the world who has ever recovered an intact B-17 bomber. It is not certain what equipment would be needed, and likely most of this equipment will be specialized recovery gear, like airbags, jigs that would have to be sent from overseas.

Transporting the bomber out of the swamp by helicopter is the usually suggested as an option. Even the cheapest lifting helicopter available in PNG costs $4,000 per hour, and certainly would require multiple trips out to the site an back to recover it, let alone deliver supplies, crew or other unexpected transport. The transportation bill alone would likely be the largest part of the budget.

Add to this the fact that compensation would certainly have to be paid to local landowners and to the PNG Museum. The amount of compensation offered in the past has included doing work for the museum, and donating other aircraft, or paying out specific sums of cash. [See below – What is The Bomber Worth]

Problem #2 – Weight of the "Swamp Ghost"

The B-17E model weighted 16.175 tons (14,704.55 kg) empty, without fuel, or armament. Add to that weight, wet sediment from the swamp that has collected inside the wings, fuselage and other parts of the aircraft. This wet sediment rapidly adds even more weight to the aircraft, for even only a cubic meter of water weight itself one ton. It is conceivable that the B-17 hold many cubic meters of water and wet sediment inside.

For comparison, another WWII aircraft[13] that force landed in swampy ground has been resting in the same location since 1943. Like the swamp ghost, it is partially submerged in water for approximately half the year during the wet season. This photo clearly illustrates how the interior of the wreckage has accumulated sediment.

Problem #3 - Logistics

The next problem would be the cost and effort to arrange the logistics of transport. How would the "Swamp Ghost" be recovered? Where would it go next? How would it get to its final destination – within PNG, or elsewhere around the world? Aside from sophisticated gear and equipment, likely transport to PNG from outside the country, there are other more practical issues to consider.

How long Would It Take?

There is no doubt that the recovery of this aircraft would be a long process. It is safe to say it would be impossible to complete in a single day, or several days, regardless of budget or funds available. Likely, it would be a major effort that would take weeks, or even multiple visits. And, other unknowns might make this time table longer. How would the local people feel about a new 'village" springing up for weeks or moths on their land?

Where Would Team Stay?

Where would a recovery team be based? The nearest large town would be Popondetta or Pongari. Although both have many amenities and things available, likely they would be unable to outfit such an operation locally, aside from food, lodging and some equipment. Would they build a camp site in the Ambiago swamp, or would a team be flown in daily?

Recovery Team Size & Members

How large would the recovery team be in size? Certainly, it would take several aircraft engineers working full time, simply on the task of disassembling the aircraft [See below - Problem #7]. Would these engineers have backup or replacements waiting nearby to relieve them or rotate responsibilities? What other support staff would be present in this remote location? (Medic,

[13] P-38 Lightning 42-66851 in the Ramu Valley

Communications, Security, Cook, etc). Who would lead the team? Would it be the same person who made the proposal, or another outside restoration expert? As previously established, since there are no other recoveries of intact B-17s, there is no one in the world who can claim that they have completed a similar project.

Problem #4 – Helicopter Transport

Most often, proposals say they would use a helicopter transport the bomber out of the swamp. For the purposes of this report, I contacted Hevi Lift, a PNG based company for information about what cost, risks and capabilities would be involved with a project of this magnitude.

Helicopter Background Information

Helicopters can lift tons of weight. The largest helicopter in the world, the Russian Mi-26 can lift a maximum load of 20 tons short distances, although safely it only lifts 16 tons. There are no MI-26's currently based in PNG. The largest helicopters inside PNG are the MI-8, which can lift far less weight. Occasionally, Chinooks operated from PNG with the RAAF.

MI-26
20 ton max
16 ton normal

Chinook
14 ton max
10-12 normal

MI-8
5 ton max
4 ton normal

The weight that a helicopter can lift is only an estimate under ideal conditions. Weather conditions, the distance the object must be moved, the shape of the object, and altitude above sea level are all additional factors. An irregular shaped bomber, in New Guinea's unpredictable weather any distance is hard to estimate.

As stated previously, the weight of an empty B-17E is tremendous, over 16 tons. This does not include any wet sediment inside the aircraft, which would add an unknown amount of additional weight to the equation, conservatively at least a ton, even with extensive cleaning. This means that lifting the entire bomber is more than a MI-26 can normally lift, and is approaching the limits of even that helicopter's maximum capabilities. It is safe to say it is impossible with a helicopter to lift the entire "Swamp Ghost".

For comparison, the weight of an A-20G[14], the largest aircraft recovered by helicopter in PNG previously is provided. This recovery was preformed by a MI - 26 Helicopter, then based in PNG, and was still a challenging task. It was recovered fully intact, including the engines. As these calculations prove, the A-20G is only half the weight of a B-17E.

WWII Aircraft Empty Weights	
B-17E "Swamp Ghost"	**A-20G "Big Nig"**
32,350 lbs (16.175 tons)	17,200 lbs (8.6 tons)
14,704.55 kg	7,818 kg

Removal Of Engines

Most salvagers know the above, and that the entire plane could not be taken in one single trip. They often propose that the four engines would be cut off the bomber, and left in the swamp. For the purposes of this report, we recalculated the weight.

Each of its four engines, with propellers[15] weighed 1,467 pounds each. Multiplied by four, this accounts for 5,868 pounds of the B-17's empty weight. Subtracting this from the original empty weight, the B-17E, minus its engines would still weight a 2,6482 pounds (58,260 kg) or 13.24 tons.

The engineless B-17 would still have an unknown additional weight from wet sediment, but for arguments sake, we will assume it had none. 13.24 tons is still a figure that only the largest helicopter, the MI-26 could lift. No MI-26 are currently based in PNG at the moment.

Helicopter Risks – Weather, Stability & Oscillation

All helicopter companies retain clauses in their transportation contracts, stating that if, at any time the load they are carrying becomes unstable or dangerous to the safely of the helicopter or the crew, they have the right to cut the load – drop it, to regain safety. Such a situation can happen in several conditions, including weather, stability or oscillation.

Any weather condition that could cause danger would fit into this category, including strong wind, storms or other weather related phenomenon, at both the pickup location, flight path, and final destination. If the load becomes unstable, it would also be dropped This could include if the cargo unexpectedly shifts from improper slinging (attaching to the helicopter's harness), or if the wreckage begins to break up or fall apart from stresses of flight or lifting.

[14] A-20G "Big Nig" 42-9436 force landed in a swamp in Madang Province

[15] Wright R-1820-65 Cyclone Radial Engines, with three bladed Hamilton-Standard Propellers

Oscillation is another situation. Oscillation is the term for the swinging of a helicopter's load. If oscillation becomes too great, the momentum of the load can endanger the helicopter, the same way violent weather does. Oscillation is particularly a problem with loads that are irregularly shaped (like a WWII bomber) and due to improper rigging. This factor was the greatest danger faced by the RAAF in their recoveries of the A-20G "Hell'N Pelican" in 1984 and the A-20 "Big Nig" in 1996.

Finally, any other unexpected mechanical failure or problems would warrant the helicopter to drop its cargo, in an attempt to regain control and save the lives of the crew.

Problem #5 – Getting The Bomber Out of Water

The bomber lies half submerged in the swamp for most of the year during the wet season, or during any flooding of the swamp. The next problem would by how do you get the bomber out of the water, to work on it, or to lift it out of the swamp?

The answer often proposed is with large air bags. Such airbags exist, and are used in aviation for a variety of tasks, and are capable of lifting even today's largest jets. Although the problem is solved by air bags, this is another time consuming step that must be completed, before any work could begin, or any object could be air lifted from the location.

Problem #6 – Water & Corrosion

Inside the plane, are liters of swamp water and sediment that have collected for the past 61 years, and also corroded the surface of the aircraft. This damage has weakened and damaged the bomber's skin and support structures, and will make lifting or disassembling the aircraft very difficult, or impossible.

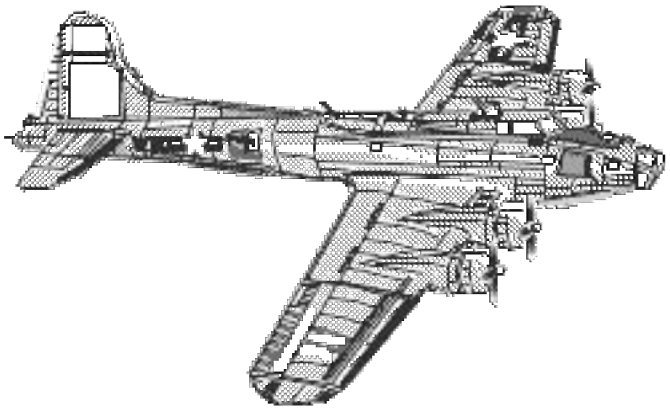
It is unknown exactly what the composition of the water in Ambaigo Swamp, around the "Swamp Ghost". Is it salt water? Is it brackish water? Is the water acidic, like other swamp water in PNG? Is it fresh water? Does the water composition change seasonally, and if so, what is the water during the other season? No scientific survey or detailed study on such matters has ever been undertaken.

Finally, as previously stated, water or wet sediment will probably fill the wings and other areas. To work on disassembling the bomber, or to reduce the weight of this excess material, the aircraft would have to be cleaned. The only feasible and quick idea for cleaning would be to rinse the surface with hoses feeding

nearby swamp water. Again, this adds time to the recovery process, and the success of such cleaning might produce are unknown.

Problem #7 – Disassembly of the "Swamp Ghost"

Salvagers often propose how they would disassemble the aircraft in the swamp, and then use smaller available helicopters to lift out these smaller loads. For the purposes of this report, I will examine this idea further. In theory, this idea sounds good. But, in consultation with aircraft engineers, and former Boeing engineers who built the B-17, this option also rapidly becomes difficult at best, and impossible at worst.



Intact B-17 "Swamp Ghost"

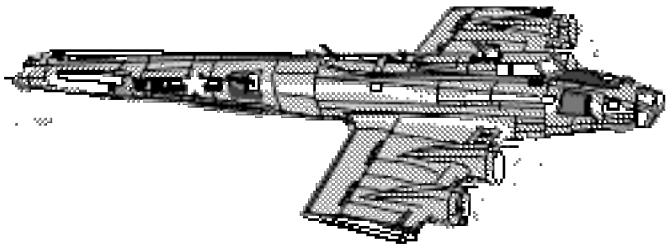
The Easy Parts

As stated previously, the four engines would probably be cut off, and abandoned in the swamp by most salvagers.

The tail's vertical fin and side stabilizers would be the easiest to remove. This work could take several days, but would be the easiest part of the plane to remove. In the case of the tail fin and stabilizers, they are probably structurally sound, as they have been above water, or had limited corrosion to them.

The outer wing panels, from the wing tips, to the base of the outer engines. The outer wing panels are each large but relatively light. Their undersides are likely to be corroded, as they have been submerged under the bomber in the swamp water since February 23, 1942.

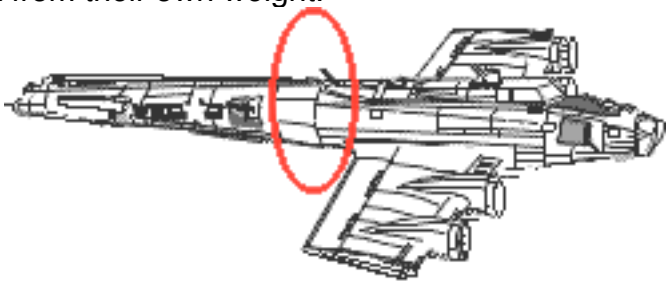
All of these object could be air lifted away by helicopter. But, certainly, as past PNG aircraft recoveries have proven, even easy tasks become hard or impossible when unexpected problems arise.



Outer Wings, Engines & tail surfaces are removed

The Hard Part

The hardest part of the bomber to disassemble is the rear fuselage from the main fuselage. This is a massive seam where the two largest sections of this 16 ton bomber were connected. It is held in place by countless rivets and bolts, half of which are submerged half a year in water, for 61 years. Simply removing the these bolts would be hard enough, and take an unknown amount of time. Add to this the problem that with each bolt removed, the stress on the two pieces becomes greater and without a support jig [See below] the two sections would rip apart or break from their own weight.



Circle indicates position of the major seam to be jigged

Sections And Jigs

To understand the difficulty of disassembly of the B-17E, one must understand how it was put together. In Boeing's factory in Seattle, the aircraft, like all planes, was built in pieces. When completed, these pieces are assembled and riveted and bolted together, to make the joints strong. This was accomplished by putting the pieces into massive jigs to support them, and hold them in place while the work was completed. As the sections began to be joined, adjustments to the jigs were necessary to assure that the pieces did not bend or break from stress as they were joined.

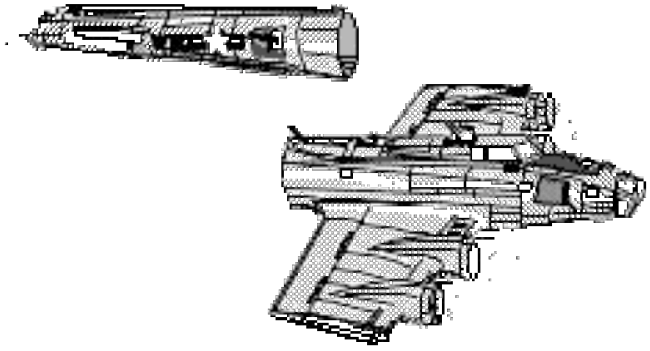
Jigs in the Swamp?

In order to disassemble a B-17, the same process would have to be undertaken, in the swamp. First, a jig for the tail section and fuselage would have to be taken to the site. Unlike the firm ground of a factory floor, keep in mind all of this work would have to be completed in a swamp, on ground that was either semi-firm or swampy. For anyone who has stood in a swamp, and shifted their weight from foot to foot we know how hard it is for a person to stand up.

Two Largest Parts – Rear Fuselage & Main Section
Even if disassembled without damage, the aircraft now would consist of two parts: 1) the rear fuselage and 2) the rest of the fuselage and wings.

The rear fuselage (approximately 3 tons) is probably within the lifting capability of any of the helicopters mentioned. But, corrosion to the bottom of the tail might mean that it has to be lifted inside a jig or closed container to prevent it from falling apart. The tail section might be damaged as soon as it is lifted, or removed from the main fuselage.

The main fuselage section and wings (approximately 10 tons) has two problems, its great weight, and irregular shape. This piece would be a major challenge for either the Chinook or MI-26 to lift. Any corrosion problems experiences with the outer wings or tail would be the worst on this section of the bomber, because it's the largest part of the plane, and it supported the most of the aircraft's weight.



Hardest parts – Rear Fuselage and Center Section

Problem #8 – Risks & Unknowns

The final greatest problem is the unknowns related to each of the above steps, and their cumulative difficulties. In the case of the "Swamp Ghost" recovery, it is easy to identify the main problems areas, but it is impossible to predict all the challenges a real recovery would face. Not to mention, other uncontrollable factors, such as the weather conditions, mechanical failures, health of workers, breakage of equipment.

Also, it is unclear what would happen if one of the above problems was unable to be solved. Would the team return on another occasion? What would happen if the project was only partially completed, or abandoned? Would PNG Museum and landowners still get the funds offered, or compensation? Who would be responsible to deal with accidents, damage or other catastrophic happenings? Would any tourists be interested in going to see a disassembled or broken bomber in a swamp?

Beyond Recovery, Static Display

Beyond recovery, if successfully done, would be the next equally daunting challenge: restoration. Experts agreed, that even just to restore the "Swamp Ghost" to a stadic condition would cost an unknown amount of time and money. It is interesting to note, that other B-17's have taken decades to restore, and millions of dollars. So, any recovery that also plans to restore the "Swamp Ghost" must also have an equally enormous budget to perform such a restoration.

Restoration to Flying

A proposal suggesting the restoration of the "Swamp Ghost" to flying condition would be almost impossible to estimate costs, time and effort. For comparison, the A-20 "Hell'N Pelican" recovered in 1984 cost the RAAF millions of dollars, and took from 1984 – 1996 to complete. The restoration of a P-38 recovered, perfectly intact from Greenland in 1992 took until 2003 to restore to flying condition, again for millions of dollars.

A B-17E like "Swamp Ghost" would cost exponentially more money, because it is a four engined bomber, and all the work related to it systems, engines and controls are exponentially greater. In aircraft restoration, there is an equation that the number of engines exponentially raises the cost of restoration. So, for instance, a two engine plane, like a P-38 would cost four times as much as a single engine airplane. A four engined plane, like a B-17 would cost sixteen times as much. This equation does not take into consideration the time required either, which would me measured in years or decades before any effort was completed. Furthermore, all too many warbird restoration projects have stalled, or been abandoned because they ran out of funds. Knowledge of the complexity of restoration has prompted even the most die-hard pro-restoration types to conclude "Swamp Ghost" could only be statically restored.

The impressive "Swamp Ghost"'s forward section & nose

4) VALUE OF THE "SWAMP GHOST" FOR PNG

Recovery is not the only option for the "Swamp Ghost". In fact, leaving the aircraft intact in the swamp has many benefits. As this evidence will prove, in this case leaving the

RECOGNIZED ICON

The B-17 "Swamp Ghost" is an internationally recognized symbol of WWII in PNG. It has even been pictured in a two-page spread in National Geographic's March 1992 issue. Even though it has never been promoted, or developed as a tourist icon, many have walked the swamp or rented helicopters in order to visit this marvel in its natural environment.

WHAT IS THE "SWAMP GHOST" WORTH?

One obvious question is "how much is the "Swamp Ghost" worth, in monetary value? Other crashed B-17E's also exist around the world, including several within PNG. Only four others B-17E (or earlier) models exist in the United States. Each organization or museum values their B-17 as being "priceless' in monetary value.

"Swamp Ghost' is valuable for the same reasons, and more. Its value is drawn from both the fact it is a rare WWII B-17E bomber, and also from what it is not – it is not restored, and left precisely where it came to rest 61 years ago. It draws additional value from the fact it is a world-class destination for those who want to step back in history, and see a relic of WWII.

There are many places one can go to see a real B-17, in museums or at air shows… but only in PNG can visitors see a real B-17E untouched since WWII.

FILM RIGHTS & ROYALTIES

Another source of income related to the aircraft are film & video rights related to it. Like other protected treasures, the museum could offer documentary crews or movies footage of the wreck as a way of generating revenue, provided their work did not harm or otherwise effect the aircraft.

Although the relic has appeared in several books and magazines, including National Geographic, the PNG Museum should prepare a policy or methodology for dealing with inquiries for filming of the wreck, and use these funds to help protect "Swamp Ghost", and other Modern History relics the country.

TOURIST VALUE

Niche tourism has become an expected part of tourism, especially in diverse countries like PNG. It would be very easy to make Swamp Ghost into a world-class destination, simply by promoting it as such.

Those who want to visit it are not looking for five-star hotels or amenities, rather a chance to see something that is unique to this country, in its natural environment. Increased tourism will help to benefit the local villages and people of Oro Province, who will serve as guides, rent canoes, and provide guesthouses for visitors. There are opportunities for the development of niche tourist services, like a swamp boat (fan driven boat) that would be able to quickly take people to the site and back.

Like the as the Huli Wigmen, and the bird of Paradise are internationally recognized symbols of PNG's cultural and natural treasures, there is no reason the intact B-17 "Swamp Ghost" can not join these ranks, and represent the struggle that occupied the skies, seas, and land of PNG from 1942 – 1945.

Other WWII sites have become icons in their respective provinces: the underwater wrecks in Kavieng and Rabaul, the Kokoda Trail, just to name a few. There is no reason why the "Swamp Ghost" should not be added to this list. "Swamp Ghost" is a timeless symbol of history and aviation that will only grow in popularity, with increased knowledge and promotion. Left undisturbed, there is no doubt the "Swamp Ghost" will be an icon into the distant future, and remain in virtually the same condition it crashed so long ago.

A tourist poses on the wing of "Swamp Ghost"
With the helicopter he rented for the visit

5) CONCLUSIONS

Since its rediscovery, there have been many proposals to recover the “Swamp Ghost”, likely; there will be others in the future.

No proposal fairly compensates PNG or the PNG Museum for the aircraft’s recovery, or grantees its ownership by the PNG government, despite the fact the world considers it to be a “priceless” aviation icon and artifact.

There are many problems and uncertainties related to the recovery of the “Swamp Ghost”, that no one can answers, because they have never been done before.

Any recovery operation, no matter how well funded or lead, might damage or destroy the aircraft, in the process, destroying the reason it is unique.

No aircraft like the “Swamp Ghost” has ever been successfully recovered. If anything was to go wrong with a recovery, it would be a tragedy, why take the risk?

Less rare B-17F and B-17G aircraft in the United States have been bought and sold for millions of dollars.

Letting the aircraft stay where it is, undisturbed in the swamp does not harm it, cost nothing, and insures it will remain in its present state, into the distant future.

People will support the PNG Museum in their stance to protect the Swamp Ghost” by leaving it in the swamp. Many more will come to PNG in order to visit this icon.

The wreck is far more than an airplane; it is a national symbol of WWII, and the history that forever impacted PNG and the world from 1942 – 1945.

The “Swamp Ghost” is a unique timeless treasure to both PNG and the world. It should be carefully protected and guarded by the Museum and government.

As a tourist site, unique to PNG, this wreck is also priceless. As broken or disassembled wreckage, it is worthless.

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