Aviators Down!

The Search for Tuskegee and Free French World War II Aircraft in Lake Huron

Final Performance Report for
R8R3ES1

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OVERVIEW

Grant Number: R8R3ES1

OER Funding Amount: $78,000

Project Title: Aviators Down! The Search for Tuskegee and Free French World War II Aircraft in Lake Huron

Area of Operation: Lake Huron, Alpena – Alcona – Iosco Counties, Michigan
(approx. area: 44.25° to 44.75° N, 83.0° to 83.4° W)

Grantee: Thunder Bay National Marine Sanctuary (TBNMS)
Superintendent, Jefferson Gray

Principle Investigator: Wayne R. Lusardi, MA
State Maritime Archaeologist
Michigan Department of Natural Resources (MDNR)

Mailing Address and Office Location

Thunder Bay National Marine Sanctuary
500 W. Fletcher Street
Alpena, Michigan 49707

Participating Institutions and Personnel:

Thunder Bay National Marine Sanctuary
John Bright, Research Coordinator
Phil Hartmeyer, Dive Safety Officer
Capt. Travis Smith, Vessel Captain
Stephanie Gandulla, Outreach Coordinator

Noble Odyssey Foundation
Capt. Luke Clyburn, *Pride of Michigan* Commanding Officer
U.S. Navy Sea Cadets

Airworthy Productions
Ric Mixter, Videographer

National Association of Black Scuba Divers
Ernie Franklin, Research Diver
Justine Benanty, Marine Archaeologist

Award Period From: 09/01/2017 **To**: 08/31/2018

SUMMARY

Abstract

During the 2018 field season, researchers at Thunder Bay National Marine Sanctuary (TBNMS) embarked upon an expedition in central Lake Huron entitled *Aviators Down! The Search for Tuskegee and Free French World War II Aircraft in Lake Huron.* This final report outlines the need and purpose of the expedition, details the scope of work undertaken, and describes the findings, accomplishments, and milestones achieved. Through various methods, the project team collected physical data at a number of areas within Lake Huron that may contain submerged archaeological sites; this data is defined and its plan for public access is delineated. Public outreach was a key component, and the report lists public presentations and media coverage of the expedition. Finally, the report suggests future work and research opportunities stemming from the expedition to locate missing World War II aircraft.

Purpose of Project

Nearly 200 military aircraft were lost in the Great Lakes during World War II. The vast majority of accidents occurred in lower Lake Michigan where Navy aviators attempted to qualify for carrier takeoffs and landings. The Army also lost pilots and aircraft in Lake St. Clair and Lake Huron. Dozens of foreign pilots including French and Norwegian exiles training in North America were also lost over water. Although many of the WWII aircraft wrecked in the Great Lakes have been recovered, the majority have not yet been found.

During the middle years of World War II, Michigan was home to several African-American Army Air Corps units, including graduates of the Tuskegee pilot training program. The pilots received advanced training, simulating aerial combat and bombing exercises over Lake Huron. The relative safety of mid-Western America, along with weather and geographical conditions that approximated what aviators could expect to encounter in Europe, encouraged the military to use airfields at Selfridge northeast of Detroit, and at Camp Skeel near Oscoda. Upon completion of training in Michigan, many Tuskegee airmen were immediately deployed to combat or support missions in Italy, North Africa and the Mediterranean. In May 1944, the Army transferred all remaining Tuskegee fighter pilots from Michigan to South Carolina, essentially ending the Tuskegee presence in Michigan. Almost immediately the vacated bases at Selfridge and Oscoda were populated with Free French fighter pilots training in America while their homeland was occupied by Nazi Germany.

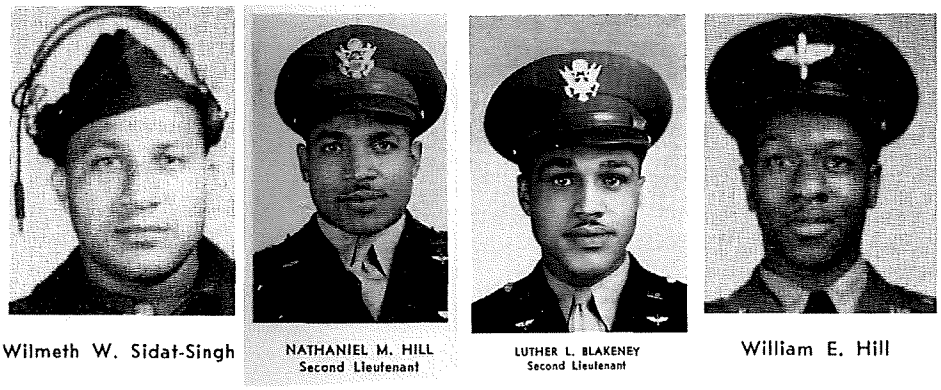


Figure 1. Tuskegee airmen Lt. Wilmeth W. Sidat-Singh, Lt. Nathaniel M. Hill, Lt. Luther L. Blakeney, and Lt. William E. Hill; all lost in Lake Huron training accidents. U.S. Army Air Corps.

The potential for Tuskegee airmen-related archaeological sites worldwide is low. Outside of Tuskegee Army Airfield itself, very few places where Tuskegee airmen trained, fought or occupied are conducive for archaeological research. Although many Tuskegee aircraft were involved in accidents that resulted in loss of the pilot and airframe, the material remains were usually recovered, leaving little if any trace of the resultant disaster. Aircraft that went missing are a notable exception. Two airplanes, both Bell P-39Q Airacobras, have recently been discovered in Michigan waters. Both were lost in training accidents and both were hidden beneath the water for many decades. Lt. Frank Moody was killed when his airplane (42-21226) crashed north of Port Huron on April 11, 1944, and Lt. Nathaniel Rayburg was killed when his Airacobra (42-21249) crashed in Lake St. Clair on December 12, 1943. At least three additional aircraft flown by Tuskegee airmen remain hidden in Lake Huron: A Curtiss P-40F Warhawk (41-13655) flown by 2nd Lt. Wilmeth W. Sidat-Singh crashed in Lake Huron off East Tawas on May 9, 1943. A Vultee BT-13A Valiant (42-42926) piloted by 2nd Lt. Nathaniel Milton Hill with weather observer 2nd Lt. Luther Linson Blakeney on board crashed in Lake Huron 2 miles off Oscoda on June 16, 1943. The Bell P-39Q Airacobra (42-21242) piloted by 2nd Lt. William E. Hill crashed into Lake Huron off Harrisville on November 22, 1943. The bodies of all of the pilots, with the exception of 2nd Lt. William E. Hill, have been recovered.

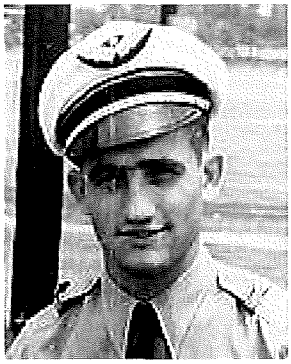


Figure 2. Free French airman Sgt. Francois Messinger. U.S. Army Air Corps.

Similarly, Free French airmen lost five Republic P-47D Thunderbolts in Lake Huron, and two other aircraft in Lake St. Clair. Sgt. Francois Messinger was killed when his Republic P-47D

Thunderbolt (42-74776) crashed near Sturgeon Point on September 17, 1944. Messinger's body was immediately recovered. During the summer of 1948, Oscoda Army Air Base was used as the filming location for a World War II fictional documentary entitled Fighter Squadron. Several dozen WWII veteran Republic P-47D Thunderbolts were used in the filming, and one piloted by Georgia Air National Guardsman 2nd Lieutenant Louie A. Mikell was lost off Greenbush on June 1, 1948. Mikell's airplane, like the ones flown by Sgt. Messinger and Lt. William E. Hill, is almost certainly within Thunder Bay National Marine Sanctuary. The planes flown by Lt. Wilmeth W. Sidat-Singh and Lt. Nathaniel Milton Hill were lost along the southern border of the marine sanctuary on lake bottomlands administered by the State of Michigan, a joint management partner of Thunder Bay National Marine Sanctuary.

Figure 3. Georgia Air National Guard P-47s, Oscoda AAF. U.S. Army Air Corps.

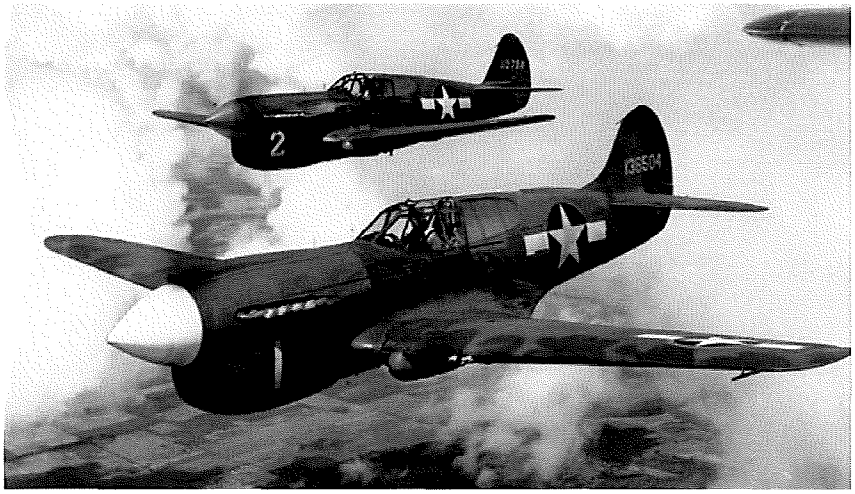


Figure 4. Curtiss-Wright P-40F Warhawk. The P-40F Warhawk, built by Curtiss-Wright Corporation, was the first pursuit or fighter aircraft flown by Tuskegee airmen training in Michigan. U.S. Army Air Corps.

The P-40F Warhawk, built by Curtiss-Wright Corporation, of Buffalo, New York, was the first pursuit or fighter aircraft flown by Tuskegee airmen training in Michigan. The Warhawk was 31.67 feet in length, had a 37.33-foot wingspan, and was powered by an Allison V-1710-39 liquid-cooled V12, 1,150hp engine. The aircraft was armed with six .50 cal. M2 Browning machine guns, and could deploy 250 to 1,000 lbs. of bombs. Although the Warhawk could reach a speed of 360 mph, had a range of 650 miles and a ceiling of 29,000 feet, engine problems resulted in the loss of many aircraft and pilots, forcing the Army to replace the aging aircraft with the Bell P-39 Airacobra.

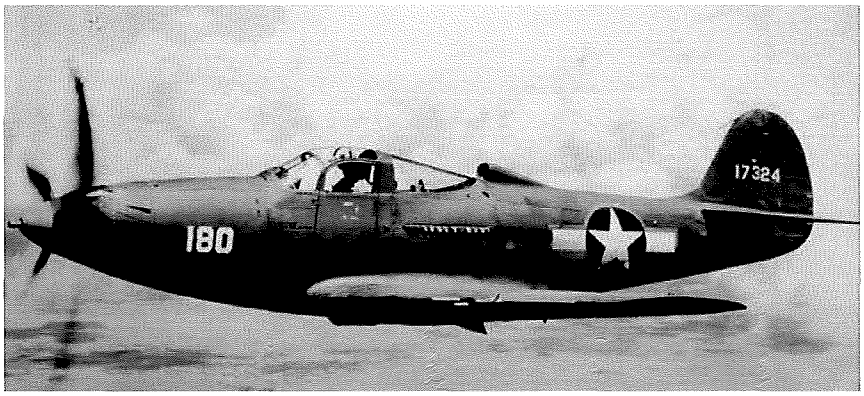


Figure 5. Bell P-39 Airacobra. The P-39Q Airacobra, a single seat plane that was primary aircraft used by Tuskegee airmen over Michigan beginning in September 1943. U.S. Army Air Corps.

The primary aircraft used by Tuskegee airmen over Michigan beginning in September 1943 was the P-39Q Airacobra. Manufactured by Bell Aircraft Corporation of Buffalo, New York, the Airacobra was 30.1 feet in length, 12.4 feet in height, and had a wingspan of 34 feet. The single seat airplane had a range of 650 miles, could reach speeds of 385 mph, and could climb to 35,000 feet. The Airacobra was conceived by Bell Aircraft Corporation around its armament, with the engine behind the pilot, necessary because the heaviest piece of ordnance ever mounted on a single-engine plane, the 37mm cannon firing through the propeller hub, filled most of the space in the nose of the aircraft. This arrangement resulted in a greater field of vision for the pilot. In addition to the cannon, the P-39Q featured an armament of four .50cal. machine guns; two located in the forward fuselage that were synchronized to fire through the propeller blades, and two located in pods, one under each wing. The aircraft could also carry a 500lb. bomb or a drop fuel tank.

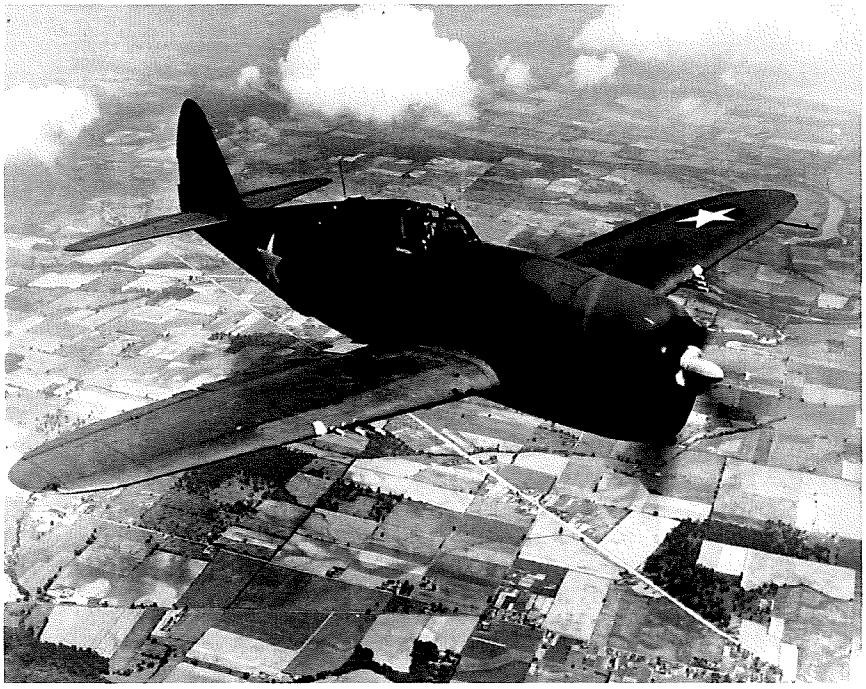


Figure 6. Republic P-47D Thunderbolt. U.S. Army Air Corps.

The P-47D Thunderbolt utilized by Free French pilots in Michigan was manufactured by Republic Aviation Corporation of Farmingdale, New York. The aircraft was powered by a Pratt & Whitney R-2800-59 Double Wasp, 18-cylinder radial, air-cooled, 2,000hp engine and could reach a speed of 428 mph. It had a range of 475 miles and could climb to 42,000 feet. The aircraft was armed with up to eight machine guns, and could deploy 2,000 lbs. of bombs.

Figure 7. The Vultee BT-13A Valiant served as a trainer and weather observation aircraft. U.S. Army Air Corps.

The BT-13A Valiant served as a trainer and weather observation aircraft. Manufactured by Vultee Aircraft Corporation of Los Angeles, California, the aircraft was 28.9 feet in length, had a 42-foot wingspan, and was powered by a Pratt & Whitney R-985-AN-1 nine-cylinder air-cooled

radial engine. The airplane could cruise at 180 mph with a range of 725 miles, and could ascend to 21,650 feet.

The 2018 OER-funded expedition utilized existing methodologies in the deployment of remote survey systems with the goal of detecting small, disarticulated archaeological sites on a geologically diverse lake floor. The project consisted of five individual survey missions, referenced as Survey Areas 1-5. Following remote sensing and target acquisition, divers were deployed to ground truth targets. The overall project stated three primary goals:

1. To emphasize the importance of World War II related cultural heritage within and adjacent to Thunder Bay National Marine Sanctuary.

2. To develop archaeological survey methodologies to locate and characterize small, disarticulated aircraft sites.

3. To create and develop new partnerships between NOAA and other academic and governmental agencies that will facilitate the exploration and characterization of Lake Huron's maritime and aviation heritage.

Four objectives served the project's goals:

1. Utilize available historic research to delineate areas of Lake Huron likely to hold the remains of World War II Tuskegee and Free French aircraft.

2. Conduct acoustic, magnetic and visual survey with intent to locate World War II cultural resources.

3. Conduct archaeological documentation of any aircraft and associated materials that may be encountered during survey using the highest resolution methods available including 3D photo-modeling and hand mapping to capture these features in the greatest possible detail.

4. Enhance awareness of Michigan's contribution to World War II through student involvement at the high school and collegiate level, while also training students in the methodologies of exploring and documenting cultural resources underwater.

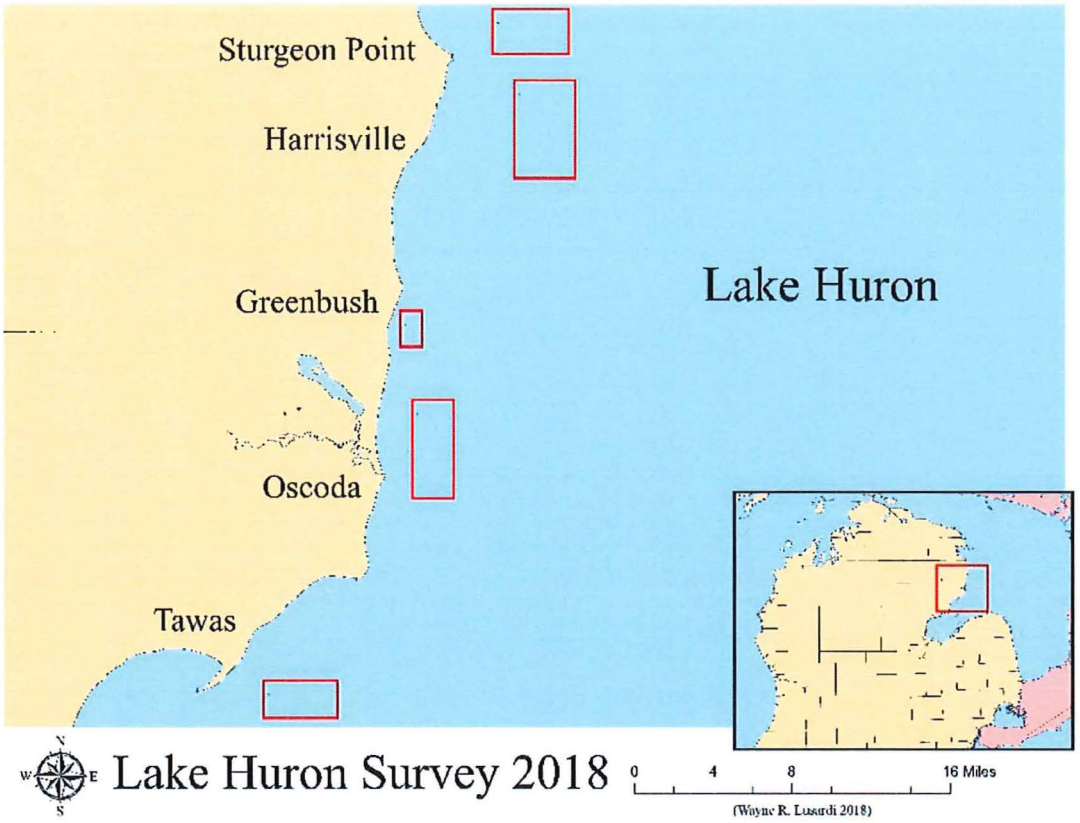


Figure 8. A geospatial analysis of historical records determined five areas of Lake Huron where missing Tuskegee and Free French aircraft were likely to have crashed. Three of the areas are within Thunder Bay National Marine Sanctuary. MDNR, Wayne R. Lusardi.

Approach and Findings

A geospatial analysis of historical records determined five areas of Lake Huron within and adjacent to Thunder Bay National Marine Sanctuary where missing World War II training aircraft are likely to be located. None of the five areas of Lake Huron had been previously surveyed. The proposed survey areas were defined using ArcGIS and uploaded to a NOAA research vessel's HYPACK navigational software. The NOAA Great Lakes Environmental Research Laboratory (GLERL) ship R/V *Storm* (R5002), is equipped with a Kongsberg Multibeam sonar, a Klein 3000 side scan sonar, and a Geometrics G-882 cesium-vapor magnetometer. 50m line spacing was chosen as the optimal coverage for the instruments. R/V *Storm* served as the primary platform to conduct the remote sensing survey of Lake Huron off Alcona and Iosco Counties in Michigan. A fulltime boat captain and the Michigan State Maritime Archaeologist, occasionally assisted by additional TBNMS staff, conducted the survey over 19 calendar days from June 27 to September 26, 2018. All five areas of Lake Huron were surveyed to some extent using some or all of the remote sensing equipment. A total of 583 acoustic and/or magnetic anomalies, some duplicates, were recorded during the survey. Of the 92 targets that were ground truth by divers (15.8% of the total), all but two were geological features including glacial clay deposits, angular boulders, and bedrock outcrops. A 19th-century windlass and anchor connected by chain, and a military tow target from the 1950s, were the only cultural materials identified during the 2018 season.

SURVEY AREA 1 Sturgeon Point

Survey Area 1 off Sturgeon Point, Alcona County, Michigan, is the location where a Republic P-47D Thunderbolt (42-74776) piloted by Free French Sgt. Francois Messinger, was lost September 17, 1944. The proposed survey area comprised a rectangle 1 mile in length (northwest-southeast) by 0.75 miles in width (southwest-northeast), in water ranging from 15-100 feet in depth.

Side scan sonar, multibeam and magnetometer survey of Area 1 was conducted on June 27-28, 2018. As no promising anomalies were located, the survey area was expanded in all directions to triple its size. After receiving local reports of possible wreckage, two smaller survey blocks were added, one off Black River north of Sturgeon Point, and one immediately south-southeast of the Sturgeon Point Lighthouse. The additions were surveyed using side scan sonar only on August 7-9, 16, and 20, 2018. A total of 206 acoustic and/or magnetitic anomalies were recorded in Survey Area 1.

Figure 9. Almost 600 anomalies were recorded during the remote sensing survey of Lake Huron. Most turned out to be geologic in origin. Glacial clay deposits dating from the creation of the Great Lakes were abundant and acoustically appeared as lines and angles on the lake bottom. Some of the clay features were over 60 feet in length. NOAA, John Bright.

Diving off R/V *Storm*, MDNR archaeologist Wayne R. Lusardi and TBNMS archaeologist John Bright investigated 4 priority targets in Area 1 on July 2, 2018. All targets were glacial clay deposits. Diving off the US Navy Sea Cadet vessel, *Pride of Michigan*, 14 Sea Cadets and archaeologist Wayne R. Lusardi investigated 10 targets in Area 1 on July 30, 2018, 14 targets in Area 1 on July 31, 2018, 17 targets in Area 1 on August 1, 2018, and 12 targets in Area 1 on August 2, 2018. All targets were geological rock formations or glacial clay deposits. Diving off the NOAA vessel R3011, volunteer divers Ernie Franklin and Justine Benanty of the National Association of Black Scuba Divers, and MDNR archaeologist Wayne R. Lusardi and TBNMS diver Stephanie Gandulla, investigated 10 targets in Area 1 on August 28, 2018. All targets were geological rock formations. Only 67 of the 206 (32.5%) targets were ground truth in Area 1.

SURVEY AREA 2 Harrisville

Survey Area 2 off Harrisville, Alcona County, Michigan, is the location where a Bell P-39Q Airacobra (42-21242) piloted by Tuskegee Airman 2nd Lt. William E. Hill, was lost November 22, 1943. The survey area comprised a rectangle 3 miles in length (north-south) by 2 miles in width (west-east), in water ranging from 40-80 feet in depth.

Side scan sonar, multibeam and magnetometer survey of Area 2 was conducted on July 19, 2018 and resulted in the recording of 7 acoustic and/or magnetic targets. Survey was also conducted using side scan sonar only on July 23, 2018 that resulted in the recording of 26 acoustic targets, on July 24, 2018 that resulted in the recording of 40 acoustic targets, on July 25, 2018 that resulted in the recording of 37 acoustic targets, and on July 26, 2018 that resulted in the recording of 22 acoustic targets. A total of 132 acoustic targets were recorded in Survey Area 2.

Diving off R/V *Storm*, MDNR archaeologist Wayne R. Lusardi and TBNMS diver Phil Hartmeyer investigated 5 targets in Area 2 on July 26, 2018. All targets were geological rock formations. Diving off the US Navy Sea Cadet vessel, *Pride of Michigan*, Captain Luke Clyburn and archaeologist Wayne R. Lusardi investigated 1 target in Area 2 on July 31, 2018. The target was a collection of five glacial clay deposits, two greater than 60 feet in length by 20 feet in width, and 8 feet in height. Diving off the NOAA vessel R3011, volunteer diver Ernie Franklin of the National Association of Black Scuba Divers, and TBNMS diver Stephanie Gandulla, investigated 3 targets in Area 2 on August 29, 2018. All targets were geological rock formations or glacial clay deposits. Only 9 of the 132 (6.8%) targets were ground truth in Area 2.

SURVEY AREA 3 Greenbush

Survey Area 3 off Greenbush, Alcona County, Michigan, is the location where a Republic P-47D-40-RA Thunderbolt (44-90339) piloted by Georgia Air National Guardsman 2nd Lieutenant Louie A. Mikell, was lost June 1, 1948. The survey area comprised a square 1 mile in length (north-south) by 1 mile in width (west-east), in water ranging from 10-30 feet in depth.

Side scan sonar, multibeam and magnetometer survey of Area 3 was conducted on June 30, 2018 and resulted in the recording of 3 acoustic and/or magnetic targets. Survey of Area 3 was continued using side scan sonar only on August 20, 2018 that resulted in the recording of 15 acoustic targets, and on September 6, 2018 that resulted in the recording of 10 acoustic targets. A total of 28 acoustic targets were recorded in Survey Area 3.

Figure 10. With several hundred shipwrecks still unaccounted for in the Great Lakes, it was not surprising to find historic wreckage. A 19th-century wooden stock anchor remains set in the lake bottom. MDNR, Wayne R. Lusardi.

Diving off the NOAA vessel R3011, volunteer diver Ernie Franklin of the National Association of Black Scuba Divers, and MDNR archaeologist Wayne R. Lusardi, investigated 8 targets in Area 3 on August 29, 2018. Seven of the targets were geological rock formations. One target consisted of the ground tackle from a 19th-century vessel including an anchor, wooden windlass, and chain. The artifacts were not associated with other wreckage and may not be representative of a shipwreck, but rather a loss of equipment. Only 8 of the 28 (28.6%) targets were ground truth in Area 3.

SURVEY AREA 4 Oscoda

Survey Area 4 off Oscoda, Iosco County, Michigan, is the location where a Vultee BT-13A Valiant (42-42926) piloted by Tuskegee Airmen 2nd Lt. Nathaniel Milton Hill with weather observer 2nd Lt. Luther Linson Blakeney on board, was lost June 16, 1943. The search area may also be the location of a US Air Force Lockheed F-94C-1-LO Starfire (50-1059) lost March 16, 1957 with Lt. Nicolay and Lt. Lewis on board. The survey area comprised a rectangle 4 miles in length (north-south) by 2 miles in width (west-east), in water ranging from 20-70 feet in depth.

Side scan sonar survey of Area 4 was conducted on September 11, 2018 and resulted in the recording of 38 acoustic targets, on September 13, 2018 that resulted in the recording of 34

acoustic targets, and on September 14, 2018 that resulted in the recording of 21 acoustic targets. A total of 93 acoustic targets were recorded in Survey Area 4. The survey of Area 4 was only partially completed and will require additional remote sensing next season.

Diving off R/V *Storm*, MDNR archaeologist Wayne R. Lusardi and TBNMS diver Stephanie Gandulla, investigated 3 targets in Area 4 on September 12, 2018. All targets were geological rock formations or glacial clay deposits. Only 3 of the 93 (3.2%) targets were ground truth in Area 4.

SURVEY AREA 5 Tawas

Survey Area 5 off East Tawas, Iosco County, Michigan, is the location where a Curtiss P-40F Warhawk (41-13655) piloted by Tuskegee Airman 2nd Lt. Wilmeth W. Sidat-Singh, was lost May 9, 1943. The survey area comprised a rectangle 2 miles in length (northeast-southwest) by 1.5 miles in width (northwest-southeast), in water ranging from 40-80 feet in depth.

Side scan sonar, multibeam and magnetometer survey of Area 5 was conducted on June 28, 2018 and resulted in the recording of 40 acoustic and/or magnetic targets. Survey of Area 5 using only side scan sonar continued on September 25, 2018 and resulted in the recording of 66 acoustic targets, and on September 26, 2018 that resulted in the recording of 18 acoustic targets. A total of 124 acoustic targets were recorded in Survey Area 5. The survey of Area 5 was only partially completed and will require additional remote sensing in the future.

Only 5 of the 124 (4.0%) targets were ground truth in Area 5. Diving off R/V *Storm*, MDNR archaeologist Wayne R. Lusardi and TBNMS archaeologist John Bright investigated 5 targets (all the same object) in Area 5 on July 2, 2018. Diving off R/V *Storm*, MDNR archaeologist Wayne R. Lusardi and TBNMS diver Stephanie Gandulla investigated several targets in Area 5 on September 12, 2018. Additional investigation is required.

Summary of Digital Data Collected:

	Bathymetric Mapping	Field Images
Data Type	Raw Sonar Files (.SDF and .XTF)	Still Photographs, Videos (.NEF and .JPG and .MP4)
Size of Archive	175 GB	1.12 GB
Data Type	Sonar Wiz Project Files	
Size of Archive	28.4 GB	
Data Type	Hysweep	
Size of Archive	24.8 GB	
Data Type	Processed Data Archive	
Size of Archive	4.47	

All data from the project will be housed and managed in the TBNMS cultural resource GIS database, allowing for a wide range of research or management queries, producing on-demand products, and fuller integration into the sanctuary's management plan and decision making. Maps and environmental data produced and collected throughout this project will be made available to the public via the National Centers for Environmental Information website.

Notation of Major Changes / Adjustments to Previously Submitted Documents

None during the period of this report.

Prior Changes / Adjustments

None during the period of this report.

EVALUATION

Accomplishments

This project succeeded in meeting the stated goals and objectives, as outlined herein:

1. To emphasize the importance of World War II related cultural heritage within and adjacent to Thunder Bay National Marine Sanctuary. As World War II becomes a distant memory, fewer Americans realize the contributions made by an entire generation, and by small towns and large cities across the nation. Michigan was the "Arsenal of Democracy" and Michigan factory workers produced tens of thousands of jeeps, tanks, and aircraft. The Great Lakes also served as a training ground for pilots and flight crews, and unfortunately, many were killed in aircraft accidents. This project succeeded in emphasizing Michigan's contribution to the war effort, and revealed the Tuskegee Airmen's and Free French presence in the region, the hardships they faced, and the human tragedy resulting from fatal accidents in the Great Lakes.

2. To develop archaeological survey methodologies to locate and characterize small, disarticulated aircraft sites. This project involved numerous methods for archaeological survey data collection, processing, visualization, and interpretation. As a result, large areas of potentially complex, disarticulated archaeological depositions were rapidly and accurately captured and assessed. Combined use of acoustic, magnetic, and photographic survey provided an expedient methodology for capturing archaeological sites and the surrounding geological features. Acoustic scanning provided the detailed, contextual view of the lake floor and potential cultural materials, while diver-based photographic documentation provided detailed views of lake floor structures, including several human-made objects.

3. To create and develop new partnerships between NOAA and other academic and governmental agencies that will facilitate the exploration and characterization of Lake Huron's maritime and aviation heritage. This project leveraged new partnerships bringing NOAA assets and expertise to the exploration of Lake Huron's archaeological resources. Partnerships were established with the Michigan Department of Natural Resources, NOAA GLERL, the U.S. Navy Sea Cadet Program, Noble Odyssey Foundation, and the National Association of Black Scuba Divers. Each of these partners provided specialized tools and expertise to aide in the exploration of near-shore environments that had not been previously surveyed for submerged aviation and maritime resources.

The primary pre-survey objective was to utilize available historic research to delineate areas of Lake Huron likely to hold the remains of World War II Tuskegee and Free French aircraft. U.S. Army Air Corps accident reports, Coast Guard records, newspaper accounts, and family histories were searched in an attempt to determine which aircraft wrecked where, whether the airframes had been recovered, and, if not, to narrow down the potential search areas.

Following the determination of five primary search areas likely to hold the remains of historic aircraft wreckage, the second objective commenced which included acoustic, magnetic, and visual survey with intent to locate World War II cultural resources in Lake Huron off Alcona and Iosco Counties in Michigan.

The final objective, enhancing awareness of Michigan's contribution to World War II through student involvement at the high school and collegiate level, while also training students in the methodologies of exploring and documenting cultural resources underwater, was also met by deploying U.S. Navy Sea Cadet divers to ground truth dozens of acoustic and magnetic anomalies. The Sea Cadets ranged in age from 12 to 18 and originated from locations throughout the state of Michigan. Their primary dive platform was the training vessel, *Pride of Michigan*, a Navy yard patrol boat based at Mt. Clemens, Michigan, on Lake St. Clair. All of the Sea Cadets are registered divers with the American Academy of Underwater Sciences (AAUS) and the Principal Investigator, Wayne R. Lusardi, trained them in basic underwater archaeological methodologies including material remains identification, scaled drawings, video and photographic documentation, and assertation of precise submerged locations using GPS.

Milestones achieved:

1. The project characterized unknown areas of the Great Lakes and provided initial information about World War II archaeology in Lake Huron.

2. World War II resources that are potentially located within NOAA's Thunder Bay National Marine Sanctuary have not yet been studied or fully realized. The discovery of artifacts, namely aircraft, related to World War II, will fundamentally stimulate future research in this understudied area.

3. Methods developed during the project contributed to the broader discipline of aviation archaeology, and help to inform cultural resource management on State of Michigan bottomlands in and adjacent to NOAA's Thunder Bay National Marine Sanctuary.

4. Bottom mapping of 18.75 sq. mi. (48.6 sq. km.) of unexplored Marine Sanctuary and State of Michigan bottomlands off Alcona County in the southern extent of the sanctuary. This survey connected gaps between several legacy data sets, creating a large contiguously surveyed area of Alcona County, and potions of Iosco County to the south.

5. Establishment/continuation of critical scientific partnerships with the Michigan Department of Natural Resources, the U.S. Navy Sea Cadet Program, the Noble Odyssey Foundation, and the National Association of Black Scuba Divers.

6. Inclusion of a diversity of participants representing a variety of cultural heritages, gender, age groups, governmental organizations, academia, private sector, active duty and veteran military personnel, and volunteers.

Next Steps

Survey Area 1 off Sturgeon Point, survey Area 2 off Harrisville, and survey Area 3 off Greenbush were surveyed in their entirety using side scan sonar. Only 67 of the 206 (32.5%) targets were ground truth in Area 1, only 9 of the 132 (6.8%) targets were ground truth in Area 2, and only 8 of the 28 (28.6%) targets were ground truth in Area 3. A total of 282 acoustic targets in these three areas remain to be investigated.

Survey Area 4 and survey Area 5 were only partially completed (approximately 50% in each area) and will require additional remote sensing. Only 3 of the 93 (3.2%) targets were ground truth in Area 4, and only 5 of the 124 (4.0%) targets were ground truth in Area 5. A total of 209 acoustic targets in these two areas remain to be investigated.

Additional targets may be identified through post processing of data following the completion of the 2018 field season, and more targets are likely to be recorded during future remote sensing.

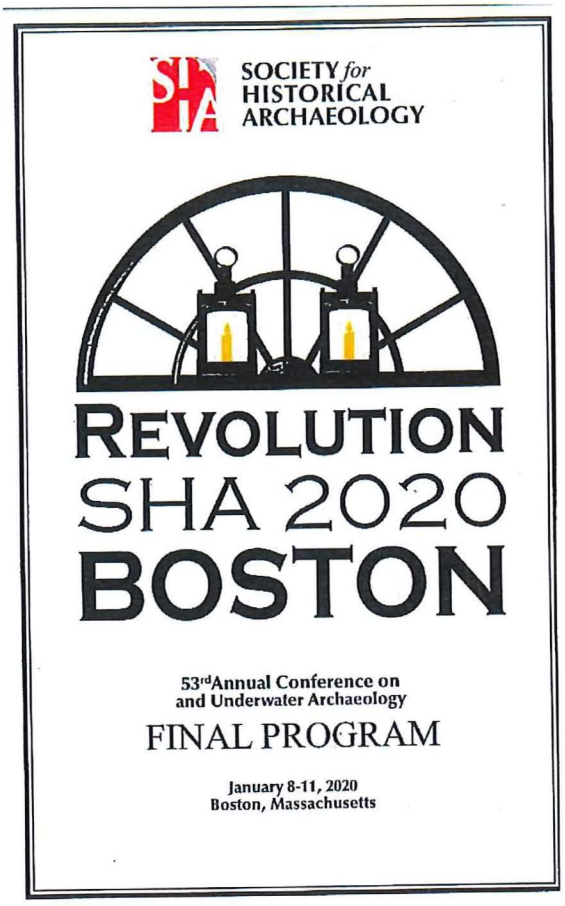
Ground truthing of targets in 2018 consisted of acquiring coordinates from unprocessed geo-tiff target images, using a GPS to mark the location with a buoy, and then sending divers down to visually survey the area. Digital imagery and video was recorded on most targets. Late season visibility in Lake Huron was reduced because of algae blooms in warmer water making individual searches more time consuming. Post processed more accurate coordinates and clearer water in spring and early summer will expedite the locating of targets.

Prepared By: Wayne Rusardi 28 APRIL 2022

Signature of Principle Investigator Date

Appendix A: Sample Conference Program

11 January 2020
Host: Society for Historical Archaeology, Boston, Massachusetts
Event: 53rd Conference on Historical and Underwater Archaeology
Presenter: Wayne R. Lusardi



SYMPOSIUM:
STRIDES TOWARDS STANDARD METHODOLOGIES IN AERONAUTICAL ARCHAEOLOGY
[SYM-47] 8:00 a.m. – 12:0 p.m. (Commonwealth)
Organizers: Hunter Whitehead, Megan Lickliter-Mundon, Timmy Gambin
Chairs: Hunter Whitehead, Megan Lickliter-Mundon, Timmy Gambin

8:00 a.m. – 8:15 a.m. *Christopher R. Eck*, Broken Wings, Recovered Souls: Understanding Site Formation Processes and Developing a Lexicon for Terrestrial Military Aircraft Crash Site Types Associated with the Recovery of Missing Personnel Remains
8:15 a.m. – 8:30 a.m. *Anna V. McWilliams*, Moving Between Disciplines: Investigations Of Crashed Aircrafts in Archaeology and Forensics
8:30 a.m. – 8:45 a.m. *Megan Lickliter-Mundon, Pat Scannon, Mark Moline, Anthony Burgess*, Evolving Partnerships for Underwater Aircraft Research and Survey
8:45 a.m. – 9:00 a.m. *Jack A. Adamson*, The Tanapag PBM Mariner: Aircraft Identification through Site Formation Processes
9:00 a.m. – 9:15 a.m. *Russell E. Matthews, James P. Delgado, Megan E. Lickliter-Mundon, Michael L. Brennan, John G. Lambert*, Archaeological Investigation and Identification of USS Independence Aircraft Through Telepresence-Enabled Exploration
9:15 a.m. – 9:30 a.m. *Anthony J. Burgess*, Flying High In An Unfriendly Sky: The Aviation Cultural Landscape of Malta During The Second World War
9:30 a.m. – 9:45 a.m. *Adrian P. Hunt*, Patterns Of Preservation In WWII Aircraft And Their Importance
9:45 a.m. – 10:00 a.m. Break
10:00 a.m. – 10:15 a.m. *Nancy E. Binnie, Erin Gregory*, Mystery Rocket Recovered From Lake Ontario: *Avro Arrow* Or Other Cold War Relic?
10:15 a.m. – 10:30 a.m. *Wayne R. Lusardi*, Aviators Down! Tuskegee Airmen in Michigan
10:30 a.m. – 10:45 a.m. *Matthew L. Hanks, David L. Conlin*, Lake Mead's Cold War Legacy: The Aviation Archeology of a Secret Mission
10:45 a.m. – 11:00 a.m. *Lisa M. Daly*, Engaging the Public at the Crossroads of the World: Methods and Site Preservation of Aviation Archaeology Sites in Newfoundland and Labrador, Canada
11:00 a.m. – 11:15 a.m. *Peter D. Fix*, Two TBD-1s *Devastators* BuNo. 0298 and BuNo 1515; Fifteen Years of *In Situ* Monitoring, Documentation and Planning.
11:15 a.m. – 11:30 a.m. *Kees Beemster Leverenz, Megan Lickliter-Mundon, Maurice Major, Kate Morrand, Alexis Catsambis*, Monitoring Underwater Aircraft in Washington State
11:30 a.m. – 11:45 a.m. *Adam Fracchia, Sarah Grady, Claudia Theune, Peter Hinterndorfer, Marilyn London, Katie Boyle, Claire Seeley*, Building Collaboration and Sustaining Partnership for the Recovery of Missing American Airmen from the Second World War in Austria
11:45 a.m. – 12:00 p.m. *Hunter W. Whitehead*, Developments in Methodology in Aeronautical Archaeology

Appendix B: Presentations and Publications by Wayne R. Lusardi

2022 (In Press)

"Lake Huron Red Tails! Tuskegee Airmen in Michigan." *Strides Towards Standard Methodologies in Aeronautical Archaeology*. Springer.

2022 (In Press)

"Lake Huron Red Tails! Tuskegee Airmen in Michigan." *Post-Contact Archaeology of the Great Lakes Region*. Alabama Press.

2022 (March-April)

"Recovery & Remembrance: Lieutenant Moody and the Lake Huron Red Tails." *Michigan History*, vol. 106.2 (March-April 2022): 60-62.

2022

"Red Tails, Blue Water: The Tuskegee Airmen Project." NOAA National Marine Sanctuaries Webinar Series (https://sanctuaries.noaa.gov/education/teachers/red-tails-blue-water-the-tuskegee-airmen-project.html).

11 November 2021

"Tuskegee Airmen in Michigan." Nautical Archaeology Society, London.

23 October 2021

"Lake Huron Red Tails!" Michigan Archaeology Day, Michigan History Center, Lansing, Michigan.

2021

"Honoring the Tuskegee Airmen in Michigan." Showcasing the State of Michigan DNR (https://content.govdelivery.com/accounts/MIDNR/bulletins/2f562a9).

2021

"Tuskegee Airmen: A WW2 Pilot's Story." History Hits Dan Snow, London, England (https://play.acast.com/s/dansnowshistoryhit/tuskegeeairmen-aww2pilotsstory).

14 May 2021

"Tuskegee Aircraft Archaeological Sites in Michigan." Michigan Historic Preservation Network.

31 March 2021

"The Tuskegee Airmen Project." Michigan State University, Lansing, Michigan (https://mediaspace.msu.edu/media/Tuskegee%20Airmen/1_dzy0x8ug).

February 2021

"Lake Huron Red Tails." Michigan Department of Natural Resources Black History Month (https://www.facebook.com/watch/?v=175175827442155).

2020

"Aviators Down! Tuskegee Airmen in Michigan." *ACUA Underwater Archaeology Proceedings 2020*, edited by Victor Mastone and Calvin Mires. Society for Historical Archaeology: 159-164.

26 February 2020

"Military Aircraft in the Great Lakes." Central Michigan University, Mt. Pleasant, Michigan.

11 January 2020

"Aviators Down! Tuskegee Airmen in Michigan." Society for Historical Archaeology Conference, Boston, Massachusetts.

June 2019

"Aviators Down!" *Earth is Blue*, vol. 4 (June 2019).

March 2019

"Aviators Down! The Search for Tuskegee and Free French World War II Aircraft in Lake Huron." *New Frontiers in Ocean Exploration*, vol. 32, no. 1, (March 2019): 122.

2018

Aviators Down: Survey Summary. NOAA Ocean Exploration and Research (https://oceanexplorer.noaa.gov/explorations/18aviatorsdown/welcome.html).

2018

World War II Aircraft Lost in the Great Lakes. NOAA Ocean Exploration and Research (https://oceanexplorer.noaa.gov/explorations/18aviatorsdown/history.html).

22 May 2018

"Tuskegee Airmen in Michigan Roll Call." Michigan State Capitol Rotunda, Lansing.

18 April 2018

"Tuskegee Airmen in Michigan." Michigan Maritime Museum, South Haven, Michigan.

14 April 2018

"Tuskegee Airmen in Michigan." Wayne State University Planetarium Series, Detroit.

28 October 2017

"Aviation Archaeology in Michigan." Michigan Archaeology Day, Lansing, Michigan.

Appendix C: Print and Digital Media Coverage

2022

"Honoring Tuskegee Airmen." Michigan Warden (https://vimeo.com/672094111).

21 October 2021

"Lake Huron Red Tails." By Nick Lusardi (https://www.youtube.com/watch?v=foh0CXZbWTQ).

29 April 2021

"Making a splash: Airborne history-makers and the Great Lakes." By Rosalie Currier. Sturgis Journal (https://www.sturgisjournal.com/story/news/2021/04/29/sturgis-airborne-history-makers-nearly-landed-great-lakes/7329813002/).

18 April 2021

"Two Tuskegee Red Tails Discovered In Lake Huron & St. Clair River. By Michael Hardy. *Thumbwind* (https://thumbwind.com/2021/04/18/tuskegee-red-tail-lake-huron/).

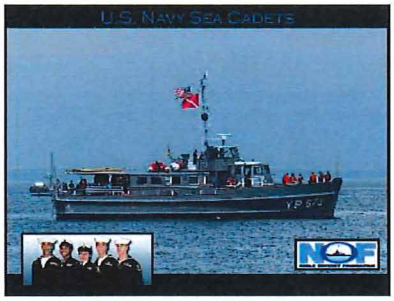
Spring 2020

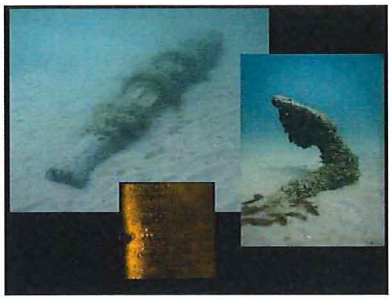
"Aviation Archaeology Takes Flight." By David Malakoff. *American Archaeology*, vol. 24, no. 1 (Spring 2020): 12-19.

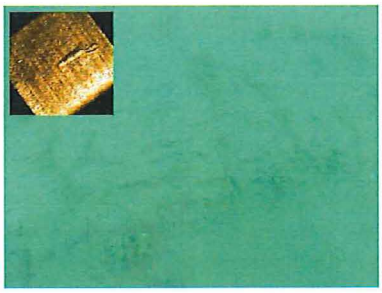
18 October 2017

"Tuskegee Airmen's Plane Crashed into Lake Huron. Found 70 Years Later to the Day." Michigan Radio.

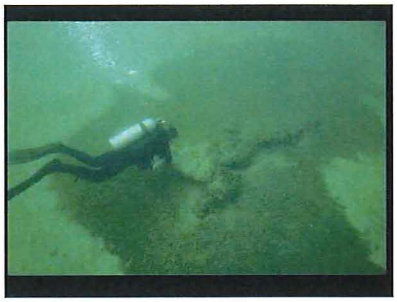
Appendix D: Project Slide Presentation








CURTISS P-40F WARHAWK

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