

The Local Pacific Inventory: Maritime heritage resources in the Main Hawaiian Islands

Hans Van Tilburg

NOAA Office of National Marine Sanctuaries, Honolulu, Hawaii 96825, USA

Email: hans.vantilburg@noaa.gov

Abstract

The systematic investigation of underwater cultural heritage in the islands started in 1989 with the University of Hawai`i's Marine Option Program. This slowly grew into a graduate certificate program in maritime archaeology and history. Manned submersibles with the Hawai`i Undersea Research Lab contribute to deep water discoveries and site surveys. Today the National Oceanic and Atmospheric Administration's (NOAA) Office of National Marine Sanctuaries continues heritage resource site assessments in Hawai`i, in collaboration with partner agencies and programs. The underwater cultural heritage in Hawai`i reflects a multicultural diversity of archaeological and historic properties, such as coastal stone fishponds, submerged heiau, 19th century plantation landings, inter island steamships etc. Major events like World War II left behind numerous naval shipwrecks and submerged aircraft. These are the physical elements of maritime cultural landscapes that describe Hawai`i's maritime past.

Key words: Hawaii, World War II, Culture landscapes, Heritage preservation, Maritime archaeology

Introduction

Hawai`i's underwater cultural heritage speaks directly to the ancient past, the multicultural historical period, and the forces of modernization and globalization leading to the modern present. It is a testimony to dynamic change. The resources that reflect this diversity lie beneath the warm blue waters of the North Pacific, generally unknown to the public, on the slopes of the tallest mountain on Earth (including the undersea portion). Discovering these resources opens windows on elements of the Islands' otherwise unseen history. Awareness of the value of this unseen heritage has been increasing steadily over the past two decades. This paper provides an introductory description of the current state of underwater cultural heritage investigations in the main Hawaiian Islands and some of the chief types of heritage resources found in Hawai`i. (Note: the term "UCH" here includes U.S. national criteria, 50-year limit, etc.)

Current State: Surveys in the Context of Education

Academic investigation started in 1989 with an in-water workshop and small symposium hosted by the University of Hawai'i's Marine Option Program. The Marine Option Program (MOP) provides hands-on marine education experiences for students from any field of study, operating across the ten-campus university system. MOP's maritime archaeology component was initiated partially in response to the passage of the U.S. Abandoned Shipwreck Act of 1987 (ASA, 1987). Over time the symposium grew into a graduate certificate program in maritime archaeology and history, led by an instructor trained at East Carolina University's Maritime Studies Program. Between 1996 and 2002 MOP offered annual classroom and field courses in maritime history, anthropology, and a six-week maritime archaeology field class. Numerous students obtained the specialized certificate, and some went on to Masters-level studies at Texas A&M University or East Carolina University (Van Tilburg, 2002). Though the maritime archaeology certificate program no longer exists, a two-week field survey class for university students continues today under a National Oceanic and Atmospheric Administration (NOAA)/University of Hawai'i partnership. The class is known as the Maritime Archaeology Survey Techniques (MAST) course. Taught by NOAA staff, students are introduced to broad aspects of the UCH preservation field in the classroom, prior to beginning the underwater survey. Study sites are selected among the main Hawaiian Islands, and students gain field experience while documenting previously unrecorded heritage resources, thus contributing to the State's archaeological inventory. Non-diving days are used to explore local heritage among the Hawaiian Islands (e.g. monuments, museums, other archaeological sites) and talk with local divers and Hawaiian cultural practitioners about marine resources and preservation management.

NOAA instruction in maritime archaeology also takes the form of public outreach (in addition to formal university education), as Maritime Heritage Program staff have been certified to teach the Nautical Archaeology Society's (NAS) training curriculum. NAS is a non-profit organization based in the United Kingdom and dedicated to advancing education in nautical archaeology at all levels. To date, NOAA has conducted six NAS Intro and Level One courses in the Pacific (Juneau and Anchorage in Alaska, Seattle in

Washington State, and several courses in the Hawaiian Islands). Maritime archaeology field courses taught at the University of Hawai'i also give the students the opportunity to obtain the NAS training credential. From its early inception until today, the University and now NOAA have also supported the annual Symposium on the Maritime Archaeology and History of Hawai'i and the Pacific. The maritime symposium, now in its 24th year, regularly draws 60-70 professional and avocational participants, as well as local divers and the general public. The three-day event includes presentations, panels, receptions, field trips, and usually an informal back-yard barbeque for the conference "banquet," local-style grinds.

NOAA's Maritime Heritage Program

In 2002, NOAA launched its Maritime Heritage Program under its Office of National Marine Sanctuaries. The Maritime Heritage Program is designed to support maritime heritage discovery and resource preservation across the sanctuary system. The sanctuary system serves as the trustee for a national network of 14 marine protected areas encompassing more than 170,000 square miles of marine and Great Lakes federally protected waters (Fig. 1). More than half of these protected areas are in the Pacific: Olympic Coast National Marine Sanctuary (NMS), Cordell Bank NMS, Gulf of the Farallones NMS, Monterey Bay NMS, Channel Islands NMS, National Marine Sanctuary of American Samoa, Hawaiian Islands Humpback Whale NMS, and the Papahānaumokuākea

Marine National Monument in the Northwestern Hawaiian Islands.

With the incorporation of cultural resource management, maritime archaeologists could begin to take advantage of existing platforms, equipment, and diving capacities previously



Fig. 1 NOAA map of sanctuary system locations (NOAA ONMS)

dedicated to purely natural resource research missions. More importantly, cultural resources and historic properties within marine protected areas began to gain consideration as unique, significant and worthy of protection. The legal mandate to protect cultural resources was actually already an integral part of the sanctuary systems' founding legislation, the National Marine Sanctuary Act of 1972, which allowed designation of marine protected areas of special national significance due to their "conservation, recreational, ecological, *historical*, scientific, *cultural*, *archaeological*, educational, or aesthetic qualities..." (emphasis added...NMSA, 1972). Today the NMSA is one of the most important pieces of federal legislation in the United States for protecting cultural submerged resources in the oceans and Great Lakes. The Maritime Heritage Program is vital, but not large. With five sanctuary sites on the U.S. West Coast, and three in the island Pacific, there are currently only three NOAA archaeologists in the Pacific region.

Deep water surveys (beyond typical scuba depths) are often cost-prohibitive. Fortunately Hawai'i benefits from a unique manned submersible program known as the Hawai'i Undersea Research Lab (HURL). HURL was established in 1980 as a joint NOAA/University of Hawai'i center with the primary responsibility of advancing knowledge of the nation's deep water resources and marine processes. Simply put, operations director Terry Kerby and his HURL team, with the two three-person submersibles *Pisces IV* and *Pisces V*, have located more underwater heritage sites than any single other program in the State. These discoveries have been accomplished through surveys conducted during HURL's pre-season preparatory dives, (testing/training dives for both subs and pilots), cost-efficient opportunities for target site identifications and assessments.

Maritime Cultural Landscapes in Hawai`i

To date, there has been no single comprehensive assessment of these resources in the waters around the main Hawaiian Islands. Rather, information comes from different sources: the HURL deep water database; the University of Hawai'i's collection of student site reports; a desk-based assessment of U.S. Navy properties in Hawaiian waters (Van Tilburg, 2003); and local journalists and avocational researchers combing through historic newspapers. Importantly, trust is slowly being built between

management agencies and the general public, and sport divers are beginning to report their own investigations and discoveries. This has led to a partial resource inventory in the main Hawaiian Islands of some 150 underwater ship and aircraft locations, many of them potential heritage properties.

It is impossible here to list all the heritage sites discovered and all the maritime archaeology projects conducted in the Islands, but rather than discussing sites individually, contextual understanding of Hawai'i's UCH can be gained by considering thematically-organized maritime cultural landscapes, for it is the cultural context of human activity that patterns this resource. This approach also better integrates archaeological data with the existing and broader ecosystem-based marine management approaches. Resources associated with three types of maritime cultural landscapes will be introduced here: 1) ancient aquaculture production; 2) the plantation and ranching era; and 3) the military landscape.

Ancient Hawaiian Aquaculture Systems

Prior to Western contact, the stone seawalls and gates of coastal fishponds, or *lokai'a*, were prominent features of the Hawaiian landscape. Hundreds of coastal ponds of various sizes produced protein for a large population by taking advantage of nutrient-rich runoff from the highlands through the *lo'i* or taro fields and the brackish coastal setting. Ocean tides through the seaward gates or *makaha* created flow through the ponds, while the long seawalls protected juvenile fish populations from marine predators. Each island had a handful of notable and productive ponds, while the island of Moloka'i, with its shallow shoals, featured the greatest number of coastal pond locations. The construction and maintenance of these systems represented an impressive commitment of labor and social structure. Most of the traditional ponds are now in ruins, submerged, or completely destroyed. Coastal development and sedimentation, as well as the degradation of upstream runoff, have combined to serious effect. Fishpond sites are vulnerable to these larger-scale processes, rather than to the perhaps more familiar individual impacts of divers on historic resource sites. However, an increasing effort exists today to physically restore some of these fishponds to productivity (Handy et al., 1972).

University of Hawai'i students assisted in mapping the shallow submerged remains of stone fish traps and fishpond wall at Kaloko Honokōhau National Park on Hawai'i Island in 1997 with limited success, and have also pursued surveys of other lithic sites including the ruins of an underwater *heiau* or temple, and the distribution of stone fishing tools (basalt sinkers, anchors, etc) at specific off shore locations (Fig. 2). State-wide archaeological studies assessing the styles and conditions of the many fishpond locations around the main Hawaiian Islands have been completed, but there has been no other underwater archaeological survey conducted on the structural remnants of this type of coastal cultural resource. Existing archaeological reports are exclusively terrestrial, while the ruins of the fishponds are often totally submerged. The question should be posed: would the type of archaeological survey techniques designed for historic UCH properties like shipwrecks be appropriate or even effective for scattered and broken stone walls often buried in coastal sediments?



Fig. 2 (left) University of Hawai'i students mapping submerged fish trap structures at Kaloko Honokōhau National Historic Park, 1997. (J. Kuwabara UH MOP)

Fig. 3 (right) Near shore survey work on a plantation-period steamship wreck, Shipwreck Beach, Lanai. (J. Kawabata UH MOP)

Hawai'i's Historic Plantation and Ranching Period

The early to mid-19th century saw the skills associated with both sugar plantations and with cattle ranching introduced to the Hawaiian Islands, and subsequently plantations and ranches had an enormous impact on the economy and society of historic Hawai'i. Both ranching and plantation economies relied on maritime transportation to the transshipment port of Honolulu, and from there to continental destinations. Yet, with the few exceptions of Honolulu on O'ahu, Hilo on Hawai'i, and Kahului on Maui, the Islands

lacked protected harbors where ships could lie in safety in all weather. Open roadsteads and narrow passages between fringing reefs were the usual setting, and often the skillful use of surf boats or cliff-side moorings and overhead wire systems were the only way to transport both passengers and products. Historic documents record the losses of hundreds of commercial sailing ships and steamers, generally clustered in the vicinity of historic landing locations (Thomas, 1983). Inter island commerce was hazardous business. The shipwrecks identified with Hawai'i's early plantation history, some submerged in a high-energy warm-water marine environment for over 100 years, have experienced significant biochemical deterioration and mechanical break-up. Whether wood or iron or steel-hulled, Hawai'i's known steamship wreck sites generally consist of only the heaviest machinery components (boilers, engines, propeller and shaft, anchors etc.) lying on the sea floor adjacent to scattered cargo, small artifacts, and hull debris. These components are often heavily encrusted in corals and coralline algae (Fig. 3). Some of the shipwreck sites were intentionally disposed hulks already stripped of useful equipment. Notably, rough and remote Shipwreck Beach on the north shore of Lāna'i was used by Hawai'i ship owners for many years to dispose of hard-working steam ships which had outlived their useful service. Lāna'i's north shore was chosen as wind and water there would force the hulks firmly aground on a relatively uninhabited coast. The reefs along the island's north shore also presented natural hazards to inter island shipping. The resulting cultural landscape at Shipwreck Beach therefore reflects not only Hawaiian settlements and history, but also at least a dozen accidental losses and intentional disposals of 19th and 20th century schooners, barges, and steamships. Several seasons of maritime archaeology fieldwork (1999, 2001, 2009) have been conducted at Shipwreck Beach (The Lāna'i Project, 2009).

Nine wreck sites associated with the plantation and ranching era have been assessed to some level, and four of those (SS *Maui* survey in 2010, SS *Kaua`i* in 2012, SS *Hornet* survey in 2009, and an unidentified steamship in 2001) have been the specific subject of NOAA/UH field class surveys, with historical interpretations and site plans. Steamship landings are also considered as potential historic locations, with the potential to shed light on both land and marine human activities. Landing locations typically include pilings, heavy mooring chains and anchors, cargo handling equipment like

winches and derricks, cable, pilings, and assorted artifacts like bottles, fire extinguishers, etc (Fig. 4). Only two of these landing sites have been surveyed in full by maritime archaeologists: Waimanalo plantation landing in 1999 and industrial Mahukona Harbor, former entry-point to the Kingdom of Hawai'i, in both 1994 and 2012.

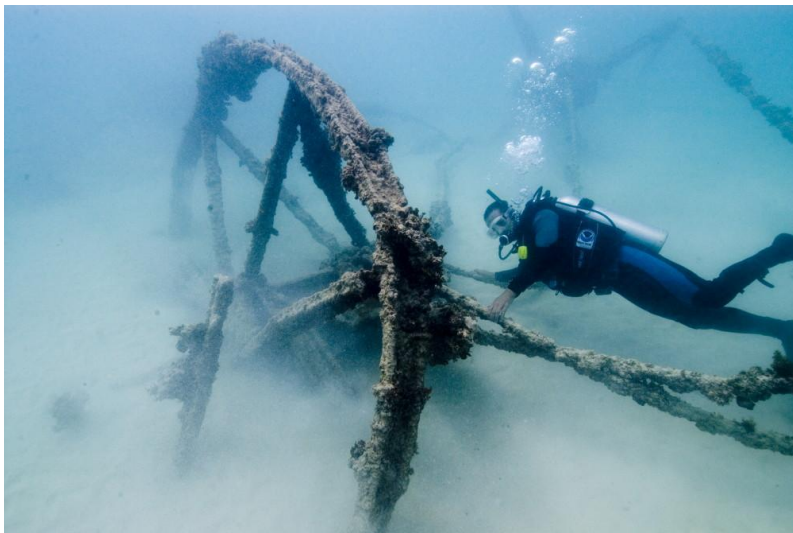


Fig. 4 The industrial archaeology of landing locations: loading derrick at the Waimanalo plantation landing site, in-use circa 1880. (T. Casserley NOAA ONMS)

Military Vessels

U.S. naval activities in Hawai'i have evolved through a number of distinct phases, beginning with early goodwill visits in the 1820's, and progressing through the commitment to develop a major naval base at Pearl Harbor by 1900, and beyond. The military construction boom and transfer of forces to the islands accelerated in the 1930's prior to World War II. Hawai'i soon became home to the U.S. Pacific Fleet, and numerous air stations, naval stations and other facilities.

Unprecedented naval activity took place among the Hawaiian Islands during the War, in the skies as well as on and under the sea. To understand the military landscape of heritage resources, though, we need to look beyond combat losses. The Hawaiian Islands only came under actual attack a handful of times: the attack on Pearl Harbor and O'ahu military installations on December 7th 1941; the Battle of Midway June 4-7th 1942; Japanese submarine shelling of Kahului, Nāwiliwili, and Hilo harbors on December 30th 1941; and a Japanese seaplane bombing incident on O'ahu March 3rd

1942 known as Operation K. By far, the many known military properties in Hawai'i's waters today are testimony to the intensive combat training operations (leading to accidental losses) during the war years, rather than direct attack. The known footprint of the military cultural landscape within the main Hawaiian Islands is significant in size and complexity, and may make up the majority of the underwater heritage resource sites. Thousands of naval aircraft and pilots took part in intensive training activities in preparation for combat operations in the Pacific. Records from 1924-1952 indicate over 1,485 naval aircraft sunk in the vicinity of the Hawaiian Islands during that period. Many of these submerged aircraft crash sites are also war graves. The submerged aviation landscape is not random, but patterned and island-specific. Often, naval aircraft are found in direct relationship to former naval air station runways. Locating and identifying these aircraft has become a popular pursuit for local sport and technical divers, particularly as closed-circuit re-breather (CCR) technology has advanced and become more available to the specialized public. Some submerged aircraft have become regular destinations for Hawai'i's recreational diving industry. Several formal surveys have focused on documenting naval aircraft (Catalina PB5Y-5A in Kaneohe study 1994; Corsair F4U-1 survey in Maunaloa Bay 2002; Helldiver SB2C-1 and Hellcat F4F in Mā'alaea Harbor 2011...see Rodgers et al., 1998). Additionally, HURL's research submersibles have located and identified dozens of deep water aircraft sites, including several Keystone PH-1 biplanes from the 1930's, several Dauntless SBD's, Avenger TBM's, and Helldiver SB2C's...and the giant Martin JRM-1 flying boat (Naval, 2004). Of the many aircraft lost in the islands, over 30 have been located and assessed to some extent. The Hawaiian Islands played a major role in the development of naval aviation in the Pacific (Fig. 5). In a fashion similar to the numerous aircraft, the wreck sites of amphibious landing craft (ramped craft delivering troops onto the beach) and amphibious assault vehicles (tracked vehicles transiting the ocean/beach and moving inland) are also ubiquitous in Hawai'i. Several surveys have focused on documenting the remains of these resources (LVT-3 AMTRACK Maui survey 2011; LVT (A)-4 AMTRACKs Maui survey 2013; LSM O'ahu survey planned for 2014). As with the aircraft, the distribution of these amphibious sites is also patterned and specific. Several areas in the main Hawaiian Islands served as amphibious training beaches

prior to major amphibious operations during WWII (invasions of Saipan, Iwo Jima, etc). These include the shores of North Kohala on Hawai'i Island and the southern corridor of Mā'alaea to Mākena on Maui, both within the NOAA sanctuary (Fig. 6). Maui also featured facilities for the Maui Amphibious Training Center and the Combat Demolition Training Center on Mā'alaea Bay, where the first Underwater Demolition Teams (UDT) were trained in surveying and destroying undersea obstructions and in reconnaissance for shore invasions. ([Maui's WWII Legacy, 2011](#)) Hawai'i proved to be the major combined forces Pacific training area for the innovation of amphibious tactics during World War II.

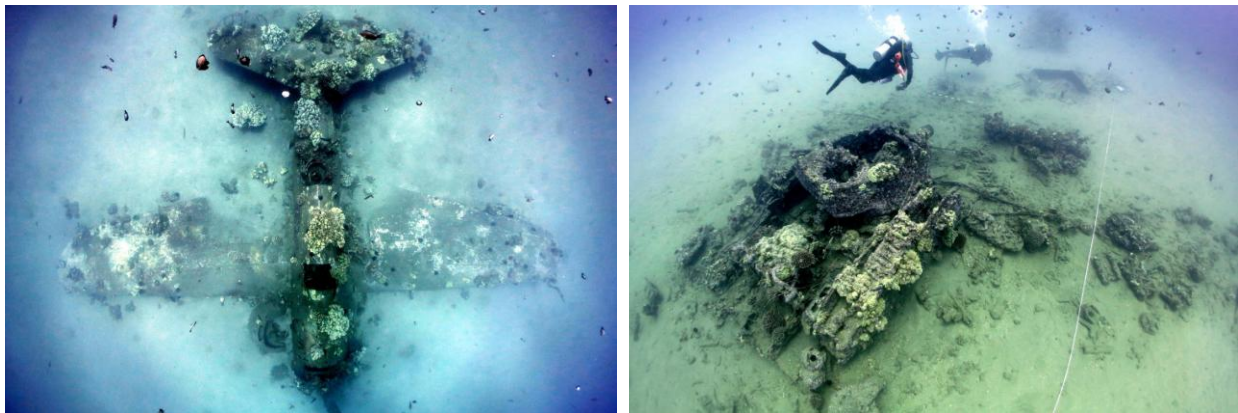


Fig. 5 (left) A WWII dive bomber (SB2C-1 Helldiver) ditched 31 August 1944; now a popular recreational dive site. (H. Van Tilburg NOAA ONMS)

Fig. 6 (right) MAST students at the site of an amphibious assault vehicle (LVTA-4 AMTRACK), near the former Maui amphibious training beaches, 2013. (H. Van Tilburg NOAA ONMS)

There are many other military vessels in Hawaiian waters. The naval inventory lists over 80 US Navy ships and submarines lost in the vicinity (including inshore patrol vessels, fleet oilers, requisitioned fishing sampans, numerous auxiliaries) and many of these have been located and identified. Unlike the early whaling or plantation periods, the peak of military activity in Hawai'i during World War II occurred only a little over 50 years ago. Modern steel construction, pre-fabrication, and sheer industrial productivity account for the fact that there are many more identified WWII and military-related properties in Hawaiian waters than any older sites. Furthermore, several military sites directly associated with the December 7th, 1941 attack on Pearl Harbor and O'ahu military installations have an importance far beyond individual archaeological surveys.

The battleship USS *Arizona* BB-39, launched from the New York Navy Yard in 1915, was sunk in Pearl Harbor during the December 7th attack with the loss of 1,177 casualties. Much has been written about the USS *Arizona*, the reverence felt for this site, and the place it occupies in the American national narrative. In 1983 the National Park Service Submerged Resources Center initiated the archaeological survey of the site (Lenihan, 1989), and subsequent field projects took place in 1998, 1999, 2000, and 2001, partnering at various times with academic, commercial, and military groups. Follow-up studies on bio-fouling and metals corrosion, as well as a site monitoring program, continue today. Multiple lines of inquiry revolve around questions of structural integrity, the specific processes of deterioration, the amount and location of fuel oil remaining in the ship, and the possibilities for long-term site preservation (Russell and Murphy, 2004). In many ways, these studies are defining the nature of submerged World War II resources and their relationship to the ecosystem.

In 2002 Terry Kerby and his HURL team discovered a small two-man submarine sitting upright in over 1,200 feet of water off the south shore of the island of Oahu ([Japanese Midget Submarine, 2005](#)). This submarine was one of five secret weapons of the Japanese Imperial Navy involved in the attack on Pearl Harbor, which heralded America's entrance into World War II in the Pacific. The sub sits upright and intact, in relatively good condition, with a slight list to port. Both torpedoes were still in their tubes, and no extensive exterior damage was visible except for a shell hole at the base of the conning tower's starboard side, corresponding to the shot which sank the sub. Since then, agencies have collaborated on multiple survey and monitoring missions to the site, and a programmatic agreement for preservation management is currently being reviewed between NOAA, National Park Service, State Historic Preservation Division, and the Advisory Council on Historic Preservation (Van Tilburg, 2007). Also since then, HURL has continued its efforts in deep water maritime inventory, and gone on to discover the fifth and last Japanese two-man submarine from the 1941 attack, and several other advanced and aircraft-carrying Japanese submarines scuttled after the war (I-14; I-201; I-401; I-400...see Kerby, 2013). The society in Hawai'i today was largely influenced by the Pacific conflict; the Islands were almost overwhelmed by the number of servicemen and military activity during the war. The heritage resources

beneath the sea stand as the physical reminders of this period. The echoes of this major national and international event still strongly reverberate for island residents and visitors alike.

Looking Towards the Future

There is great potential for the investigation of Hawai'i's submerged heritage resources, and the indigenous aquaculture structures, historic properties related to the plantation and ranching periods, and the extensive military resource base, will remain important additions to the story of Hawai'i's past. Though there is no longer any academic UCH program in the state, the public agency collaboration between NOAA and the University of Hawai'i continues. The necessary prioritization, which is an inherent part of that effort, must carefully consider public opinion, for public agencies which employ maritime archaeology as a tool for public resource management have that responsibility. The field of underwater cultural heritage is relatively new to Hawai'i and not well understood. Effective education and outreach efforts remain, therefore, equal to or greater than efforts to simply conduct more individual site assessments. How the investigation of underwater cultural heritage resources in the islands can continue to be incorporated into marine planning processes, and how heritage sites can ultimately contribute to increasing ocean awareness and ocean resource stewardship, remains to be seen.

Acknowledgements

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Biography

Hans Van Tilburg holds a BA in geography from University of California Berkeley, an MA in maritime archaeology/history from East Carolina University, and a PhD in history from the University of Hawai'i, where he ran the graduate program in maritime archaeology and history. Hans has taught courses in world maritime history and published over 30 articles and book reviews, as well as several books. He has served as a consultant for UNESCO's cultural heritage program and instructor for UNESCO's UCH Foundation courses. He is currently the maritime heritage coordinator and unit diving supervisor for NOAA's Office of National Marine Sanctuaries in the Pacific.