

Home Front Hawai`i: a WWII Legacy Underneath the Sea

(lessons from submerged social sciences)



NOAA Educator's Webinar, Thursday February 14, 2019

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Topics to be Covered:

- 1) The maritime heritage field = *submerged social science*
- 2) The Hawaiian Islands during the war years = *history*
- 3) The WWII resource base in Hawai`i = *maritime archaeology*
- 4) Wrecks and the environment = *biological interactions*
- 5) Access to the oceans = *evolving marine technology*
- 6) Maritime Cultural Landscapes = *understanding our impacts*

Submerged Social Sciences

What is Maritime Archaeology?



This...

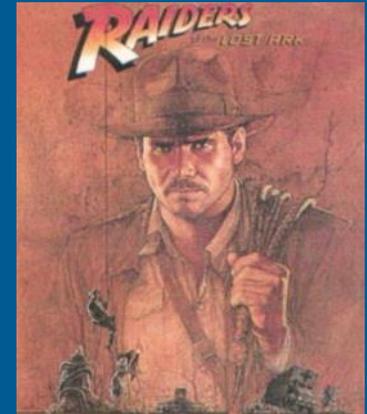
“The interpretation of the seafaring past through the study of things manufactured or modified by humans...usually underwater”

Field initiated by Dr. George Bass and others in the 1960s

Multidisciplinary:

- Anthropology
- History
- Geography
- Engineering
- Chemistry
- etc

This...



but not this...

Training in the maritime archaeology field



College graduate (Masters) degree standard for the field

Types of coursework:

- archaeology
- anthropology
- history
- museum studies
- material culture
- GIS and mapping
- engineering
- acoustics
- etc



Applied skills needed:

- diving
- computer
- grant writing
- rigging
- drafting (drawing)
- photography
- archival research

Main American universities:

- Texas A&M
- East Carolina University

Maritime Heritage: the Preservation of our archaeological resources in the sea



NOAA WHO?



- National Historic Preservation Act
section 106
section 110
- National Marine Sanctuaries Act
includes *historic, archaeological, cultural resources*
- Abandoned Shipwreck Act
State properties under DLNR
- Sunken Military Craft Act
military vessels remain federal property

History: Islands during War Years



Waikiki, Territory of Hawai'i, 1943

- Martial Law
- Japanese internment
- Loss of *habeas corpus*
- School closures
- Censorship
- Coastal fortifications
- Gas masks
- Curfew
- Blackout
- Rationing
- Victory gardens
- Loss of fishing fleet



History: Islands during War Years

Japanese-American loyalty on parade, Waikiki 1942



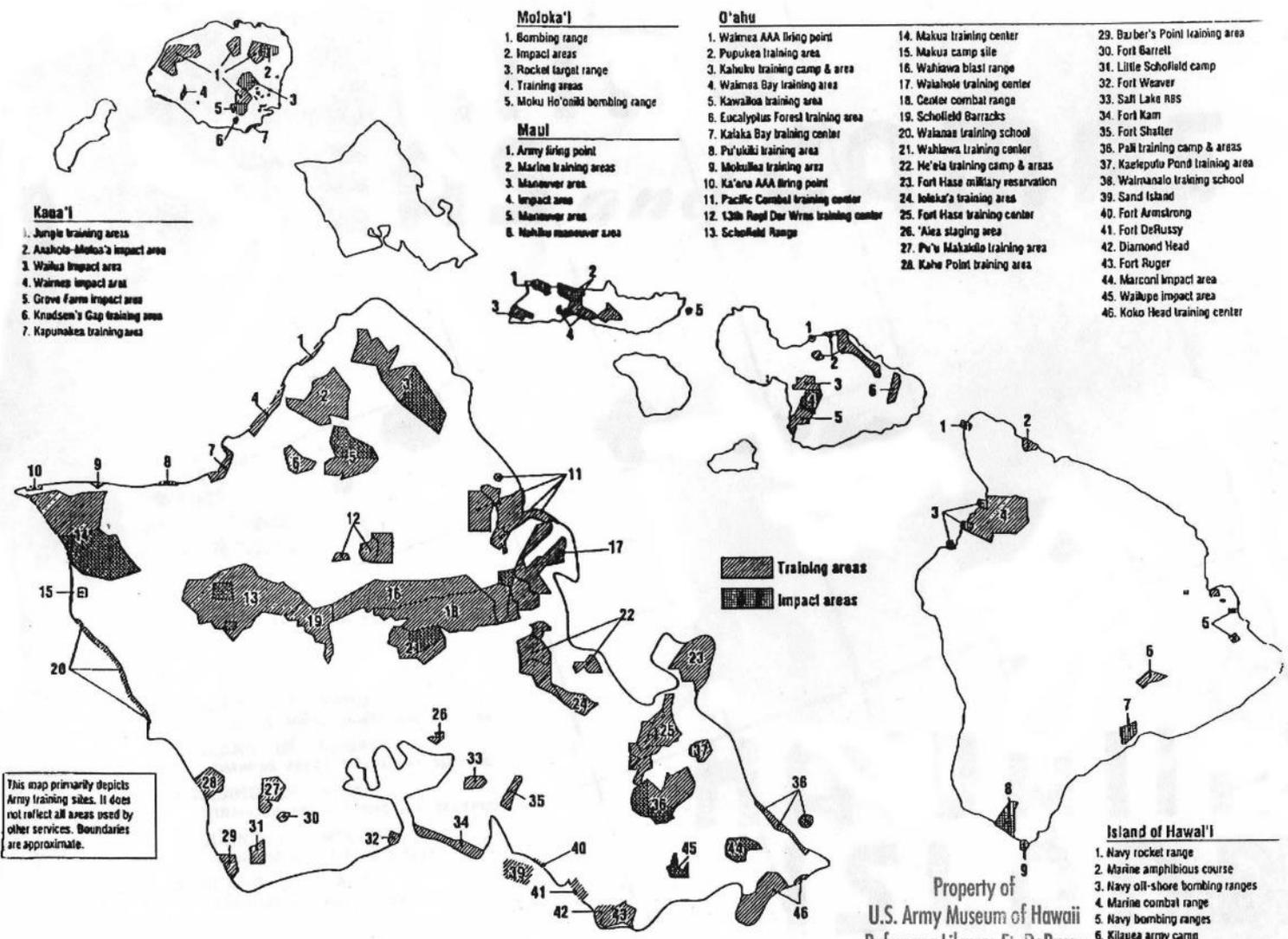
History: Islands during War Years

4th Marine Division departing Kahului, Maui



History: Islands during War Years

WWII Ground training areas, Territory of Hawai'i



- Kauai**
1. Jungle training areas
 2. Anahole-Molokai impact area
 3. Waiaua impact area
 4. Waimea impact area
 5. Grove Farm impact area
 6. Knudsen's Gap training area
 7. Kapunakea training area

- Molokai**
1. Bombing range
 2. Impact areas
 3. Rocket target range
 4. Training areas
 5. Moku Ho'onihi bombing range

- Maui**
1. Army firing point
 2. Marine training areas
 3. Maneuver area
 4. Impact area
 5. Maneuver area
 6. Nahiku maneuver area

- O'ahu**
1. Waikanae AAA firing point
 2. Pupukea training area
 3. Kahuku training camp & area
 4. Waikanae Bay training area
 5. Kawaiahae training area
 6. Eucalyptus Forest training area
 7. Kalaka Bay training center
 8. Pu'uuli training area
 9. Mokuileia training area
 10. Ka'ana AAA firing point
 11. Pacific Combat training center
 12. 13th Regt Der Wres training center
 13. Schofield Range

14. Makua training center
15. Makua camp site
16. Wahiawa blast range
17. Wahiawa training center
18. Center combat range
19. Schofield Barracks
20. Waianae training school
21. Wahiawa training center
22. He'eia training camp & areas
23. Fort Hase military reservation
24. Ioleka'a training area
25. Fort Hase training center
26. Aiea staging area
27. Pu'u Makalalo training area
28. Kaha Point training area

29. Barber's Point training area
30. Fort Barrett
31. Little Schofield camp
32. Fort Weaver
33. Salt Lake NBS
34. Fort Kam
35. Fort Shafter
36. Pali training camp & areas
37. Kaelepuia Pond training area
38. Waimanalo training school
39. Sand Island
40. Fort Armstrong
41. Fort DeRussy
42. Diamond Head
43. Fort Ruger
44. Marconi impact area
45. Waiupe impact area
46. Koko Head training center

Training areas
 Impact areas

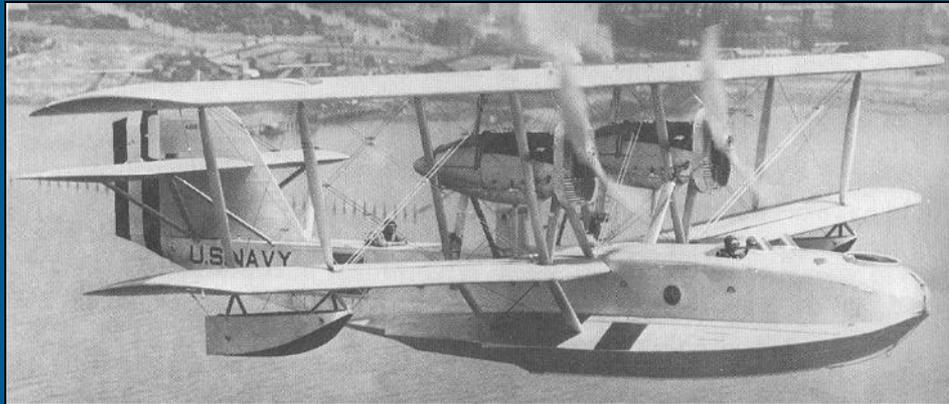
This map primarily depicts Army training sites. It does not reflect all areas used by other services. Boundaries are approximate.

- Island of Hawai'i**
1. Navy rocket range
 2. Marine amphibious course
 3. Navy oil-shore bombing ranges
 4. Marine combat range
 5. Navy bombing ranges
 6. Kilauea army camp
 7. Army bombing range (Ka'u desert)
 8. Paliuli bombing range (Army)
 9. Morse field

TRAINING AREAS AND CAMPS 1942 TO 1945

Property of
U.S. Army Museum of Hawaii
Reference Library, Ft. DeRussy

Archaeology: Early Naval Aviation in Hawai`i



Keystone PK-1 naval flying boat, long-range patrol bomber 1930s (USN photo)

USN

(NOAA ONMS)



(NOAA ONMS)



Ford Island VP-1 squadron insignia

Archaeological Resource: 1,475+ Sunken Naval Aircraft



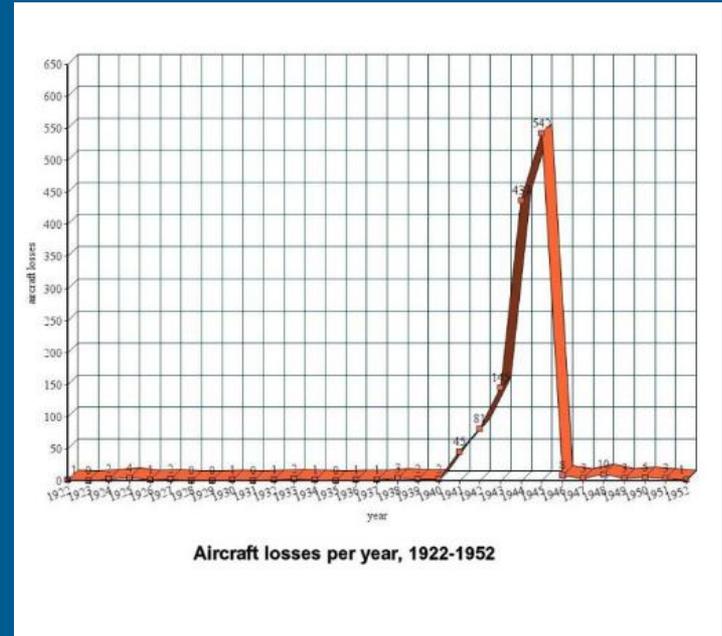
SB2C-1C Helldiver



TBF Avenger
(Ross and Milisen 2015)

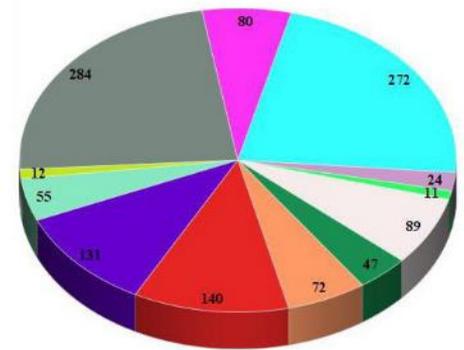


F6F Hellcat (HURL)



Aircraft losses per year, 1922-1952

- FM-2 Wildcat = 89
- FG-1 Corsair = 47
- F4F Wildcat = 72
- F4U Corsair = 140
- TBM Avenger = 131
- TBF Avenger = 55
- OS2U Kingfisher = 12
- F6F Hellcat = 284
- SBD Dauntless = 80
- SB2C Helldiver = 272
- PBY Catalina = 24
- PBM Mariner = 11



Aircraft losses per main type (n>10)

Evolution of amphibian vessels and tactics, 1932-1945



(USN image)



And specific variations of all these:

- | | |
|------|--|
| LCA | landing craft assault, small vessel |
| LCI | landing craft Infantry, fitted with bow doors |
| LCP | landing craft personnel, for transporting personal |
| LCS | landing craft support, small armed landing craft |
| LCT | landing craft tank, up to four tanks and bow doors |
| LSI | landing ship infantry, ship carrying LCI, or capable of being grounded |
| LSM | landing ship medium |
| LST | landing ship tank, RoRo vessel converted for carrying tanks |
| DUKW | amphibious truck six-wheel drive |

Archaeological Resource: Amphibious Vessel losses in Hawai'i



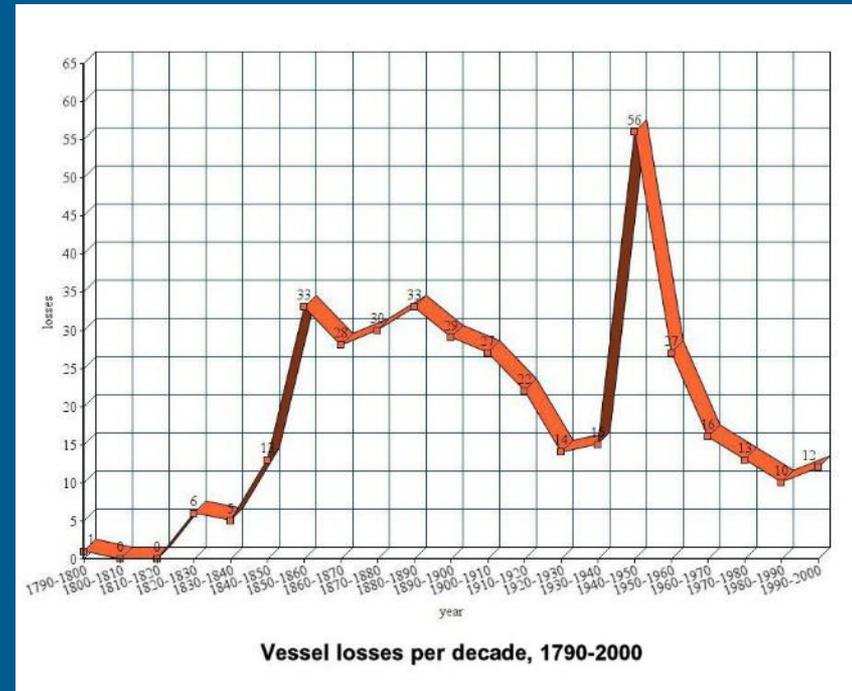
Operation Forager training exercises April-May 1944, Maui (NARA)



LVT-4 Maui



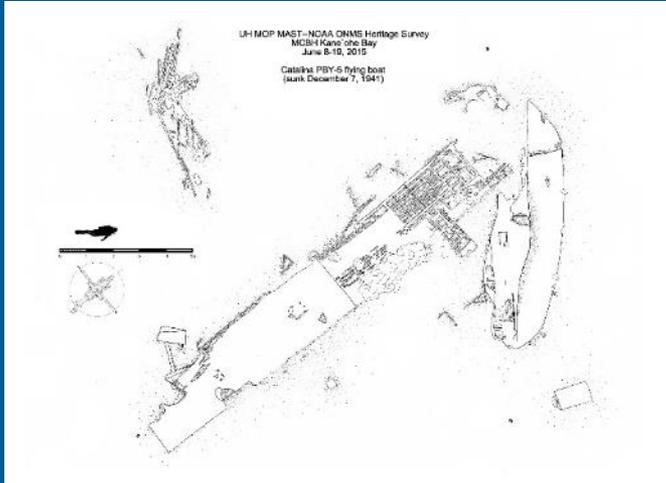
LVT(A)-4 Maui



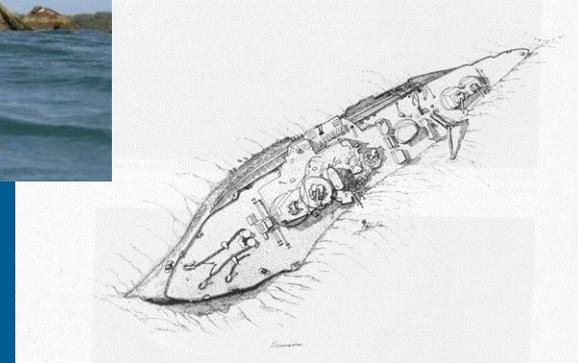
Combat losses in Hawai`i

Islands only attacked a couple times

PBY-5 site plan (Kaneohe Bay)



USS Utah

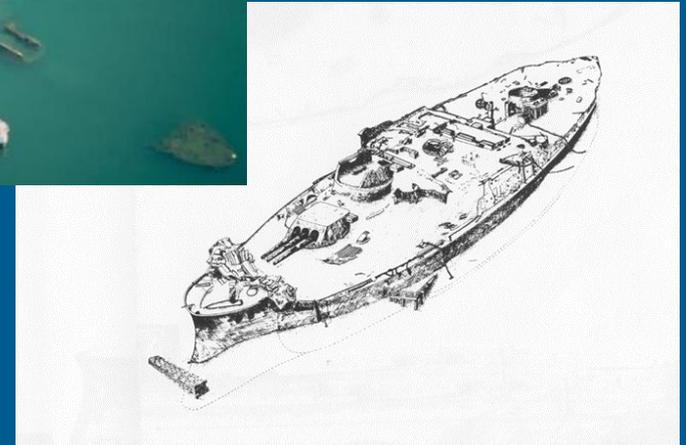


USS Arizona

(NPS)



Japanese Kohyoteki (minisub) HURL



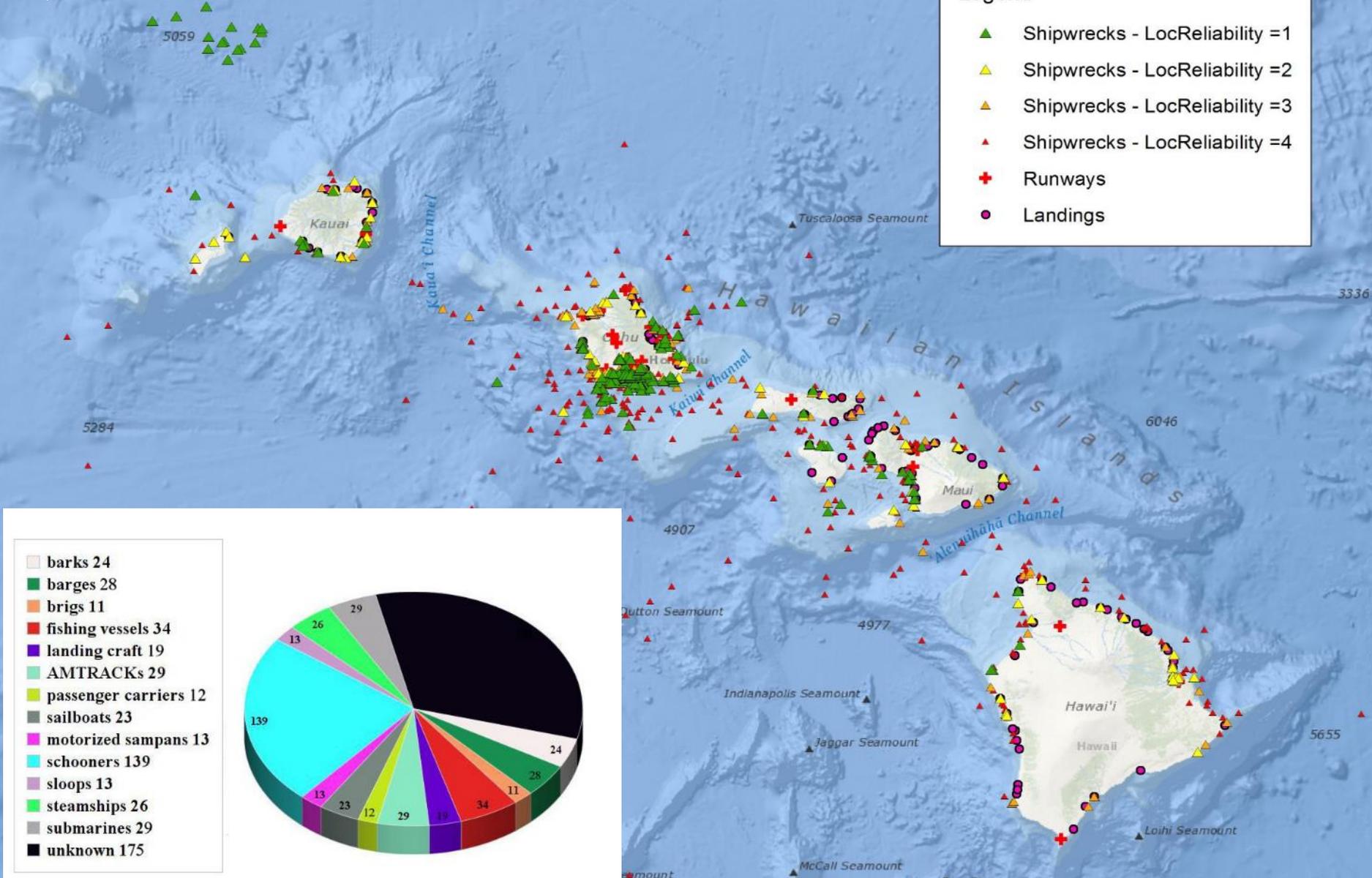
(NPS)

Main Hawaiian Islands

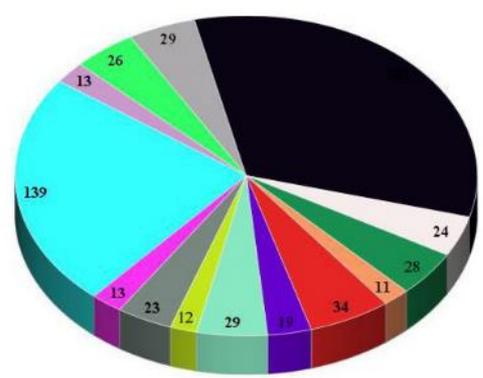
2,127 entries in the database

Legend

- ▲ Shipwrecks - LocReliability = 1
- ▲ Shipwrecks - LocReliability = 2
- ▲ Shipwrecks - LocReliability = 3
- ▲ Shipwrecks - LocReliability = 4
- + Runways
- Landings



█	barks	24
█	barges	28
█	brigs	11
█	fishing vessels	34
█	landing craft	19
█	AMTRACKs	29
█	passenger carriers	12
█	sailboats	23
█	motorized sampans	13
█	schooners	139
█	sloops	13
█	steamships	26
█	submarines	29
█	unknown	175



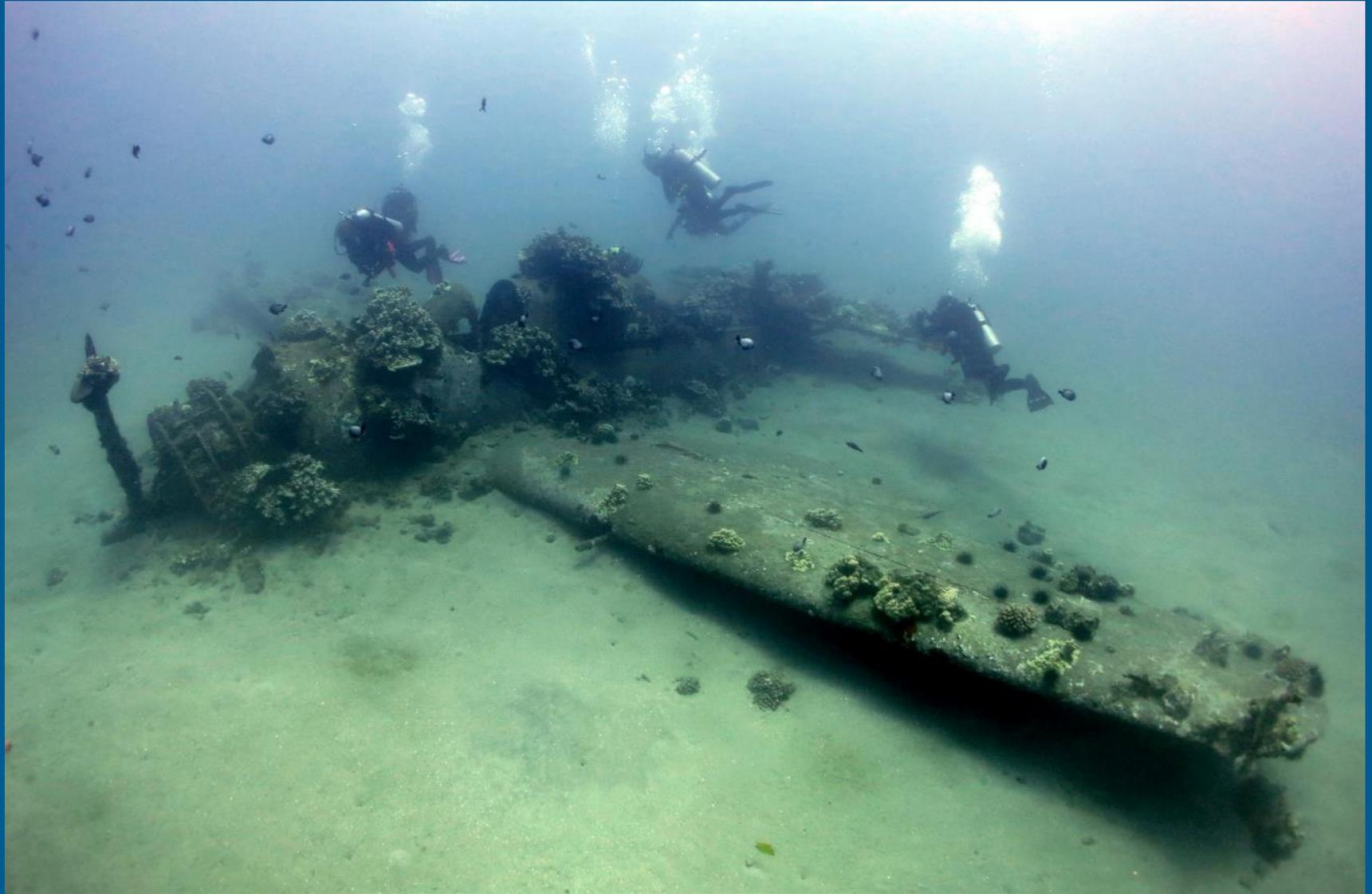
Educational Collaboration: MAST courses (UH) NAS sport diver training



Biological Interaction: Wrecks in the Marine Environment



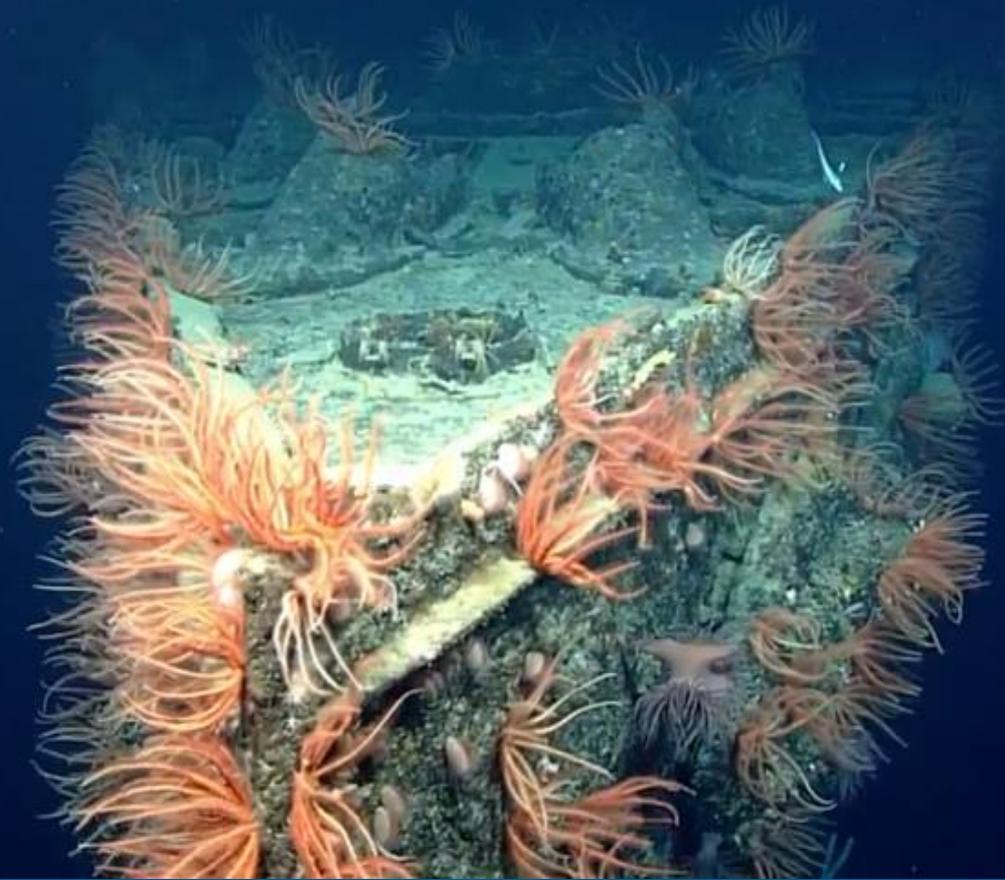
Biological Interaction: Wrecks in the Marine Environment



Biology: Wrecks in the Marine Environment



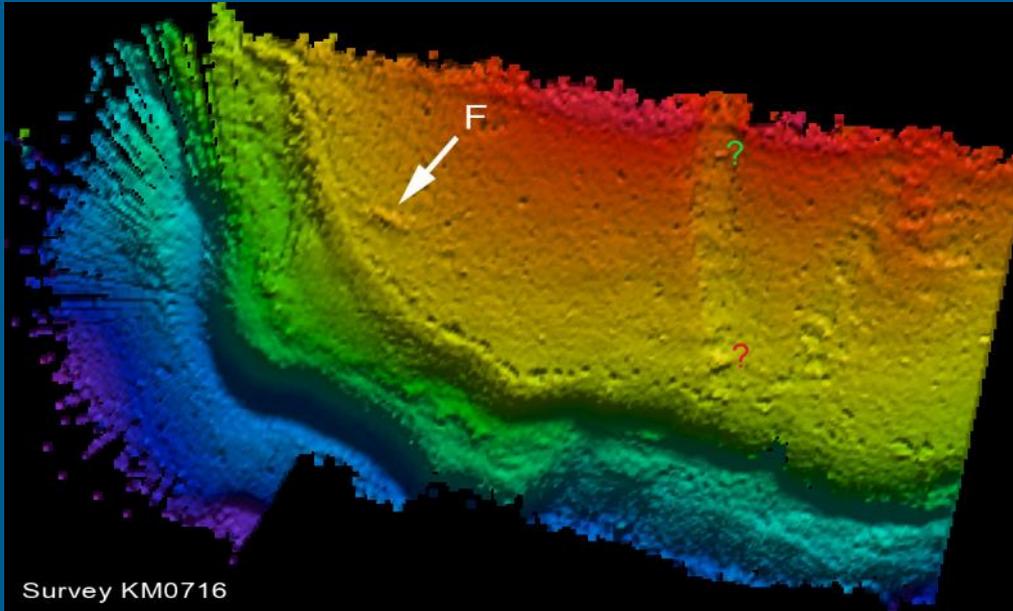
 OKEANOS EXPLORER 2017



Technology: Multibeam and Backscatter Data for Target Analysis



Kongsberg EM302 30khz multibeam
Range 7000m

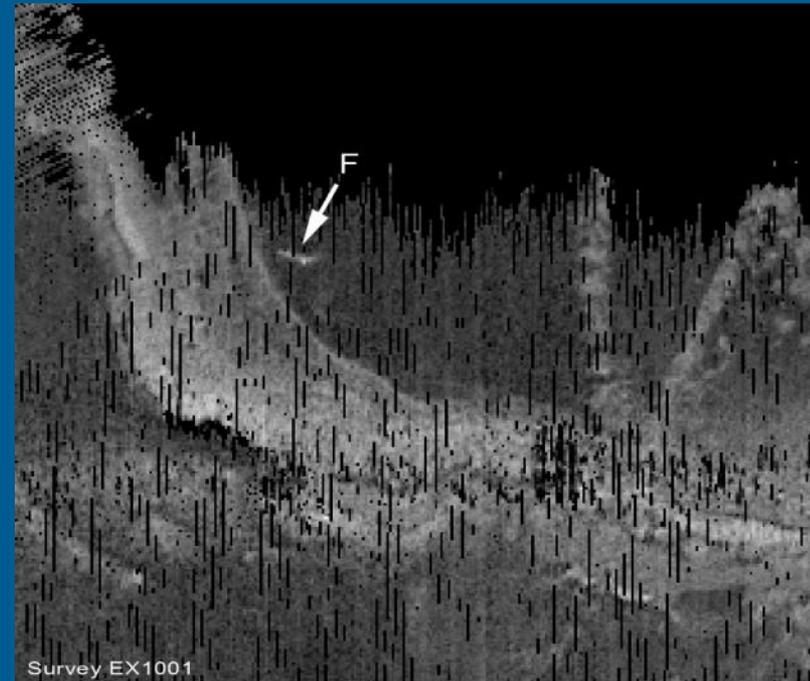
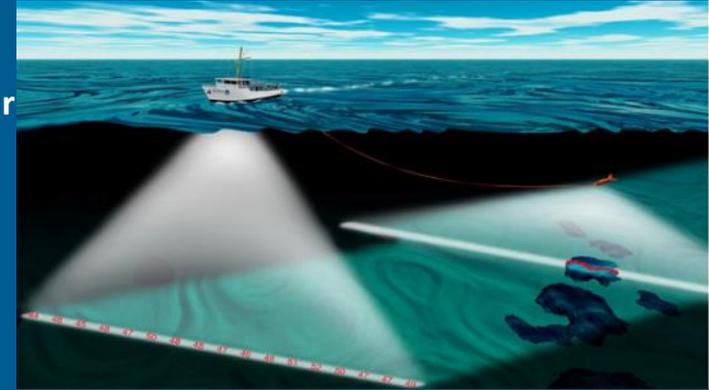


Multibeam survey

The multibeam target = Japanese submarine I-401



Hull-mounted
multibeam sonar

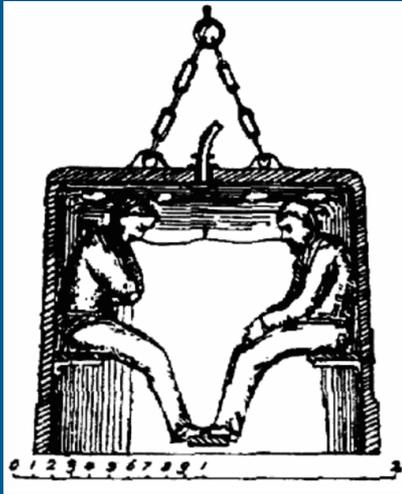


Backscatter imagery comparison

Technology: from Breath-hold to Bubbles and Beyond



Diving bell 17th century



SCUBA 1950s



Lloyd bridges as Mike Nelson!

Open-circuit scientific diving



Closed-circuit rebreather technology

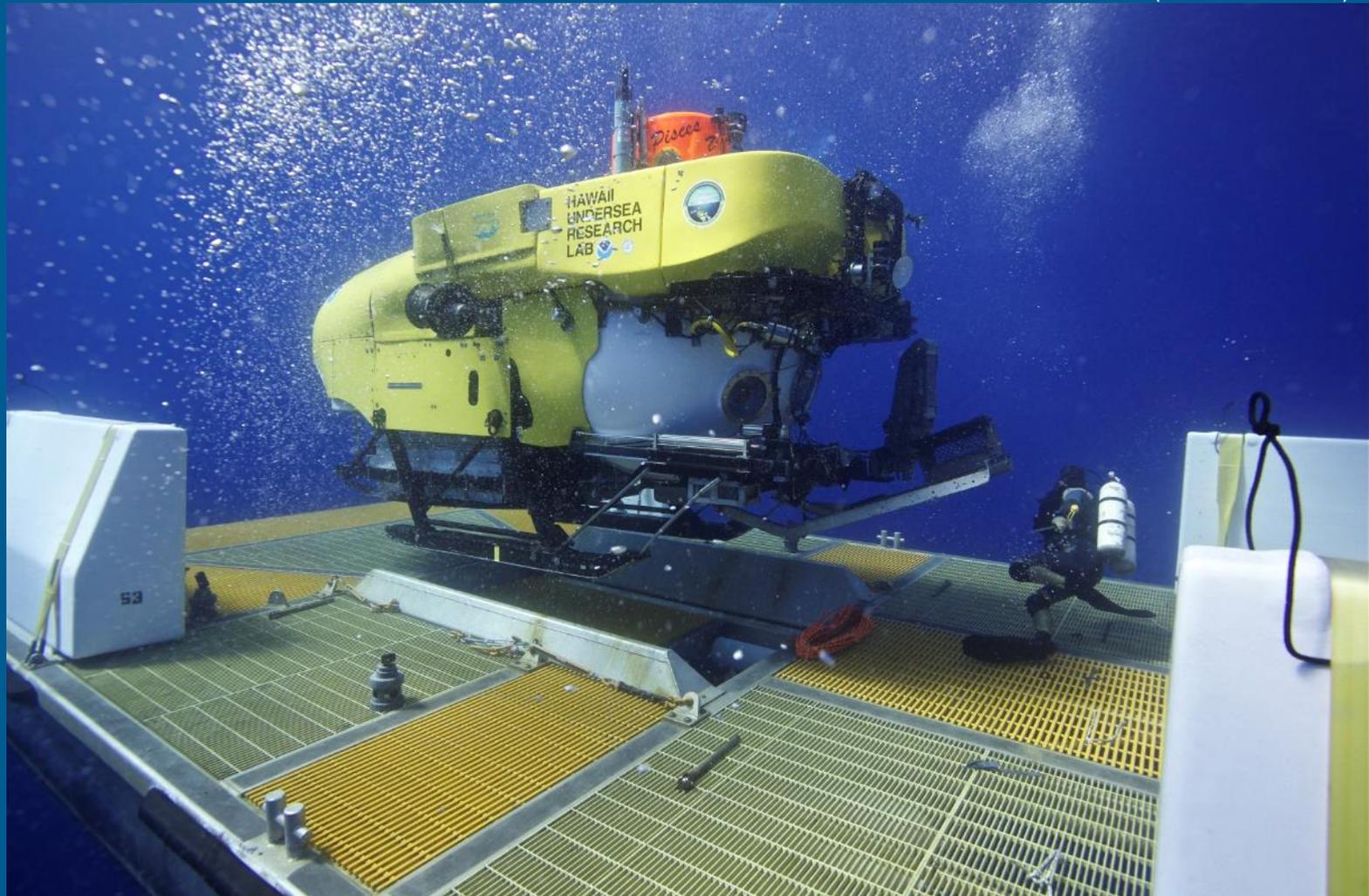


Heavy gear 19th century

Hawai`i Undersea Research Lab PISCES 3-person research submersibles



(HURL C Wollerman)



Ship control cab



ROV Surveys (*Okeanos Explorer*)

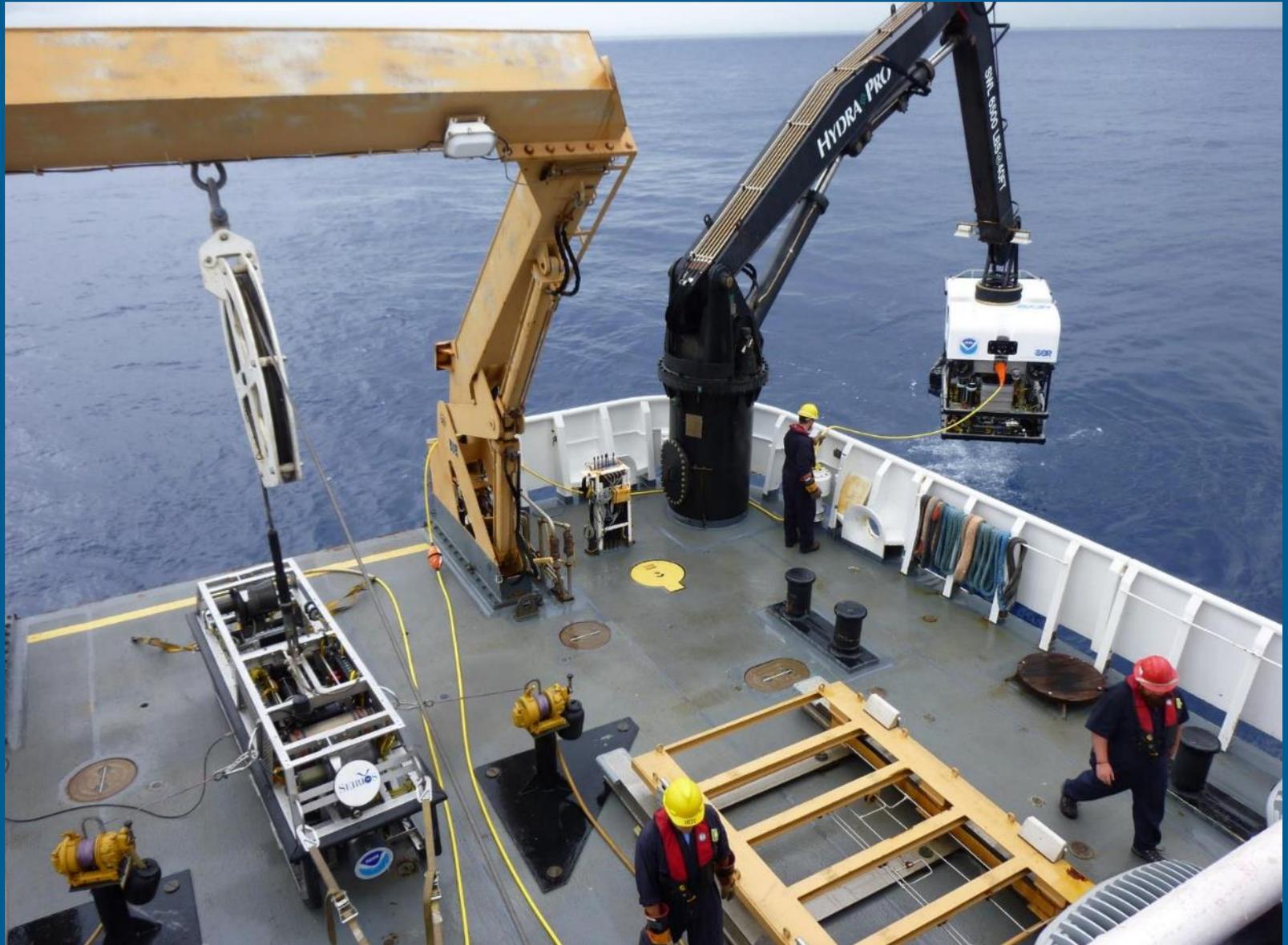
Remotely Operated Vehicles
Deep Discoverer and *Seirios*
Range 6000m



Shoreside Comm Center



Deploying Seirios and D2 ROV system



- 
- 1) Oahu *S-19* survey Sept 2015
 - 2) Wake Island *Amakasu Maru No.1* survey March 2016
 - 3) Tinian B-29 Superfortress survey July 2016
 - 4) Oahu Japanese mini-submarine survey Dec 2016
 - 5) Oahu *Royal Taipan* (ex-USS *Swan*) survey Dec 2016
 - 6) Oahu Sentaka *I-203* search Sept 2017
 - 7) Oahu USS *Baltimore* survey Sept 2017

NOAA CAPSTONE
archaeology missions
2014-2017

Cultural Landscapes: Patterns in Ocean History



Navigation landscape along coasts and harbors

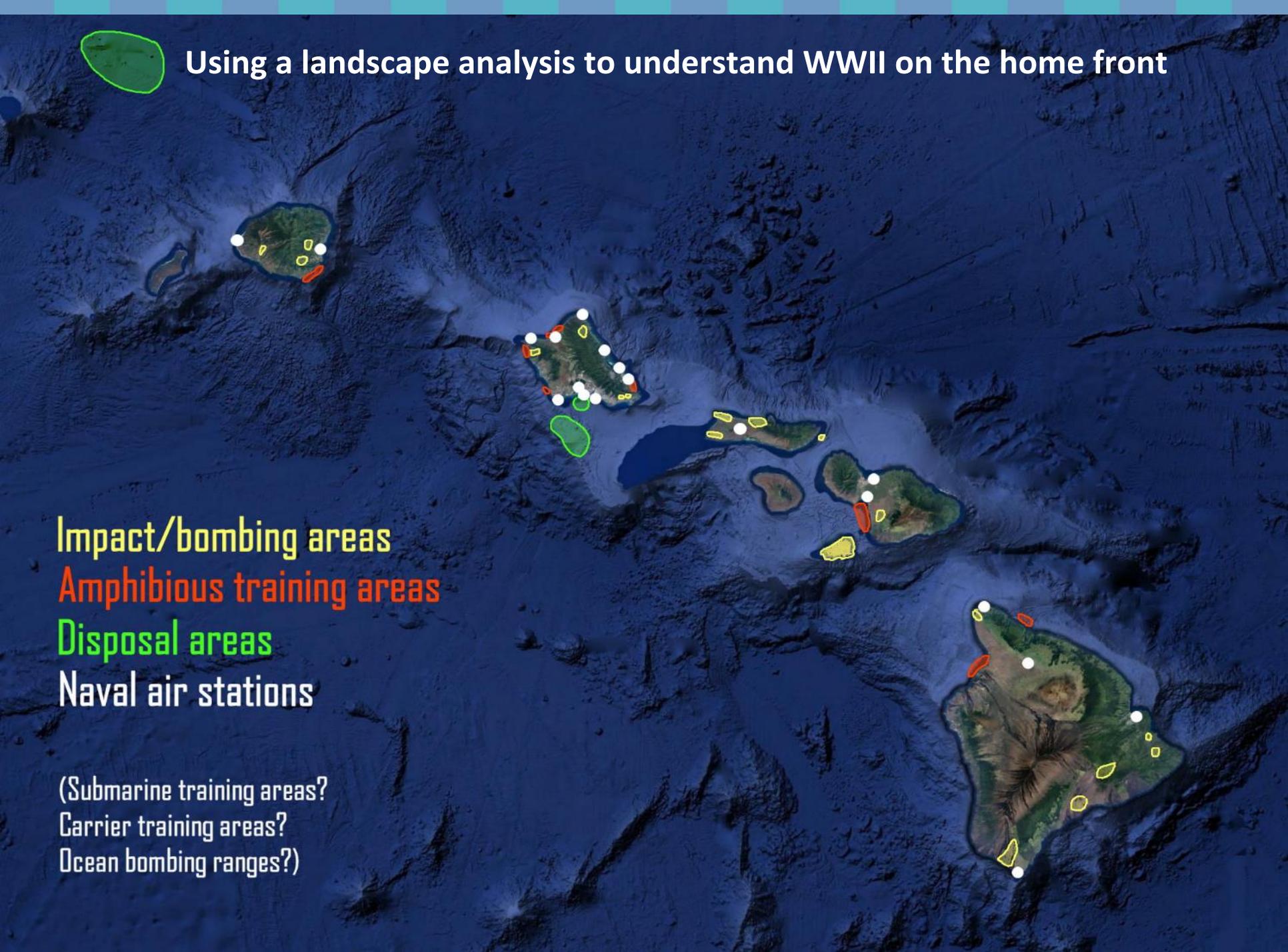


Commercial fishing landscape



Cultural landscape of traditional voyaging

"The maritime cultural landscape signifies human utilization (economy) of maritime space by boat, settlement, fishing, hunting, shipping, and its attendant subcultures, such as pilotage, lighthouse and seamark maintenance..."



Using a landscape analysis to understand WWII on the home front

Impact/bombing areas

Amphibious training areas

Disposal areas

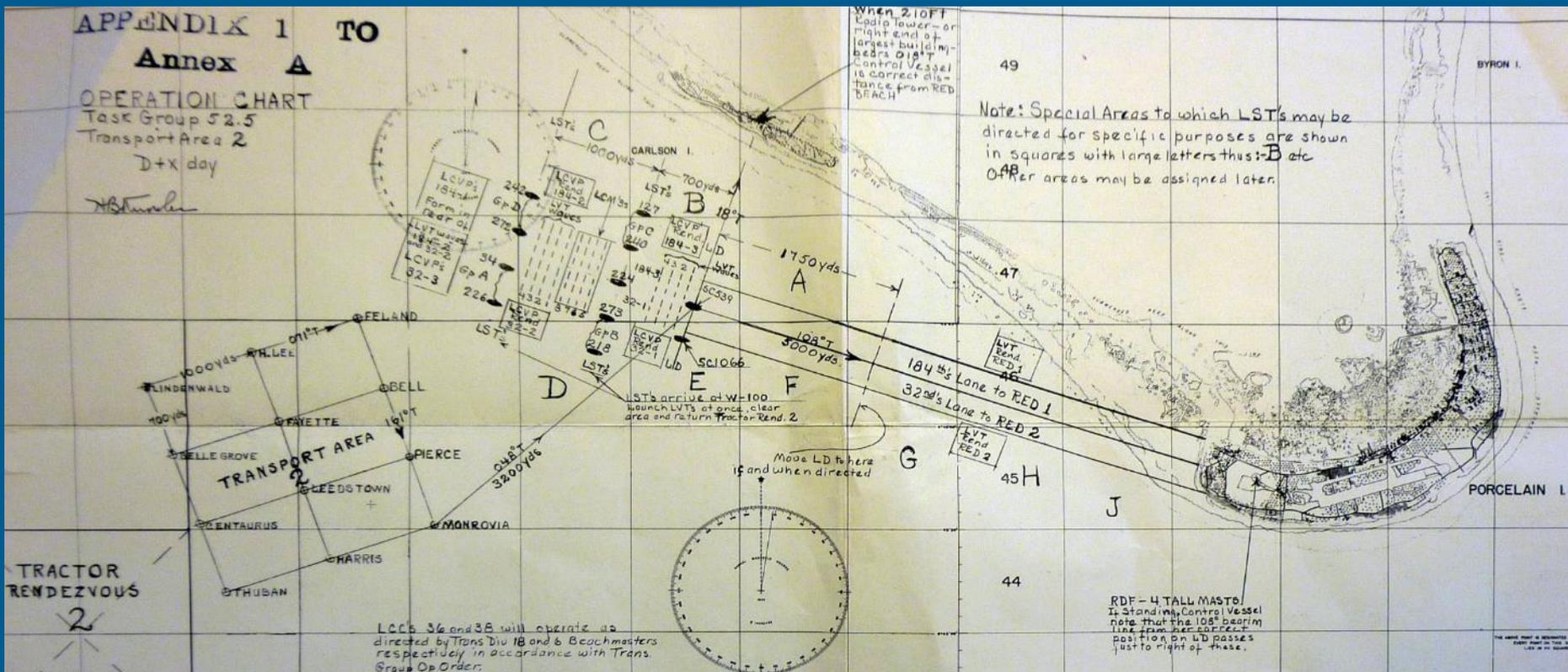
Naval air stations

(Submarine training areas?

Carrier training areas?

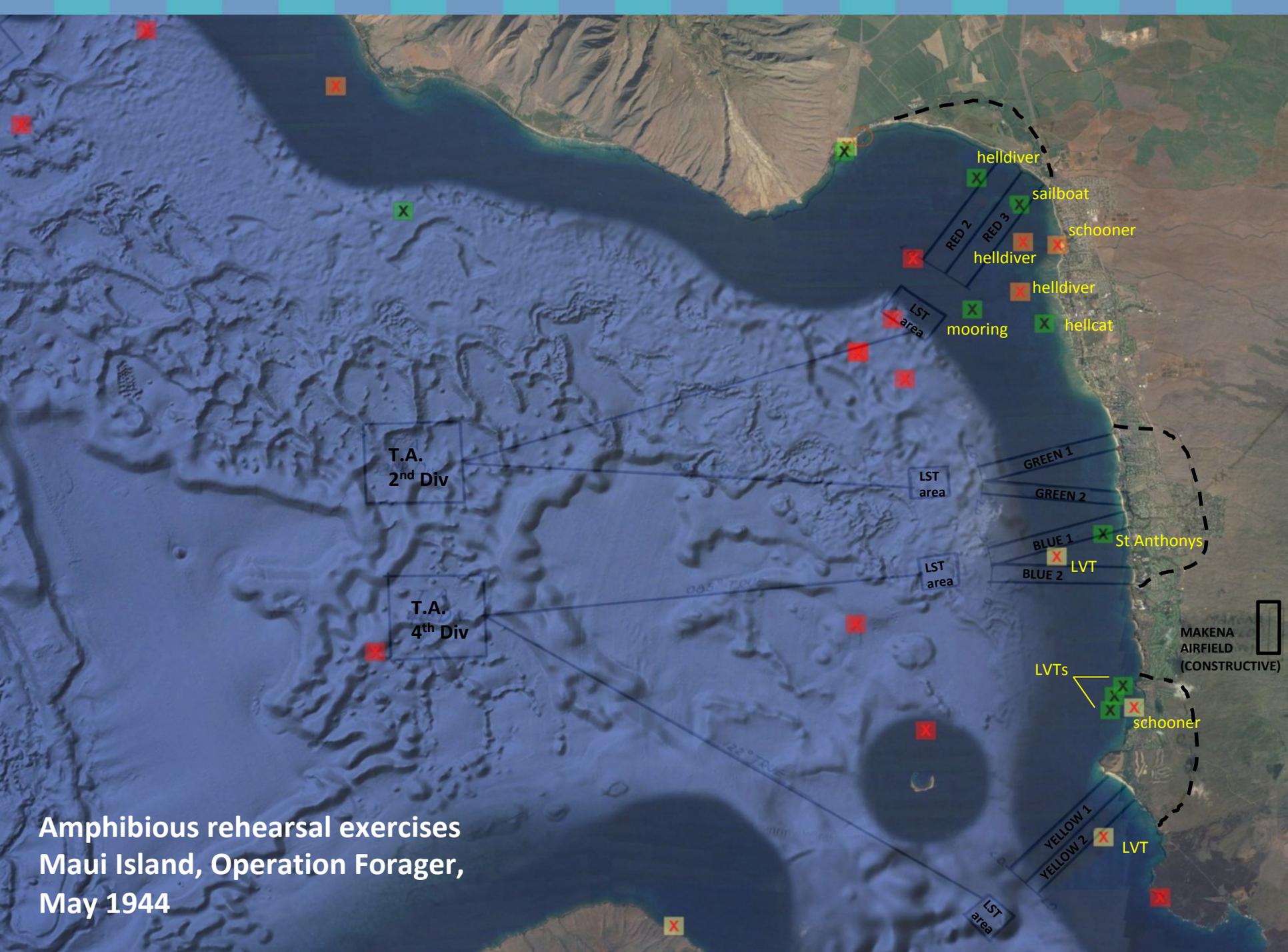
Ocean bombing ranges?)

Amphibious landing plan “Porcelain” Island -- Kwajalein



National Archives

...one of the most organized, premeditated, regimented, and patterned forms of human behavior...the action of military units on a battlefield are based on the tactics of the prevailing military wisdom of the day; they are not random. (Potter et al 2000)



**Amphibious rehearsal exercises
Maui Island, Operation Forager,
May 1944**

T.A.
2nd Div

T.A.
4th Div

helldiver

sailboat

schooner

helldiver

helldiver

mooring

hellcat

GREEN 1

GREEN 2

BLUE 1

BLUE 2

St Anthony's

LVT

MAKANA
AIRFIELD
(CONSTRUCTIVE)

LVTs

schooner

YELLOW 1

YELLOW 2

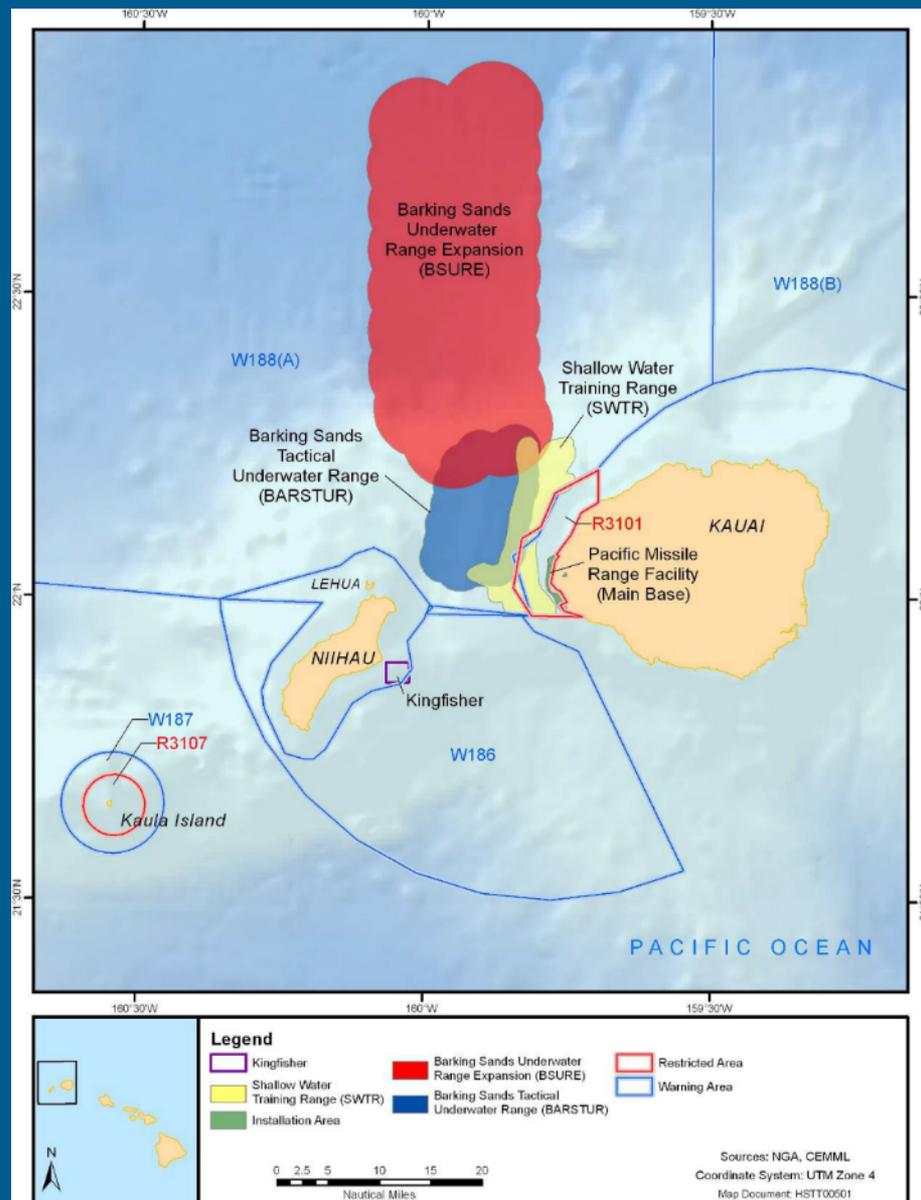
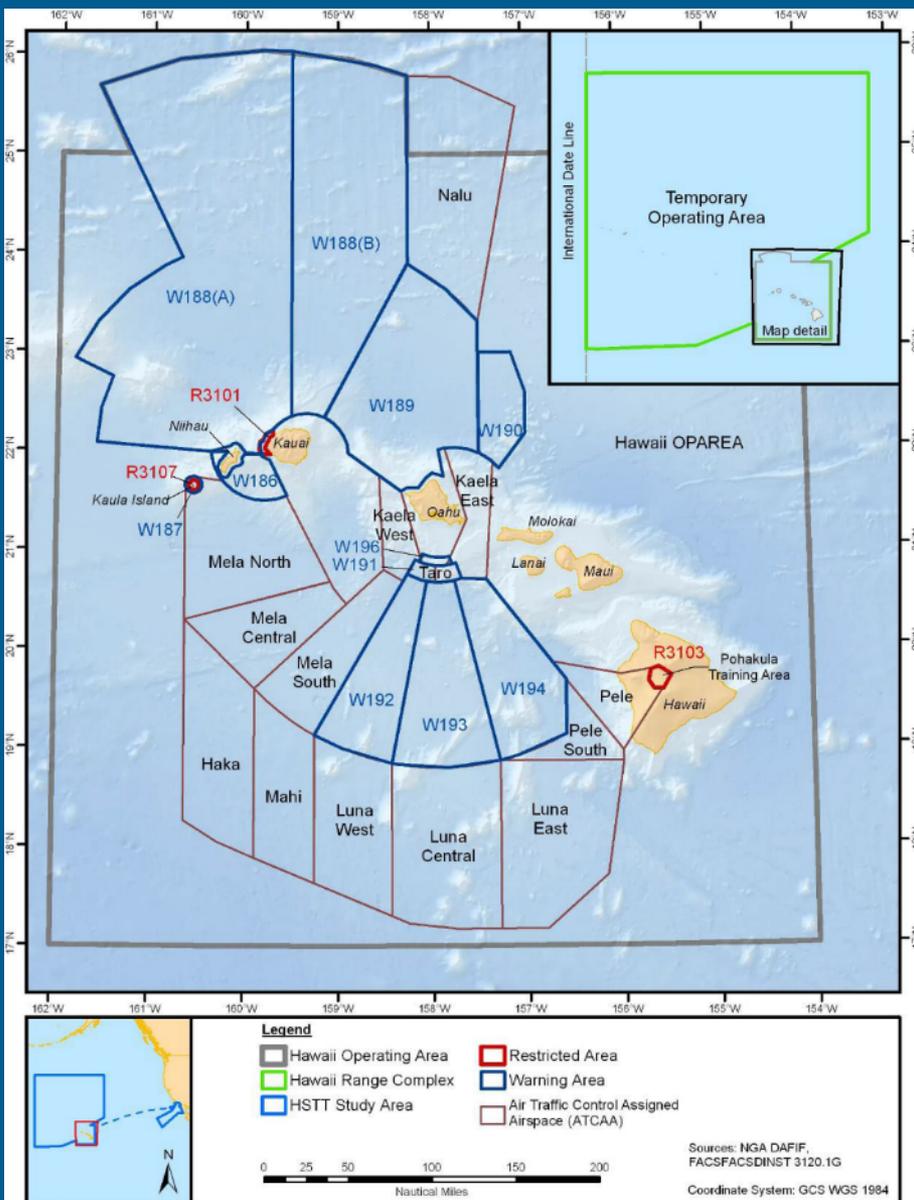
LVT

LST area

LST area

LST area

LST area



Examples of modern military training landscapes in Hawai`i

Potentially polluting wrecks worldwide

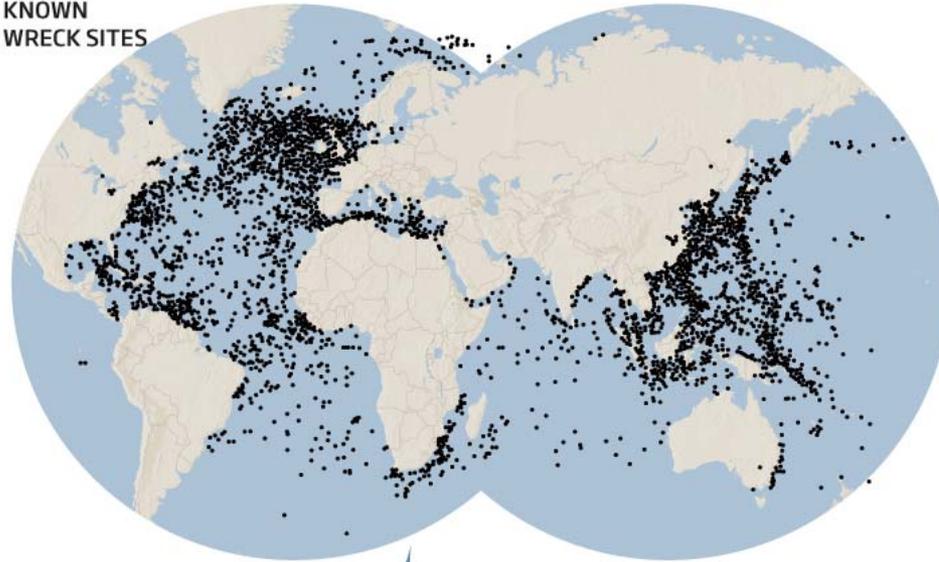


Rusting time bombs

©NewScientist

There are over 8500 potentially polluting wrecks lying on the seabed, nearly 1600 of which are oil tankers. Most of them sank during the second world war

KNOWN WRECK SITES



Exxon Valdez
tanker spill
1989



~40,000
tonnes

Deepwater
Horizon
2010



~1.1 million
tonnes



1 tonne of oil = ~7 barrels = ~1.1m³

ESTIMATES
OF THE OIL REMAINING
IN SUNKEN VESSELS

2.5 to 20 million
tonnes

CLEAN-UP
COSTS

\$2300 to \$17,000
per tonne

SOURCE: SEA AUSTRALIA

Review:

- 1) The maritime heritage field = submerged social science**
- 2) The Hawaiian Islands during the war years = history**
- 3) The WWII resource base in Hawai`i = maritime archaeology**
- 4) Wrecks and the environment = biological interactions**
- 5) Access to the oceans = evolving marine technology**
- 6) Maritime Cultural Landscapes = understanding our impacts**

“Curiosity is the First Prerequisite”

Wreck of the *Dunnottar Castle* 1886



History and heritage have a special place in Our Oceans...

Thank you for participating

