

1562 Gutierrez map

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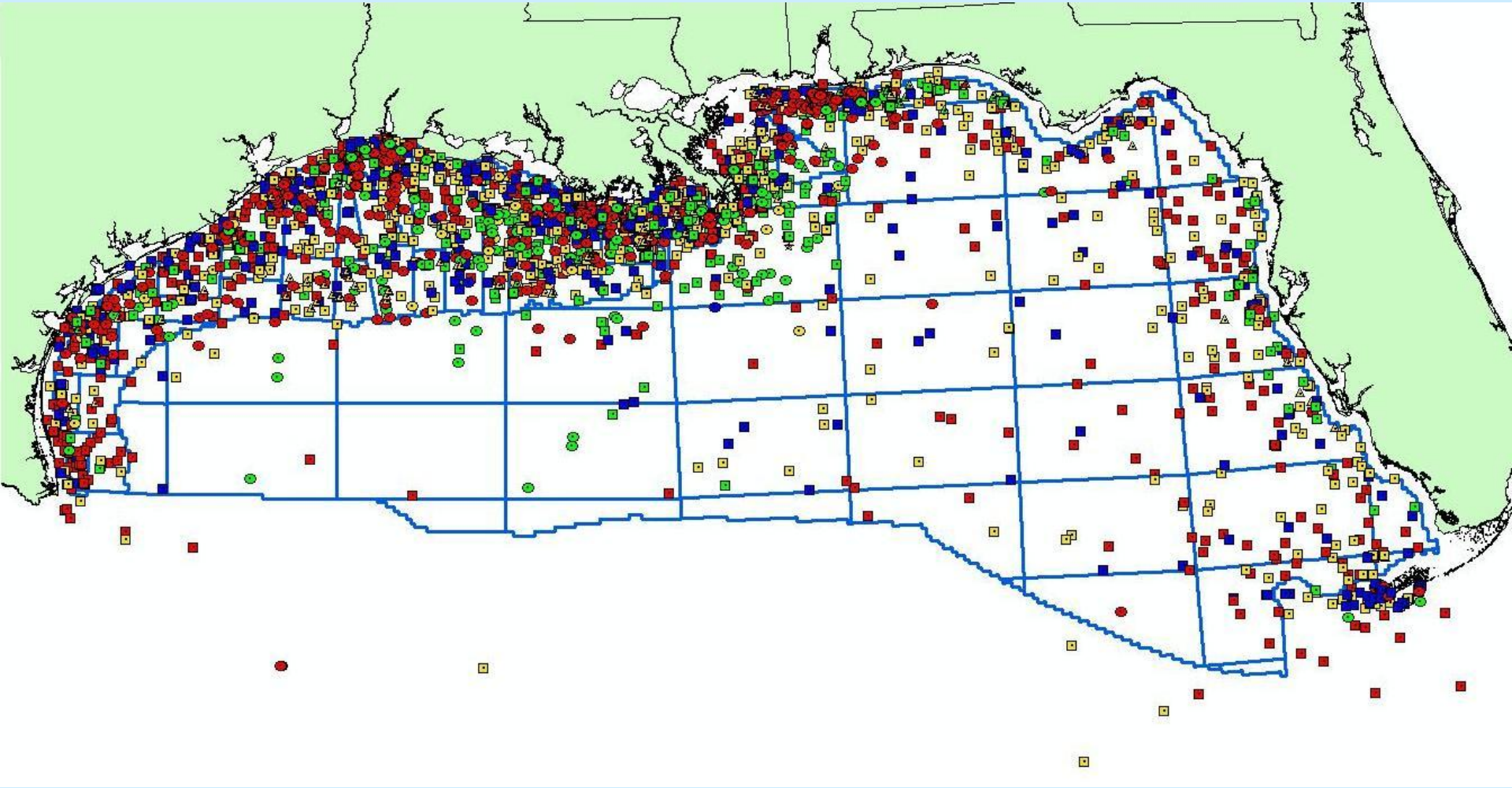


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<p>**PO = Physical Oceanography FE = Fate & Effect BIO = Biology PS = Protected Species SE = Social & Economic OT = Other</p>			

Gulf of Mexico OCS Region



**A Comparative Analysis of an Oil Spill on Biota Inhabiting
Several GOM Shipwrecks Spanning the 19th to 20th Centuries**



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Tentative Ranking: 3

BOEM Information Need:

- whether and how oil, dispersed oil, and dispersant used to manage the overall oil spill interact with and are integrated within the seafloor and these micro-habitats
 - address the long term impacts on the biota and the seafloor surrounding each of the test sites
- address the archaeological degradation of metal and wooden hulled shipwreck sites, the impacts that hydrocarbons and other chemicals have on site formation processes, and current state of six sites from a 2004 study plus additional wooden shipwrecks with available pre-spill baseline data

Date Information is Required:

As soon as possible as no other studies of this sort are being conducted on submerged cultural resources

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Tentative Ranking: 3

Background:

A) Relationship with Previous Work/Efforts

Previous BOEM-funded studies: predictive modeling, site-specific studies
None have examined actual impacts from oil spills on shipwrecks and their biota

2004 MMS study “*Archaeological and Biological Analysis of World War II Shipwrecks in the Gulf of Mexico*” = baseline data at 6 WWII shipwrecks which contain a diverse array of biota

- biochemical analysis provided information on the site formation processes as well as the types of microorganisms inhabiting the sites and whether they accelerated the degradation process for metal-hulled shipwrecks - many of these sites have not been revisited since 2004

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Tentative Ranking: 3

Background:

B) Relationship with Concurrent/Future Efforts

Post-spill investigations are looking at deepwater coral colonies near the Macondo site; 1 colony to SW exhibited stress from possible oil exposure

However, only visual inspection with ROV at a few select shipwreck sites in vicinity; no samples collected for analysis

No NRDA studies on impacts to cultural resources (especially shipwrecks)

Study's Objectives:

- Complete a detailed comparative analysis of new data with data from 2004 and other sites with pre-spill baseline data
- Assess current physical and environmental conditions – were the sites exposed to oil?
- If exposed to oil, how has it affected the sites and their states of preservation?
- Identify changes over time in resident biota

Study's Methods:

- Reassess and compare the local environment pre- and post-spill from available video
 - identify physical and biological modification of sediments in the immediate area
- Collect and analyze floral and faunal samples to determine degree of impact from oil/dispersant (if any)
- Collect and analyze wood, metal, sediment samples for oil/dispersant exposure to understand any impacts (mass spectrometry, etc.)
- Archaeological assessments to identify changes since baseline
- Bio-battery coupons placed on site to track *in situ* rust formation rates
- Microbial metabolic rate measurements
- Repeat sampling/analysis every 3-5 yrs over ~15-yr period, long-term monitoring

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Tentative Ranking: 3

Addition *Pertinent* Information:

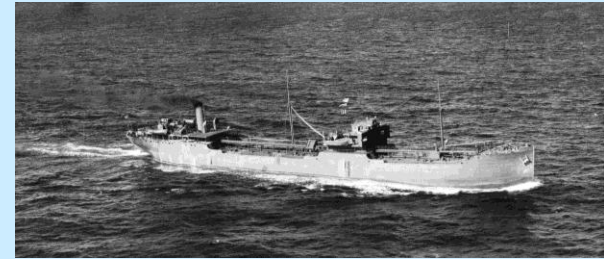
- Public outreach component – posters, booklets, etc.
- Proposed collaboration between BOEM, U.S. Naval Research Laboratory, George Mason University and potentially others
- Training and research experience for students through a mentorship program (TBD)
- Conference presentations: American Geophysical Union and Society for Historical Archaeology targeted

Shipwrecks from 2004 study

Virginia



Halo



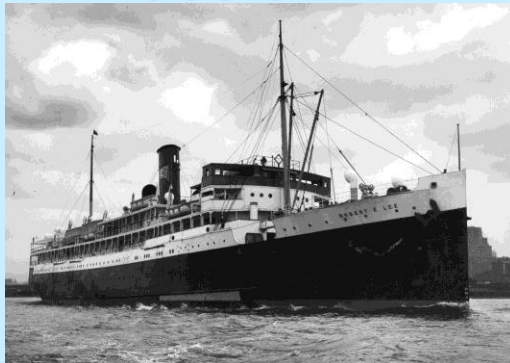
Alcoa Puritan



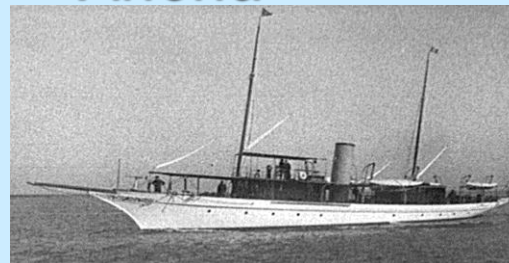
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Robert E.



Anona

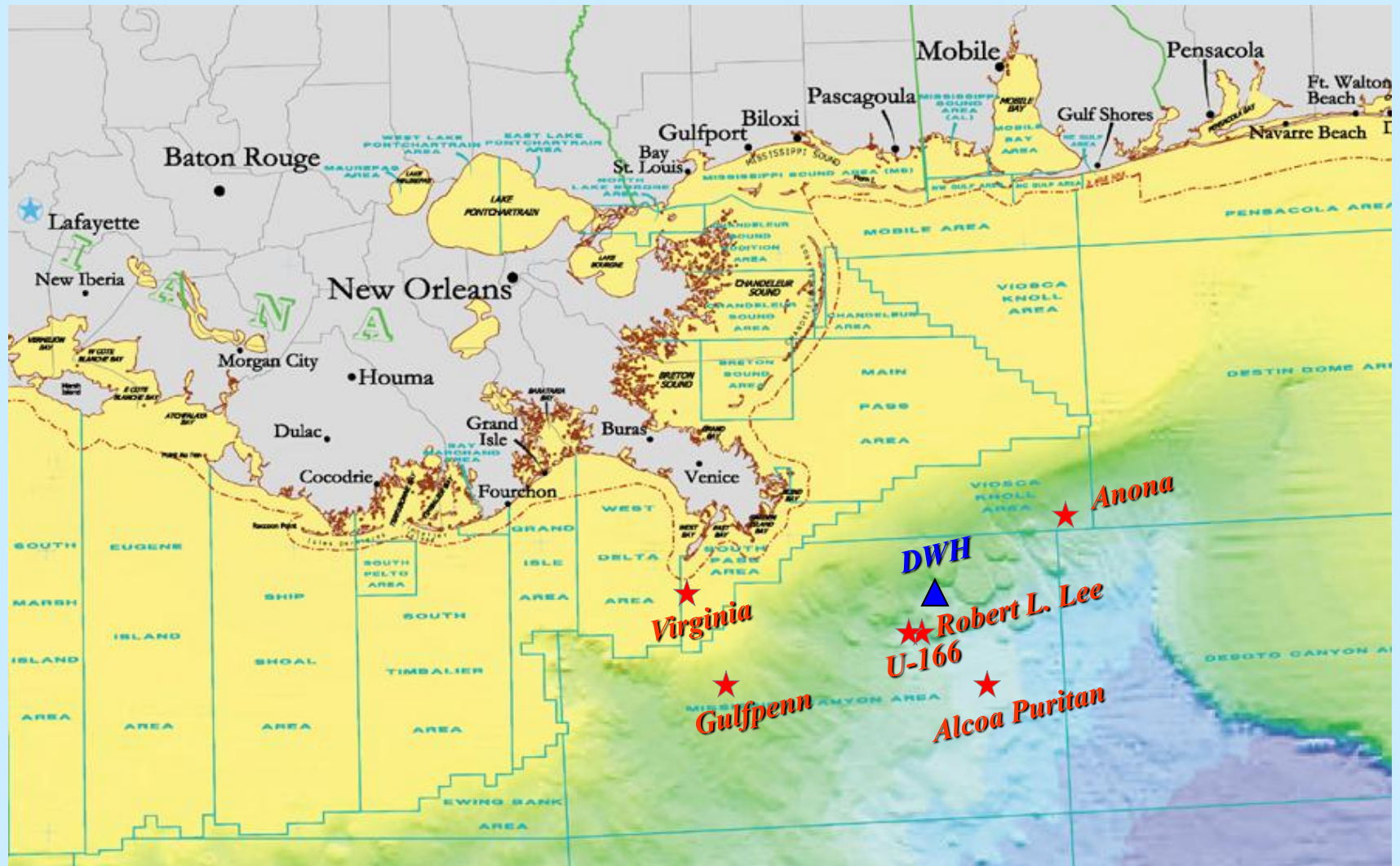


U-166



Shipwrecks Investigated During the 2004 Deep Wrecks Study

World War II U-boat casualties and U-166

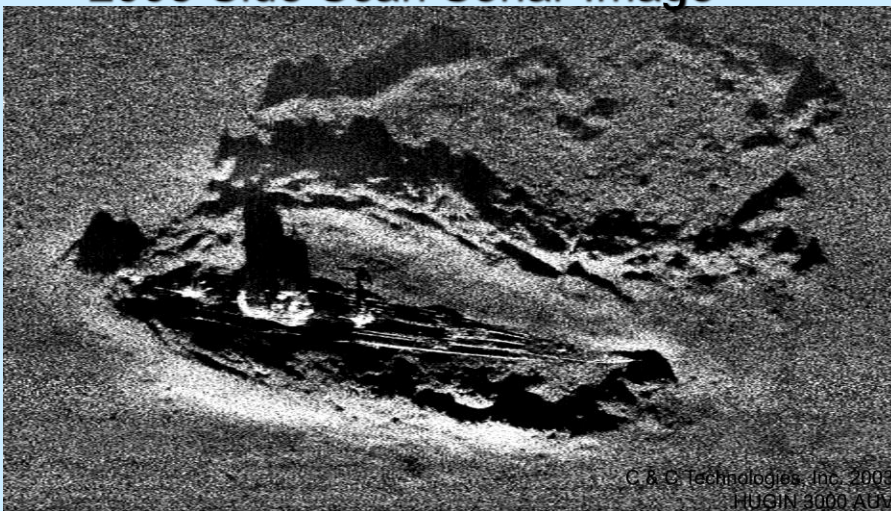


U-166

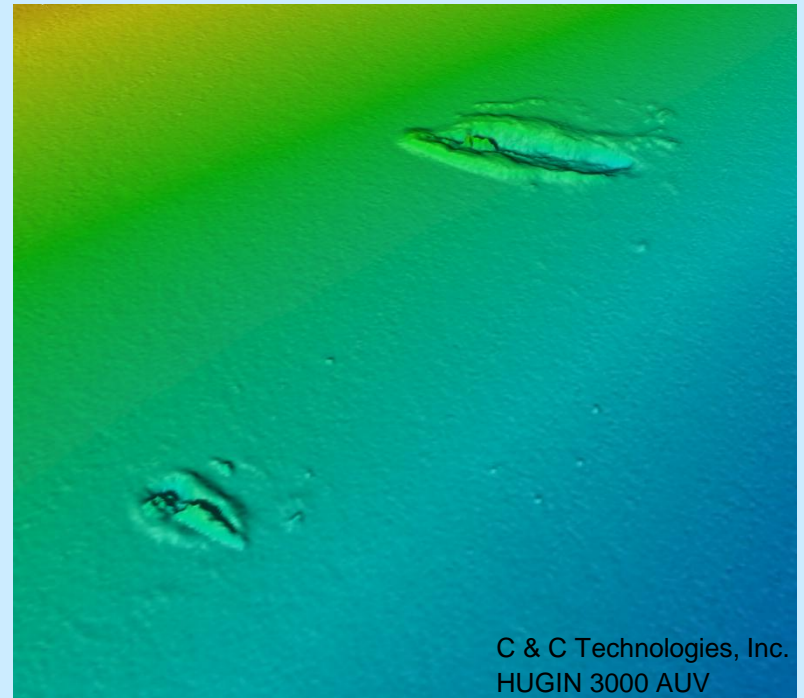
- Sunk on July 30, 1942
- During action with PC-566
- After sinking the *Robert E. Lee*
- Averages Water depth at the wreck site is 4,780 feet



2003 Side Scan Sonar Image

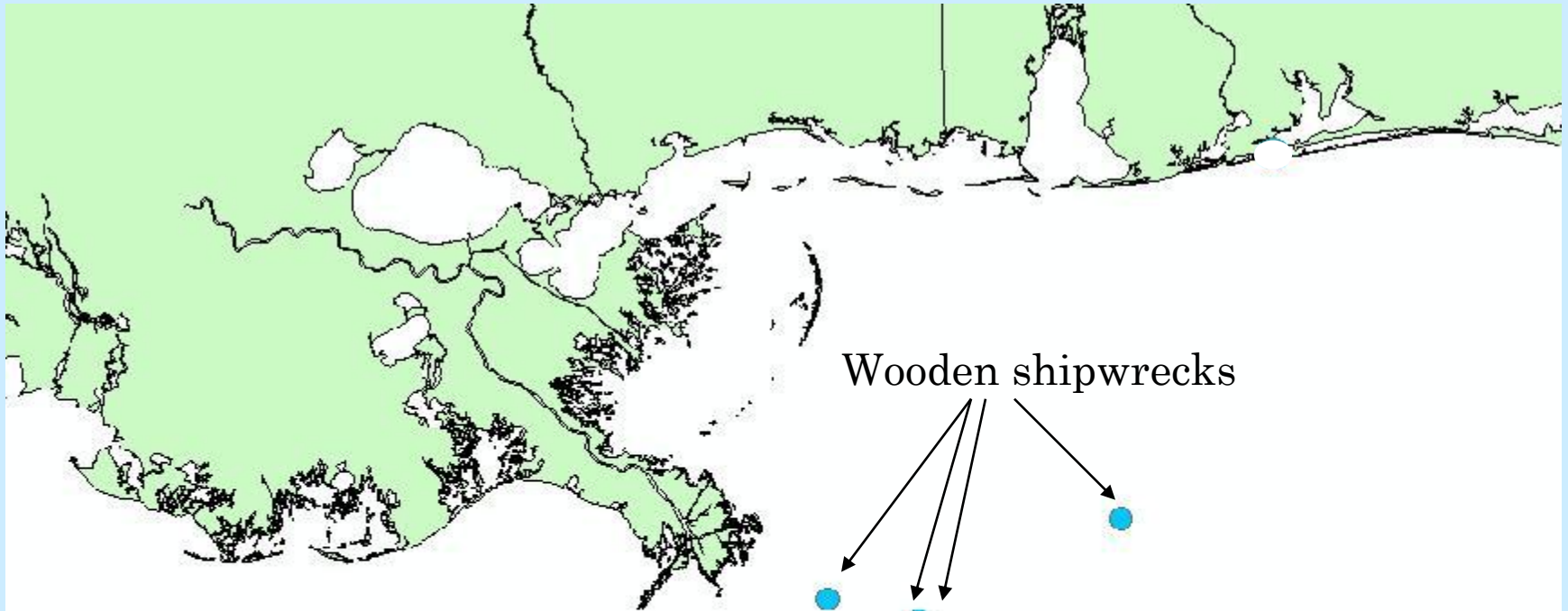


C & C Technologies, Inc. 2003
HUGIN 3000 AUV



C & C Technologies, Inc.
HUGIN 3000 AUV

Potential wooden shipwreck sites to be investigated



Wooden shipwrecks

Macondo well

- Mardi Gras wreck
- Mica wreck
- Petronius wreck
- former Western Empire
- Other wooden wrecks outside of spill impact area