**SCUBA Dive Assessment of the**
**Red Sea Tugboat Artificial Reef**
**Off Panama City, Florida**
**March 9, 2010**

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## PURPOSE

The primary objective of this assessment was to confirm the current navigational clearance of the 125 ft. long tugboat, the *M/V Red Sea*, located in the Gulf of Mexico off Panama City (Bay County, Northwest Florida, Northeast Gulf of Mexico). Additionally, FWC staff conducted a roving diver fish census and photographed representative features of the fish assemblages and structure, and County staff installed a replacement navigational buoy.

## BACKGROUND

The *M/V Red Sea* Tug is a 125 ft. long steel ocean tug which was deployed as an artificial reef on June 24, 2009 within the Midway II Artificial Reef Permit Area located 6.3 nautical miles south-southeast of the Panama City Entrance Channel in state waters at a depth of approximately 72 ft. The Midway II Artificial Reef Permit Area was permitted to Bay County by the Florida Department of Environmental Protection on September 15, 2008 (Permit No. 03-0288569.001-DG), and by the U.S. Army Corps of Engineers on March 16, 2009 (Permit No. SAJ-200704354 IP-CP).

Previous dive inspections of the *Red Sea* Tug Reef were conducted on June 24, 2009 (immediately after deployment) by FWC staff Bill Horn and Keith Mille (Horn and Mille 2009), and on August 30, 2009 by Bay County Artificial Reef Coordinator Allen Golden (Golden 2009). The navigational clearance measured on June 24, 2009 was 37 ft., and the navigational clearance measured on August 30, 2009 was 40 ft.

FWC's primary diving objective during this assessment was to document the navigational clearance of the Tug Red Sea, with the secondary objective of conducting a roving diver fish count and securing photos of the general hull fouling condition and representative fishes associated with the tug 8.5 months post deployment. This assistance was requested by Mr. Terry Wells of the U.S. Army Corps of Engineers and Mr. Allen Golden, Bay County Planning's artificial reef coordinator. The County's primary objective during this dive effort was to deploy and attach to the tug an unlighted yellow nun buoy about six feet tall with reflective tape to replace the buoy that was originally deployed with the vessel on June 24, 2009 but was recently lost (after approximately 8.5 month duration) due to apparent abrasion and subsequent severing of the 5/8" steel cable. The Bay County Artificial Reef Coordinator reported the loss of the first buoy to the U.S. Coast Guard on March 8, 2010. No report has yet been received of any sighting of this first buoy adrift. There were reports that this first buoy had been utilized to tie up to by fishing and diving vessels. This replacement buoy, like the first buoy, had printed in black letters on the side: Midway II Red Sea Tug, Bay Co. FL. Permit 09-010.

Bay County Sea Grant Agent, Steve Theberge was also on board in a non-diving capacity. His interest was in testing out a new drop down camera. Robert Cox, President of the Mexico Beach Artificial Reef Association had also been invited to provide additional underwater photographic documentation.

**Crew and passengers on board the *M/V Captain SCUBA II***

**Divers:**

Keith Mille, FWC Division of Marine Fisheries Management
Jon Dodrill, FWC Division of Marine Fisheries Management
Allen Golden, Bay County Artificial Reef Coordinator, Bay County Planning Division
Bob Cox, President, Mexico Beach Artificial Reef Association
Paul, First Mate and Dive Master, Panama City Dive Center
Mike Gomez, Owner/Instructor, Panama City Dive Center
Nick, open water student of Mike Gomez, citizen

***Non-Divers***

Steve Theberge, Bay County Marine Extension Agent, Florida Sea Grant
Captain Mike 'Rambo' Ramsey, Vessel Captain, Panama City Dive Center

**Methodology**

The vessel used for this dive assessment was the M/V Captain SCUBA II, a 45 ft long dive boat operated by Panama City Dive Center. The M/V SCUBA II is a 28 passenger dive boat.

Still photographs were taken using a Nikon D100 camera and 12-24mm lens in a Light and Motion Titan housing with dual Sea & Sea YS90 strobes.

Fish census was conducted using the roving diver technique (Schmitt and Sullivan 1996), and data recorded on water proof underwater paper.

Minimum navigational clearance measurements were taken using four different dive computers: Dive Rite Nitek III, Oceanic Prodigy, Oceanic Data Max, and Oceanic Data Plus.

**Chronology**
1045 hrs (Central Time): FWC staff arrives at Panama City Dive Center (PCDC) and completes paperwork, payment, and roster.

1100 hrs: FWC staff arrive at Captain Andersons Marina and begin loading the *M/V Captain SCUBA II*.

1140 hrs: *M/V Capt SCUBA II* departs from Anderson Marina.

1233 hrs: *M/V Capt SCUBA II* arrives at the Tug Red Sea location. Already at the Tug Red Sea Reef was a 25 ft. inboard/outboard boat, the *M/V Salt Shaker III* anchored directly over the Tug Red Sea with all 3 passengers (the captain and two paying customers: one male and one female) fishing the site using light open face spinning tackle with 2-3 hooks baited with small live bait (possibly menhaden). The *Salt Shaker III* is a 6-pack fishing charter vessel captained by Captain Bryan Clacker out of Captain Anderson's Marina in Panama City Beach (2100 West Beach Drive, phone 850-914-2111). Between 1234 hrs and 1307 hrs, while waiting for the fishing vessel to complete fishing and while trying to position the *Capt SCUBA II* at a safe distance from the fishing vessel, we observed the fishing vessel catch three flounder which were kept, and three Red Snapper which were released.

1328 hrs: After standing by for about one hour and numerous failed attempts to position the M/V SCUBA II to safely tie in to the Red Sea adjacent to the fishing vessel, Captain Ramsey communicates with the vessel fishing captain and the fishing vessel captain states they plan to depart in 30 minutes, so The M/V SCUBA II motors over to other nearby areas where the County wanted to confirm some coordinates.

1402 hrs: Upon our return, the *Salt Shaker III*'s anchor was hung in the Red Sea. Dive Master Paul went into the water and released it. At around 1402 hrs the *Salt Shaker III* stowed its fishing gear, retrieved the

anchor disengaged by our Dive Master, and headed towards shore. No other vessels were observed fishing in our vicinity while we were offshore. After the *Salt Shaker III* left the area, Dive Master Paul is dropped at the Tug Red Sea coordinates and on SCUBA swims down to the Tug Red Sea Reef and attaches the *M/V SCUBA II* anchor line to the bow capstan on the Tug Red Sea Reef.

1436 hrs: Divers entered the water and began the dive. The First Mate/divemaster Paul had tied the *Capt Scuba II* into the bow capstan of the Red Sea (the top of the capstan was at fifty feet). Following entry into the water off the port beam of the dive boat, Keith Mille and Jon Dodrill followed a connecting line to the main down line and descended and performed a circuit of the tug, moving along the port side, passing behind the stern around the rudder and back along the starboard side to the top of the wheelhouse, then back up the dive boat mooring line. Additional underwater photos were taken by Bob Cox. The Dive Master, Paul assisted Allen Golden with the buoy deployment, secured at the same location with the same steel cable as the previous buoy (attached to the starboard stern gunwale).

1500 hrs: Divers surfaced from the dive and re-boarded the M/V SCUBA II.

1520 hrs: The *M/V SCUBA II* departed the Tug Red Sea and returns to Panama City.

1610 hrs: The *M/V SCUBA II* arrived at Captain Anderson's Marina.

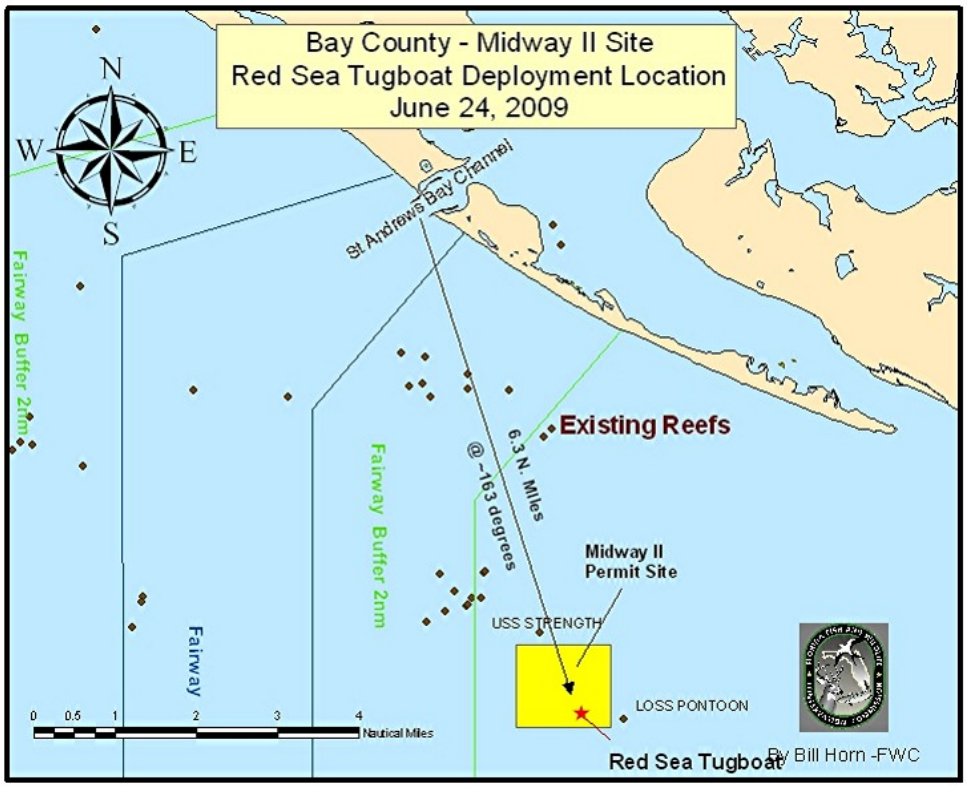


**Figure 1 –** Location of the Midway II reef site and the Tug Red Sea Reef in relation to Panama City and the St Andrews Inlet Channel (prepared by Bill Horn, FWC).

**DIVE RESULTS**

**Dive No. 1 - Bay County, Tuesday, March 9, 2010**
**73 feet for 32 minutes, entered the water at 1436 CDT**

| UNDERWATER CONDITIONS | | SURFACE CONDITIONS | |
|---|---|---|---|
| **VISIBILITY:** | **20 feet estimated** | **AIR TEMP:** | **62º F** |
| **TEMP:** | **Bottom 56º F** | **WIND:** | **SE 10-15 MPH** |
| **CURRENT:** | **Moderate** | **SEAS:** | **2-4 ft.** |

| | |
|---|---|
| **SPECIFIC REEF SITE:** | **Red Sea Tugboat, FWC# BA0230** |
| **DISTANCE OFFSHORE:** | **6.5 nm South-Southeast of St. Andrews Channel** |
| **DEPTH:** | **73 feet (KM)** |
| ***DIVE COORDINATES:*** | ***30º 00.958' N / 85º 42.003' W*** |
| ***GRANT #:*** | ***None*** |
| ***MATERIAL TYPE:*** | ***Steel oceangoing tugboat*** |
| ***DEPLOYMENT DATE:*** | ***June 24, 2009*** |
| ***PROFILE:*** | ***35 feet , clearance 41 feet*** |

**DIVE NOTES AND OBSERVATIONS**

**Navigational Clearance Measurements**

Four depth gauges were placed at the top of the wheel house to record the depth to the top of the wheelhouse. Jon Dodrill's Oceanic Data Max depth gauge measured 41 ft depth; Keith Mille's Dive Rite Nitek3 measured 42 ft. depth; Keith Mille's Oceanic Prodigy measured 40 ft.; and Bob Cox's Oceanic Data Plus measured 42 ft. The average of all 4 dive computer depth measurements was 41.25 ft. The time of day of the depth gauge readings was estimated to be about 15:05 central time, and high tide (+1.03 feet) occurred at 14:51 central time. The estimated MLLW at Panama City Beach is 0.03 ft. Therefore, the calculated MLLW navigational clearance of the Tug Red Sea on March 9, 2010 was estimated to be approximately 40.19 ft. (41.25 ft. (measured depth) – 1.03 ft. (reported tidal elevation at 14:51 central time)) – 0.03 ft. (MLLW) = 40.19 ft.). As an intended supplement to the dive computer depth measurements, Keith ran a crab trap buoy to the surface using a wreck diving reel and knotted the line off at the top of the wheelhouse to mark the vertical distance to the surface. Unfortunately the knot pulled out due to the rough sea state during the remainder of the dive and as a result we were unable to measure the length of the line to the surface buoy following the dive. Surface sea surface conditions combined with a light current running were too rough to permit accurate or safe use of a tape measure to measure the vertical distance.

There was some scouring along the base of the hull with a maximum depth to the bottom of the scour depression substrate reported by Keith at 73 ft. The coordinates at the Tug Red Sea Reef were confirmed prior to the dive using a handheld Garmin76 GPS which were the same as the deployment coordinates. There was no indication that the vessel has shifted position or general orientation since its initial June 24, 2009 deployment.

**Preparations by Bay County for Navigational Aid Compliance**

Allen Golden stated his intent to proceed with a solar powered lighted buoy to be placed in the center of the permit area. Allen was looking at a product from Carmanah Technologies Corp. (Address: Building 4, 203 Harbour Road Victoria BC Canada V9A 352; toll free 1.877.722.8877. Web: carmanah.com (contact: Business Development Manager: Brian O'Flynn; boflynn@carmanah.com ; Cell 1.250.415.3053)). This

is the same company FWC Boating and Waterways Coordinator Ms. Tara Alford previously recommended to Allen Golden on April 1, 2009.

On March 8, 2010 Allen Golden met with Chief Jason M. Rule, Officer in Charge, of the U.S. Coast Coast Guard Aids to Navigation Office (AtoN) Panama City (cell 850.596.1665; Jason.m.rule@uscg.mil). During this meeting Chief Rule showed Allen Golden several 5,000 pound concrete anchors that were no longer in use because the old concrete anchors had been replaced with new 300 pound steel sinkers. Chief Rule was looking for a beneficial way to dispose of the old concrete anchors. He said that if Bay County could not use them, they would otherwise be transported to Mobile, Alabama where the concrete would be crushed and recycled. Allen Golden suggested the use one of the discarded anchors for the center of the Midway II site. Since the Midway II site is located about 6 miles from the Panama City Entrance Channel, Chief Rule said they might be able to deploy the sinker for Bay County because they are frequently working in the area and they have the equipment to deploy and maintain "Aids to Navigation" in this area, provided the project benefits the public and provided a formal written request letter is sent from Bay County to Chief Rule.

Donation of concrete anchors as a beneficial use disposal option of USCG buoy anchors has been previously used in Florida, most recently off Sarasota by the USCGC Joshua Appleby, U.S. Coast Coast Guard Aids to Navigation Office (AtoN) St. Petersburg. Twelve concrete buoy anchors were deployed as artificial reef material within the Lynn Silvertooth Sarasota County Artificial Reef Site on October 5, 2009.

On Friday, March 12, 2010 and March 15, 2010 additional correspondence was received from Dr. Madeleine W. McNamara, Waterways Management Coordinator, Eighth Coast Guard District, New Orleans (504-671-2103) further clarifying the Coast Guard's expectations for the deployment of the navigational aid Bay County is required to deploy and maintain in accordance with the Midway II Artificial Reef permit (Permit No. SAJ-200704354 IP-CP). As stated in the USACE Permit No. SAJ-200704354 IP-CP issued to Bay County, "Prior to the deployment of the vessel, the permittee will gain proper authorization and must install and maintain, at their expense, any safety lights and signals prescribed by the U.S. Coast Guard." Therefore, under no uncertain terms, Dr. McNamara provided the following corrective statements via email on behalf of USCG District Eight:

1) The U.S. Coast Guard has not offered to and will not deploy any aids to navigation for the Midway II reef site;
2) The U.S. Coast Guard has not and will not provide equipment to Bay County;
3) The U.S. Coast Guard has provided technical lighting information to Mr. Golden;
4) The District Waterways Office is the point of contact for all artificial reef matters within District Eight. Field units should not be solicited.

On March 15, 2010, Mr. Allen Golden notified all parties that Bay County will utilize an alternative donation source for the concrete buoy anchor to be deployed at the center of the Midway II Artificial Reef Site.

**General Fish Distribution**

A list of fishes observed during the approximate 25 minute roving diver circumnavigation of the tug appears in Table 1. Jon Dodrill was the primary observer for the roving diver fish census, supplemented by the observations of Box Cox and Keith Mille who also each saw a Bank Sea Bass and Bob also noted a Gray Triggerfish. Hundreds of tomtate grunts (3-6" Total Length (TL)) were aggregated at the bow. Thousands of schooling bait fish (round scad) were in the water column over the wheel house. The Divemaster also reported balls of baitfish out away from the vessel over open sand. He also noted several flounder out on the sand near the tug. The single southern flounder Jon Dodrill observed was perched perfectly camouflaged on the starboard gunwale of the tug, then dropped down to the deck when disturbed. Enough of a fouling community had developed on the ship to provide microhabitat shelter to accommodate belted sandfish, blennies, and juvenile cocoa damselfish. The thirty to forty 15-24 inch total length (estimate) red snapper we observed were down below the level of the main deck, toward the stern around the rudder and out in the water column over the adjacent sand at depths of 60-70 ft. The two legal size vermilion snapper seen were down below the top of the wheel house and not up in the water

column, and the 6 juvenile vermilion snapper were observed on the deck of the vessel mixed in with a school of tomtate grunts. The lone gray snapper and gag grouper were observed on the vessel deck.

Between the gunwale and the deck on the inside of the hull two to three dozen purple sea urchins were observed, as well as a dead sand dollar observed on the deck. The dive master said he observed an octopus species, concealed on the vessel. Bob Cox noted and photographed some anemones.

Jon Dodrill noted a lost egg sinker (approximately 8 oz) on the bow. There was approximately 20 feet of length of cable still attached to the starboard stern gunwale remaining from the original buoy deployment which Keith pointed out as frayed. Jon Dodrill saw two other lines, ¼" or thicker draped across the port side of the vessel, plus the upper railing from the top of the wheelhouse that had detached and shifted from its original position. The detached stack appeared to be where it was placed - jammed into the hold.

**CONCLUSIONS AND RECOMMENDATIONS**

The results of this dive assessment report a navigation clearance of 41.25 ft as measured by dive computers, and 40.19 ft after adjusting for tides and MLLW.

Unless the County is able to immediately secure a 4 ft. waiver of the required -45 MLLW minimum navigational clearance and the associated buoy requirements, we recommend that the County proceed with the planned purchase and deployment of the required lighted buoy at the center of the Midway II permitted area. Locating the navigational aid sufficiently away from the Tug Red Sea will prevent boaters from using the navigational aid as a mooring buoy (note, tying up to a navigational aid is against the law, unless it is an extreme emergency). For the installation of the navigational aid, we strongly recommend using appropriate tackle as previously recommended by FWC Boating and Waterways, and the USCG (e.g., suitable anchor, minimum ½ inch stainless steel cable, subsurface buoy located 1/3 of the way up off the bottom, etc.).

Once the lighted buoy is installed at the required location at the center of the Midway II permit area, we recommend removal of the unlighted buoy from the Red Sea Tug. Based on the results of this dive inspection, the original nun buoy cable failed as a result of failure of the primary cable, which was frayed at a distance of approximately 20 ft. from its attachment point at the stern of the tug. Looped through the gunwale of the starboard stern of the tug was a teflon-coated stainless steel cable which even after 8.5 months appeared to still be intact with no apparent areas of cable failure. Attached to the stainless steel looped cable was the primary cable (not stainless) which attached to the buoy. As a result of a combination of normal corrosion (non-stainless) and likely rubbing on the wheelhouse structure during certain current directions, likely caused the original cable to prematurely corrode, fray, and eventually fail at a distance of approximately 20 ft from the attachment point. Further accelerating the failure of the buoy cable line may have also been the reported use of the buoy as a mooring buoy by recreational boats and some dive boats (the Panama City Dive Center staff made it clear that for safety reasons alone their dive charter trips used a dive master to tie directly in to the structure, rather than rely on the unknown stability of the buoy cable).

Another consideration for future steel vessel deployments should be the removal of the railings along the structure, especially at popular locations where vessels may regularly anchor. The railings provide minimal marine habitat value and create potential anchor attachment points that make it difficult for vessels to retrieve their anchors from the surface (for example, as observed during this assessment, the failure of the *Salt Shaker III* to detach from the *Red Sea*). Lost anchors and lost anchor line in turn create further anchor and fishing gear entanglement hazards thereby increasing the likelihood of additional anchor entrapment, marine debris and potential marine turtle or other marine life entrapment. Furthermore, the railings themselves eventually fail causing movement of the detached steel pieces creating additional potential diver hazards. In this case the uppermost railings were observed detached from the top of the wheelhouse, now only partially connected to the *Red Sea*.

**REFERENCES**

Golden, A (2009). Bay County – Midway II / Red Sea Tug Permit No# SAJ 200704354: Placement Report and Post Deployment “AS Built” Plans for August 30, 2009. 21 pages.

Horn, W and K. Mille (2009). Deployment and SCUBA Dive Assessments of Red Sea Tugboat Artificial Reef Off Panama City, Florida, June 24, 2009. Florida Fish and Wildlife Conservation Commission Division of Marine Fisheries Management. 22 pages.

Schmitt, E. F. and K. M. Sullivan (1996). "Analysis of a volunteer method for collecting fish presence and abundance data in the Florida Keys." Bulletin of Marine Science **59**(2): 404-416.

**Table 1.** Fishes observed on the Artificial Reef Tug *Red Sea*, Bay County, FL March 9, 2010

| COMMON NAME | *SCIENTIFIC NAME* | RELATIVE ABUNDANCE | APPROXIMATE AVERAGE SIZE (ESTIMATED) |
|---|---|---|---|
| Round Scad | *Decapturus punctatus* | Abundant (> 100) | 2-3” |
| Tomtate Grunt | *Haemulon aurolineatum* | Abundant (> 100) | 3-7” TL |
| Red Snapper | *Lutjanus campechanus* | Many (11 to 100) | Approximately 15-24” TL |
| Belted Sandfish | *Serranus subligarius* | Few (<10) | Adult |
| Cocoa Damselfish | *Stegastes variabilis* | Few (<10) | Juveniles 1-4” |
| Vermilion Snapper | *Rhomboplites aurorubens* | Few (<10) | Two 12” TL, four 4” TL |
| Bank Seabass | *Centropristis ocyurus* | Few (<10) | 6” |
| Flounder (Southern) | *Paralichthys lethostigma* | Single | 16” TL estimated |
| Gag Grouper | *Micteroperca microlepis* | Single | Sublegal-15” TL estimated |
| Gray Snapper | *Lutjanus griseus* | Single | 13” TL estimated |
| Blenny sp. | *Blennidae* | Single | Adult |
| Blue Angelfish | *Holacanthus bermudensis* | Single | Adult |
| Sheepshead | *Archosargus probatocephalus* | Single | Adult, 12” TL Estimated |
| Slippery Dick | *Halichoeres bivittatus* | Single | Adult |
| Gray Triggerfish | *Balistes capriscus* | Single | 12” |

## APPENDIX A – Representative Photos

**Photo 1 (a, b, c, d).** Photographs of four different dive computers depicting the depth (navigational clearance) at the uppermost portion of the wheelhouse. (a) DiveRite Nitek3 showing a depth of 42 ft.; (b) Oceanic Prodigy showing a depth of 40 ft.; (c) Oceanic Data Max showing a depth of 41 ft.; and (d) Oceanic Data Plus showing a depth of 42 ft.

(a)  (b)  (c)  (d) 

**Photo 2**. Jon Dodrill records fish observations along the port side of the Tug Red Sea Reef (photo by Keith Mille, FWC).

**Photo 3**. School of tomtate grunts at the bow of the *Tug Red Sea* (photo by Bob Cox, MBARA).

**Photo 4**. Red Snapper observed schooling Beneath the stern of the vessel around the rudder (photo by Bob Cox, MBARA).

**Photo 5**. Anemones observed alongside the port side of the *Tug Red Sea* (photo by Bob Cox, MBARA).

**Photo 6**. The detached smoke stack observed within the engine hold area, with blue angelfish and tomtate grunts (photo by Keith Mille, FWC).

**Photo 7**. School of tomtate grunts, juvenile vermilion snapper, and bank sea bass on the starboard side of the Tug Red Sea (photo by Keith Mille, FWC).

**Photo 8.** Jon Dodrill records the depth (50 ft.) At the bow capstan of the Tug Red Sea where The anchor line from the SCUBA II is tied (photo by Keith Mille, FWC).

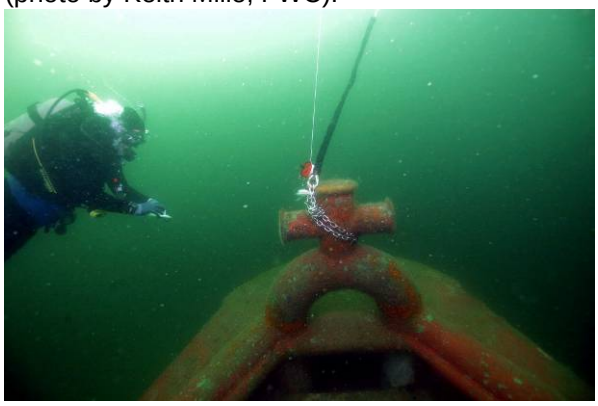

**Photo 9.** Bank Sea Bass observed on the sand bottom near the hull of the Tug Red Sea (depth 73 ft.) (photo by Bob Cox, MBARA).

**Photo 10.** Railing detached from the roof of the upper wheelhouse leaning against the port side of the *Tug Red Sea* (photo by Keith Mille, FWC).