

## PCB Monitoring on the Oriskany Reef (Part I: Project Background)

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May 17, 2006. Since 0530 hrs I had been standing on the bridge of a Navy command and control ship, the 226 foot long salvage vessel, M/V *Powhatan*. Well before dawn, the ship weighed anchor, moving from its night offshore anchorage through 2-3 ft seas under the power of two 5,000 h.p. Electric Motor Company locomotive diesels. We were 22.5 nautical miles southeast of Pensacola Pass off North-west Florida in the NE Gulf of Mexico. Since 0600, two converted 170 foot ghostly white *Asheville* class Vietnam era coastal patrol gunboats, the *Athena I* and *Athena II* carrying marine mammal and sea turtle environmental observers had been moving back and forth in a grid search pattern on either side of a 62 year old de-commissioned aircraft carrier, the ex-U.S.S. *Oriskany* (CVA-34). The 888 foot long 32,000 ton carrier lay motionless, under a clear mid morning sky. Around 1000 hrs the final radio calls came in to me from the environmental observers on the two *Athena* vessels. No marine mammals, sea turtles or any large mats of *Sargassum* weed possibly concealing juvenile turtles were visible near the *Oriskany*. Observers on the *Powhatan* confirmed the same. The two observer vessels backed off to a range of .8 nautical miles from the carrier. At 1025 hrs, following a one minute warning, the Navy's "Test Conductor" stood at a laptop computer on the *Powhatan*'s bridge. He gave a ten second count down and moved his hand and outstretched finger toward the lap top key board.

As the Test Conductor made a single keystroke, I heard a momentary muffled "whump!" coming from the direction of the aircraft carrier, now a half mile off. I saw an orange flash illuminate the opening of the aircraft elevator door that led into the cavernous empty aircraft hanger bay just below the flight deck. Rust-colored smoke briefly billowed out of the carrier's stack, the side elevator door opening and various other open hatches. Then, as the smoke drifted away, nothing more seemed to happen. The carrier, held in place by four 37,000 lb anchors, just floated there, seemingly unaffected. Twenty minutes later, there was still no obvious change.

Meanwhile, deep in the ship's interior, 750 lbs of shaped C4 explosives placed at 22 locations had done their job. The charges, connected to each other by 16,000 feet of detonating cord nearly simultaneously blasted open two bulkheads and the closed valves of 20 through-hull seawater intake (sea chest) pipes of various diameters (10-40 inches) connecting the hull exterior to the engine rooms and fire rooms. Thousands of tons of water poured unseen through these compromised seawater intake pipes into the vessel interior. The prior cutting of scores of bulkhead holes, opening hatches, and many other pre-sinking preparation actions facilitated the controlled flooding of nearly four thousand compartments. Gradually the great ship began to settle, first imperceptibly then progressively more rapidly by the stern as geysers of air mixed with water shot up. The ship listed to port, then momentarily righted itself in brief hesitation. When the water level reached the open hanger bay, the speed of sinking further accelerated. Foaming blue water swept up the flight deck towards the bow which had risen completely out of the water. A small boat lashed with breakaway cables to the same flight deck from which Navy Commander John McCain took off on his last combat mission, broke loose and floated free. This boat, intended for recovery, contained a metal box with all the electronic instrumentation associated with the remote ignition of the explosives and post blast monitoring.

At 1101 hours, the carrier's entire superstructure or "island" rising 159 feet above the keel, quickly disappeared from sight followed by the bow at 1102. Whereas a lesser carrier, the WWII era U.S.S. *Independence* CV-22, watertight integrity intact, survived two separate July 1946 Bikini Atoll atomic bomb blasts, the *Oriskany* sank in 37 minutes, the result of the intensive joint planning and modeling efforts of naval architects and demolitions experts.

The *Oriskany* is the largest vessel ever to be sunk intentionally for use as a shallow water artificial reef. Resting in the planned upright position on the bottom, the vessel's superstructure rises to within 68 feet of the surface, providing ample navigational clearance to meet U.S. Coast Guard and Army Corps of Engineers permit clearance requirements of 55 feet. The flight deck, at a depth of 137

feet represents a physical and visual depth barrier to open water recreational SCUBA divers, though portions of the vessel on down to the sea floor at 212 feet entice technical divers. The *Oriskany* was intentionally sunk to face south, bow toward the probable general direction of any approaching hurricane. A stability analysis predicted no movement of the ship in a 100 year return interval hurricane event. In January 2007, title to the ship and the Army Corps of Engineers artificial reef permit were transferred from FWC to Escambia County.

Today, the Oriskany Reef, as intended by FWC and Escambia County, is primarily utilized as an offshore fishing and diving destination. It is also considered to be a site of naval historical interest, and contributes a measurable economic benefit to Pensacola and adjacent NW Florida communities. Additionally, the reef provides three-dimensional structural habitat in an area of the West Florida shelf where less than 5% of the sea floor is exposed natural hard bottom.

The creation of the Oriskany Reef was the culmination of three years of effort involving multiple agencies, consultants, two marine contractors, and extensive environmental review. The primary project partners were the Florida Fish and Wildlife Conservation Commission (FWC), Escambia County, and the Navy. The Navy was represented primarily by the Naval Sea Systems Command whose project managing entity was the Inactive Ships Program Office. This office is the Navy's agent for ship inactivation and reutilization. They coordinate the transitioning of ships from the fleet for storage and disposal, preserve Naval heritage through museum donations, protect the environment through ship dismantling and recycling, and most recently make available selected vessels for "enhancing marine ecosystems through artificial reefing" (Inactive Ships Program Mission Statement).

The Navy's overarching decommissioned military vessel disposal/transfer/recycling objective is to pursue the most cost effective or "best value" means of reducing the size of its inactive reserve fleet, thereby reducing long-term inactive fleet maintenance costs. At an estimated 2002 cost of \$24 million to subsidize the domestic scrapping of the *Oriskany*, the Navy planned to fund a turn key artificial reefing operation to sink the aircraft carrier as an artificial reef at a lesser cost.

Following the 2003 passage of enabling federal legislation (USC Title 10, Chapter 633, Section 7306b) that gave the Navy the authority to provide certain combatant ships for sinking as artificial reefs, the Inactive Ships Program identified the *Oriskany* as their first reefing candidate. After a distinguished 25 year career spanning the Korean War and Vietnam conflicts, the *Oriskany*, was decommissioned in 1975. Nearly three decades later, the "Mighty O" was one of the largest, oldest and most environmentally problematic ships remaining in the Navy's inactive reserve fleet. Contractors had defaulted on two prior contracts let to scrap the ship. The carrier had become a priority for removal from the inactive fleet. Foreign scrapping was not an option.

In response to an Oriskany notice of availability for reefing announcement, the Navy received and reviewed applications from the artificial reef programs of five states. FWC also internally evaluated five potential sink site locations within Florida. In April 2004 the Navy selected the joint FWC-Escambia County proposal to reef the *Oriskany* in an active and previously charted artificial reef site permitted to FWC in federal waters southeast of Pensacola, Florida. The open sand bottom deployment site within the permitted area was selected using side scan sonar, a drop-down video camera, and a ponar sediment grab.

## **Environmental Issues**

Section 3516 of the National Defense Authorization Act for Fiscal Year 2004 required the Department of Transportation's Maritime Administration (MARAD) and USEPA to jointly develop guidance recommending environmental best management practices (BMPS) to be used in the preparation of vessels to be used as artificial reefs. Additionally under this Act the Secretary of the Navy is required to ensure that the preparation of a vessel stricken from the Naval Vessel Registry for use as an artificial reef is conducted in accordance with these BMPS and applicable environmental laws. One of the intents of the Act is to ensure that vessels prepared as artificial reefs "will be environmentally sound in their use as artificial reefs".

EPA chaired an interagency work group to develop best management practices to be used in the preparation of vessels for use as artificial reefs. This guidance document provided general clean-up performance goals and information on methods for achieving those goals. The finalized May 12, 2006 guidance document, whose draft was followed in the environmental preparation of the *Oriskany*, was "National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs" (<http://www.epa.gov/owow/oceans/habitat/artificialreefs>).

EPA on their website stated: "The BMP guidance identifies materials or categories of materials of concern that may be present aboard vessels, identifies where these materials may be found, and describes their potential ad-

verse impacts if released into the marine environment. The materials of concern include: fuels and oil, asbestos, polychlorinated biphenyls (PCBs), paints, debris (e.g., vessel debris, floatables, and introduced material), and other materials (e.g., mercury, refrigerants). For each material or category of material of concern identified, this document provides a general clean-up performance goal and information on methods for addressing those goals.”

With a requirement that the draft BMPs be followed, the contract for the *Oriskany* environmental cleanup and preparation for sinking was let by the Navy’s Supervisor of Shipbuilding, Conversion and Repair (SUPSHIP, Bath, ME) to two partnering contractors, Resolve Marine Group (Fort Lauderdale, FL) and Esco Marine (Brownsville TX). In September, 2003, the contractors towed the *Oriskany* from the Maritime Administration’s inactive reserve fleet at Beaumont on the east Texas Gulf Coast to Texas Dock and Rail shipyard at Corpus Christi, TX. There, environmental cleanup and salvage of recyclable material to offset some of the cleaning costs took place.

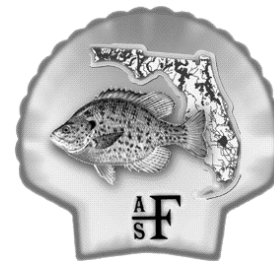
In selecting the *Oriskany* as their initial pilot artificial reefing project, the Navy recognized that the ship was going to be a challenging vessel to environmentally remediate and prepare for sinking as an artificial reef. Before they were banned from use in 1975, PCBs, primarily in a solid state, were used in various materials on military vessels because of their heat resistant fire retardant qualities, and ability to maintain flexibility in rubber products. PCBs are classified as persistent organic pollutants (POPs), environmental health hazards, and suspected carcinogens ubiquitous in food, animal tissue (particularly lipids), soils/sediments in terrestrial, marine, and freshwater environments. The USEPA considers PCBs to be a “probable” human carcinogen though to date documentation of a direct link of PCB ingestion with creation of cancer causing tumors has been demonstrated only in lab animals. PCBs are capable of bio accumulating through trophic level transfer in top-level predators like fish and marine mammals that are part of the marine food chain. From a human health perspective, there are concerns about human exposure to PCBs particularly in the case of recreational fishermen, subsistence fishers, or at risk elements of the population (pregnant women, children) consuming over an extended period, fish and shellfish products that may have bio-accumulated PCBs.

PCB-containing materials were identified aboard the *Oriskany* through the Navy’s routine sampling protocol during the ship de-activation process. PCBs were found in bulkhead insulation, rubber products, paints, electrical cable insulation, ventilation gaskets, and lubricants on board the *Oriskany*. Particularly problematic to address were going to be the solid polychlorinated biphenyls (PCBs) at regulated levels above 50 parts per million (ppm) distributed in a solid matrix primarily in the thousands of feet of wire cable insulation and in fiberglass bulkhead insulation. The Navy believed that some of this solid PCB containing material located at levels below the hanger bay (main deck) could not cost effectively be removed without totally dismantling the ship and scrapping it at a greater anticipated expense.

The Navy proposed to leave some of this PCB containing material in the interior of the ship at the conclusion of their environmental remediation. In order to do this they had to get approval from the EPA to sink the ship with PCB bulk product above the regulated levels of 50 ppm still on board. On April 28, 2004 the Navy submitted to EPA an application requesting to dispose of PCB bulk product waste under 40 CFR Part 761.62(c). EPA under the authority of the Toxic Substances Control Act regulations (TSCA), based on a case-by-case review, may authorize disposal of PCB bulk product at concentrations greater than or equal to 50 parts per million. The standard for issuance of risk-based PCB disposal approvals under 40 CFR part 761.62(c) is a finding by EPA of “no unreasonable risk or injury to health or the environment.” To make this risk-based determination, EPA considers not only the effects of PCBs on health and the environment (including the degree of uncertainty in the risk assessments) but also the economic consequences and benefits of disposal.

The burden of proof was on the Navy. Their task, which involved the presentation and subsequent refining of several million dollars worth of supporting documents that had been under development for several years, was to demonstrate to the EPA that PCBs leaching over time into the marine environment from shipboard materials (mainly cable insulation and bulkhead insulation) left in the interior of the *Oriskany* below the main deck once sunk as a reef would not pose an unreasonable risk of injury to human health and the environment. That effort and subsequent EPA review and evaluation took another 21 months. The results of the internal and external EPA review, subsequent requirements for PCB monitoring and initial monitoring results will be covered in a future Part II installment of PCB monitoring on the *Oriskany* Reef.

# the Shellcracker



FLORIDA CHAPTER OF THE AMERICAN FISHERIES SOCIETY

<http://www.sdafs.org/flafs>

**July, 2008**

### *President's Message:*

Greetings, Florida AFS members. After a generally mild spring, summer has arrived in the Panhandle with no uncertainty. Those of us who live and work in our state's northern reaches, such as myself, probably should not complain about heat and humidity, but we all should take proper precautions when conducting field work in the heart of summer. One way to cheat summer a bit is to head north, far north, such as to Ottawa, the host city of this year's AFS national meeting. I noticed that Florida AFS will be well-represented among presenters at this year's meeting, and I hope many others will be able to steal away for those few days in late August to take in some good talks, eat some good food, and catch up with colleagues who sometimes are spread far and wide.

One reason the heat has been on my mind recently is because for the first time in a few years I have been able to get out in the field quite a bit this summer. I got into fish biology because I love to be in the field sampling fish or fish habitat in some fashion or other, but, as others have expressed to me over the years, advancing careers sometimes translate to increased desk time, which in turn limits field time. This has been disappointing to me and I am glad that (over)commitments of the recent past years are getting fulfilled and I am now able to get out and touch a fish now and again. Another lesson that I am learning for myself, although it was first impressed upon me a few years back by an esteemed member of our Chapter who shall remain nameless, is that sometimes less is more. We hear about it all the time that the quest to build a career in many fields (e.g., business, the law, medicine, etc.) sometimes results in limited family time or limited time pursuing one's other passions. For those of us who have chosen fish biology as a career (or it chose us!), I think sometimes there is a danger in getting consumed by the job given that work and passion often are closely linked. For myself, that danger is most often manifested in over-committing to things because funding is never as certain as we would like and so many projects sound too interesting to pass up. But balance is key and we all need to find ways to recharge the batteries once in a while. Our annual state chapter meeting is a good way to do that, as are regional and national meetings, but if the job becomes a grind for anyone, try to remember why you got into this business to begin. And go touch a fish.

Beyond getting out in the field and actively conducting hands-on fish biology, mentoring students or interacting with the fishing public are other great ways to rejuvenate oneself. Our parent society clearly recognizes the value of such interactions, thus sponsors, along with several state and federal agencies, a great program that pairs promising high school students with professional biologists to introduce students to careers in fisheries: the 2008 Hutton Junior Fisheries Biology Program. In this edition of the Shellcracker, Kathy Guindon introduces us to Vaughn Crozier, a Hutton Scholarship winner who will be working with FWC fishery biologists in the coming year. Congrats to Vaughn on his scholarship and congrats to Kathy and others for undertaking what promises to be a rewarding experience for all.

Best Regards,  
Will Patterson  
President, Florida AFS



# Getting in Touch

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## *Upcoming Events*

July 20-25: Eighth International Wetland Conference. Cuiaba, Brazil.

July 23- 28: American Society of Ichthyologists and Herpetologists. Montreal, Canada.

July 28 – August 1: Eighth International Congress on the Biology of Fish. Portland, Oregon.

August 17-21: American Fisheries Society 138<sup>th</sup> Annual Meeting. Ottawa, Ontario Canada.

## *New Titles*

Burbot: Ecology, Management, and Culture. Vaughn L. Paragamian and David H. Bennett, editors. 270 pages, Symposium 59. Published by the American Fisheries Society. February 2008.

Reconciling Fisheries with Conservation: Proceedings of the Fourth World Fisheries Congress. Jennifer Nielsen, Julian J. Dodson, Kevin Friedland, Troy R. Hamon, Jack Musick, and Eric Verspoor, editors. Published by the American Fisheries Society. March 2008.

***Check out our Parent Society's calendar at  
<http://www.fisheries.org/Calendar.shtml>  
for other events not listed here!***

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