



# Offshore Area Fact Sheet

## Corps Finds No Impact from FNOD on Offshore Area

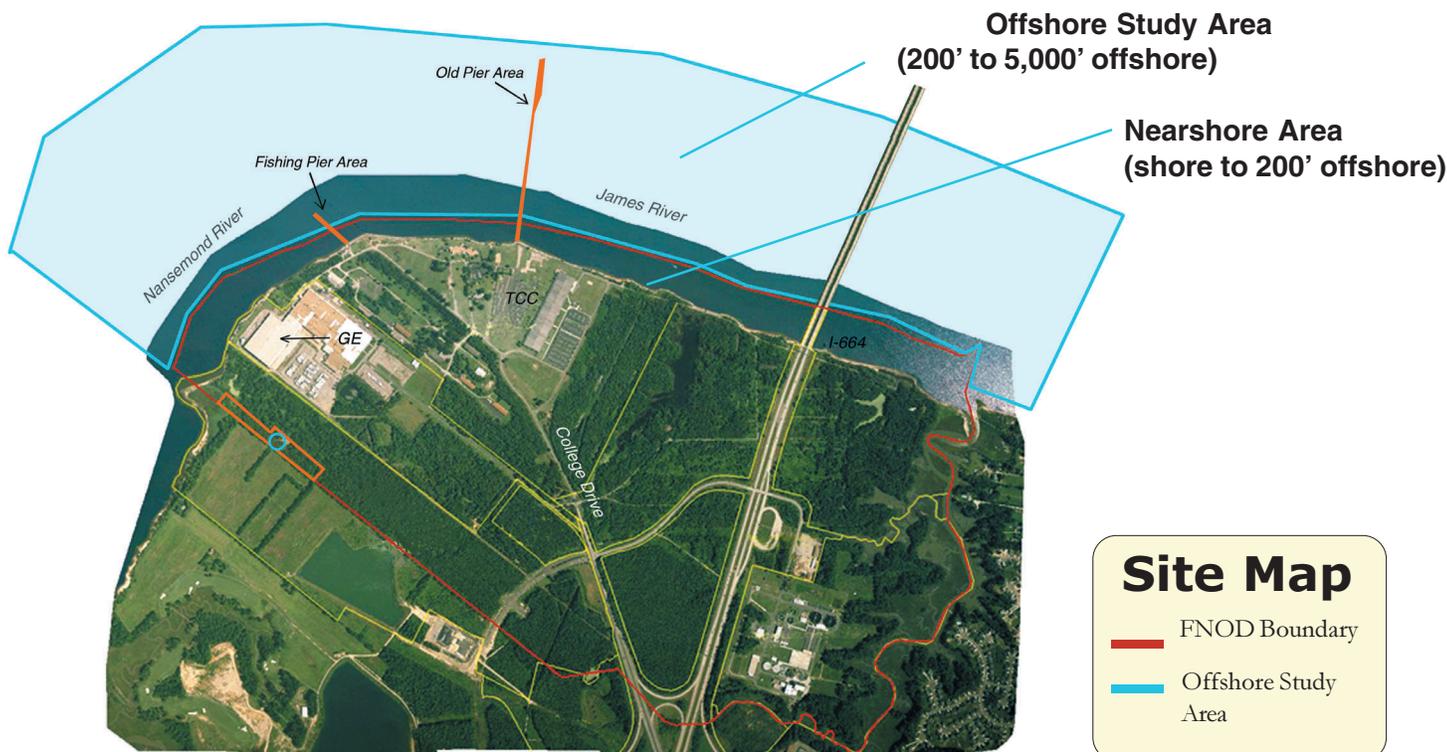
The U.S. Army Corps of Engineers has successfully completed environmental investigation activities in the marine area offshore of the Former Nansemond Ordnance Depot (FNOD). Results of this investigation indicate that the contaminants associated with the Former Nansemond Ordnance Depot are not present in river sediments in concentrations that would pose a risk to human health or the environment. The offshore study included 3 miles of river from the James River near the I-664 bridge to the Nansemond River near the GE facility. It extended from the Mean Lower Low Water (MLLW) line (approximately 200 feet from shore) to approximately 1 mile offshore. This area was designated as a

“Source Area” in EPA’s National Priority Listing of FNOD in 1999. The primary concern was that contaminants from the former depot could have migrated into the river due to the extensive shoreline erosion (greater than 300 feet) that has occurred at the site over the past 50 years. The purpose of this study was to determine the potential for human health and ecological impacts in the Offshore Area from the former depot.



### What’s been done?

The Offshore Investigation has consisted of a number of studies including: environmental characterization activities and field surveys, Screening Level and Baseline Ecological Risk Assessments, and a Human Health Risk Assessment.

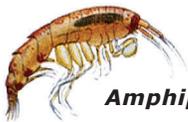


## Environmental Characterization Study

This effort began in 2000 with an Environmental Survey of the Marine Offshore Area. The goal of this survey was to determine general environmental conditions and the presence of former depot-related contaminants and debris (such as ordnance) in the offshore area. Phase 1 of the survey involved a geophysical survey of the river to map layers of sediment deposits and to locate metal objects and ordnance on the river bottom. Phase 2 involved sediment profile photography to identify subsurface features, sediment layers, and types of habitat.

Phase 3 involved surface sediment sampling in the upper 100 cm of river sediment to determine geotechnical characteristics, sediment chemistry, and sediment toxicity. The sediment samples were analyzed for metals, Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), pesticides, dioxins, and explosive compounds. The Corps conducted toxicity testing of amphipods exposed to sediments from the site and compared their mortality rate with a control population of amphipods.

### Findings



**Amphipod**

Scattered buried metal objects such as crab pots were detected during the geophysical (magnetometer) survey. While the field team could not identify all of the metal objects, no ordnance

debris was observed. Biological activity was limited to the top few centimeters of river sediment. No deep burrowing organisms such as shellfish were observed in these sediments. The sediment sampling data indicate that contaminants exist in the river sediments (0-20 cm depth) and subsurface sediments (>20 cm depth) but not at concentrations that are known to cause harm to aquatic life. Results of toxicity tests indicated that the sediments from the site were not toxic to amphipods.

## Ecological Risk Assessments

In 2000, the Corps completed a Screening Level Ecological Risk Assessment. The Corps used the river sediment sampling and toxicity data from the Environmental Characterization study to estimate exposure to animals such as clams, mussels, oysters, crabs,

and croaker. Corps risk assessors also used EPA formulas to estimate exposure doses to black-crowned night heron and raccoon and compared these doses with EPA Toxicity Reference Values.

### Atlantic Croaker

Recreational fishing takes place by boat throughout the Offshore Area and along the Old Pier.



Adult croaker generally spend the spring and summer in estuaries such as the James River and Nansemond River, and move to offshore waters in the fall.

Croaker are opportunistic bottom-feeders that eat a variety of invertebrates and occasionally fish. They prefer muddy bottoms and depths less than 120 meters.

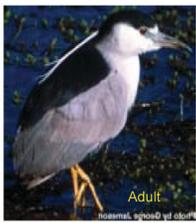
No explicit risk was identified during the initial ecological risk assessment, but the interagency team did identify a lack of data in the Old Pier area. Given that the Old Pier was once used to transport ordnance between vessels and the FNOD land-based facilities, additional investigations in that area were deemed necessary. The Corps conducted a survey along the Old Pier in 2002. This survey involved a sidescan sonar survey, sediment photography (including 202 images), sediment sampling (7 samples), and amphipod toxicity testing similar to the 2000 Environmental Survey. Sediment samples from the Old Pier area were analyzed for metals, PAHs, PCBs, pesticides, and explosive compounds. In addition, survey efforts were expanded in the Old Pier area to include tissue sampling of croaker (5 samples) and blue crabs (6 samples).

Both sets of data from the 2000 study and the Old Pier survey were used to conduct the Baseline Ecological Risk Assessment (BERA), which was completed in September 2002. The purpose of the BERA was to determine risk to animals from contact with FNOD-related contaminants in the river sediment. The FNOD Chemicals of Potential Concern (CoPCs) that were evaluated were metals (arsenic and mercury), two PAH compounds (acenaphthene and fluorene), and four pesticides (4,4'-DDD, 4,4'-DDT, aldrin and endrin ketone). Risk assessors estimated the animal's exposure to the CoPCs and calculated ecological risk using EPA formulas. Sediment toxicity tests were conducted to provide supporting evidence. The Corps also assessed risk to animal predators such as raccoon and herons that feed on animals that are in contact with the river sediments.

The factors that were considered in determining the potential effects on herons and raccoon were:

- How much the animals eat.
- Where they eat (conservative assumption: they eat only at the study area).
- Average weight of each animal.
- Estimate of sediment ingestion consumed by these animals while eating.
- How readily contaminants are absorbed by the animals.
- How readily chemicals in the sediment are absorbed by the animals.
- How readily chemicals in prey are absorbed by the animals.

The Corps' ecological risk assessors compared the estimated chemical ingestion levels with levels known to have adverse effects.



**Black-crowned night heron**



**Raccoon**

## Findings

*Sediment sampling* - Several samples contained contaminant levels slightly above the screening benchmarks, but they occurred in isolated areas rather than site-wide, and were typically in the subsurface sediments at depths greater than 20 cm where exposure is less likely.

*Toxicity testing* - No toxicity was observed in amphipods exposed to sediments from the site.

*Ecological Risk Modeling* - FNOD CoPCs do not appear to be a significant source of risk to clams, mussels, oysters, blue crabs, or croaker in the Offshore area or to predators such as raccoons and black-crowned night herons at the site.

*In the Old Pier Area* - Metals, PAHs, and dioxins were detected in approximately 20% of the sediment samples, but mostly at low concentrations compared to conservative benchmarks established by the National Oceanic and Atmospheric Administration (NOAA). No toxicity was observed in amphipods exposed to sediments from the Old Pier area. For fish and crab tissue tested, most of the CoPCs were either not detected or detected at very low concentrations.

## Human Health Risk Assessment

The Corps initiated a Human Health Risk Assessment in the Offshore Area in 2002. The study assessed potential risks to humans from consuming fish and crabs that live in the sediments of the Offshore Area. Direct human contact with river sediments was considered unlikely due to water depths. However, recreational fishing and crabbing are common in the Offshore Area and along the Old Pier. The Corps followed EPA guidance for conducting this assessment and used measured and predicted fish tissue values from the Old Pier area and compared them to EPA screening levels referred to as human health Risk-Based Concentrations (RBCs). The following CoPCs were evaluated in the assessment: arsenic, three PAH compounds (benzo(a)anthracene, benzo(a)pyrene and benzo(b)-fluoranthene), and Total PCBs.

The Corps' risk assessors then used conservative assumptions to evaluate potential exposure to adults, adolescents, and children based on known recreational fishing patterns in the area. They evaluated both the combined cancer risk of exposure to all the CoPCs as well as other health risks associated with exposure to Arsenic. This was done by developing numerical human health risk estimates based on the exposure assessment (estimates of the magnitude, frequency, and duration of exposure) and toxicity assessment (assessment of the potential adverse health effects of the CoPCs). Other health effects from arsenic were evaluated by comparing estimated exposure concentrations for each age group with EPA's chronic reference dose for arsenic.

## Findings

Cancer risk calculations for adults, adolescents, and children were within EPA's acceptable risk range. The Hazard Index calculated to determine other health effects associated with exposure to arsenic was below 1 (EPA's action level). This indicates a low risk of other health effects associated with exposure to arsenic from Offshore Area river sediments.

**Q.** Is it safe to eat fish and crabs from this area?

**A.** FNOD contaminants were not found in the river sediments, fish tissue, or crab tissue samples collected from the Offshore area at concentrations that pose a risk to human health.

However, the Virginia Department of Health has posted a health advisory for the James River and its tributaries from Richmond to the Hampton-Norfolk Bridge Tunnel for Kepone from other sources. This warning can be found at [www.vdh.state.va.us/HHControl/fishing\\_advisories.htm](http://www.vdh.state.va.us/HHControl/fishing_advisories.htm)

## **Nearshore Area**

The Corps is currently conducting an investigation in the Nearshore Area along the James River Beachfront and the Former Fishing Pier. This investigation will address any potential impacts from the former depot on Nearshore river sediments due to erosion. The Nearshore consists of the shallow water from the shore out to the Mean Lower Low Water (MLLW) line approximately 200 feet from shore. Results from this effort are expected in 2005.

## **Conclusion & Proposed Plan**

Risks from contaminants in the Marine Offshore Area were evaluated in three assessments: a Screening Level Ecological Risk Assessment (SLERA), a Baseline Ecological Risk Assessment (BERA) and a Human Health Risk Assessment (HHRA). These studies have all concluded that risks presented by the Marine Offshore Area are negligible, and do not warrant remedial action. The Corps is proposing "No Further Action" in the Offshore Area.

## **Public Comments**

The Corps is seeking public comment on their proposed plan of no further action in the Offshore Area. A 30-day public comment period for this Proposed Plan will begin on December 4, 2003, and end on January 4, 2004. Comments and other information relevant to the proposed plan may be submitted in writing to David Wigle, U.S. Army Corps of Engineers Norfolk District, 803 Front Street, Norfolk, VA 23510-1096, [David.E.Wigle@NAO02.USACE.ARMY.MIL](mailto:David.E.Wigle@NAO02.USACE.ARMY.MIL), or presented at the Public Meeting to be held on December 4, 2003 at the Bon Secour Health Center in Harbourview (Suffolk, VA) from 6 until 7 p.m.

## **Contact Information**

For more information about the Former Nansemond Ordnance Depot project please contact the following people:

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## **What's Next?**

Following the public comment period, the Corps will prepare a "responsiveness summary" to address significant comments or new data received during the public comment period. The responsiveness summary will be available for public review on the project website at the information repository at TCC Portsmouth Campus library. Once the remedy is agreed upon, the Corps will prepare a Record of Decision that will document the plan for the site and place a public notice in the *Virginian-Pilot* newspaper. EPA will then initiate the delisting of the Offshore Area from EPA's National Priority List.

## **Reports for Offshore Investigation**

The following are a list of reports that have been prepared for the Offshore Investigation. These documents and the Proposed Plan are available for public review at the TCC Portsmouth Campus library and on the Corps' project web site.

[Findings of an Environmental Survey of the Marine Offshore Areas of the Former Nansemond Ordnance Depot](#), prepared by SAIC, September 2002.

[Final Report: Baseline Ecological Risk Assessment for the Marine Offshore Areas of the Former Nansemond Ordnance Depot, Suffolk VA](#), prepared by SAIC, September 2002.

[Human Health Risk Assessment for the Marine Offshore Areas of the Former Nansemond Ordnance Depot, Suffolk, VA](#), prepared by SAIC, September 2003.

## **Project Web Site**

<http://www.nao.usace.army.mil/Projects/Nansemond/welcome.html>

## **Information Repository**

Information about the Former Nansemond Ordnance Depot project is available for public review at the Tidewater Community College Library

7000 College Drive, Portsmouth, VA  
Library Hours: 8 a.m. to 9 p.m. Monday through Thursday  
and 8 a.m. to 4 p.m. on Friday