Introduction

A fish study and risk assessment was conducted in 2009/2010 by the Department of the Navy in the 3rd Battalion Pond. The findings indicate fish from the pond might not be safe to eat due to concentrations of mercury and polychlorinated biphenyls (PCBs). PCBs and mercury are common contaminants found in water bodies around the nation and the world.

The Marine Corps Recruit Depot (MCRD) Parris Island has posted signs around the pond stating that fishing is not allowed. This fact sheet provides a history of 3rd Battalion Causeway (Site 3) and a summary of the fish study and risk assessment.

3rd Battalion Causeway

The 3rd Battalion Causeway is located in the northwestern portion of Marine Corps Recruit Depot (MCRD) Parris Island and connects Horse Island to Parris Island. It was used as the major disposal area for trash and other materials between 1960 and 1972. The causeway was constructed across a tidal marsh of the Broad River by filling in the marsh. When land filling at the site was discontinued in 1972, the causeway covered approximately 10 acres and was 4,000 feet long, 100 feet wide, and 10 feet high (above the water surface). The causeway currently separates a ponded area (north of the causeway) from a marshy area (south of the causeway).
The 3rd Battalion Causeway is part of the Navy and Marine Corps environmental cleanup program (referred to as Installation Restoration Program Site 3). The site officially includes the original landfill, the causeway constructed over the landfill, and sediments within 200 feet of the northeastern side of the causeway (within the 3rd Battalion Pond).

Various investigations of soil, groundwater, surface water, sediment, and limited fish tissue sampling occurred between 1986 and 2000. Results of these investigations indicated cleanup action was needed to reduce risks to human health and the environment from elevated levels of polycyclic aromatic hydrocarbons (PAHs), PCBs, pesticides, and metals in the surface soil and sediment.

The following cleanup actions were completed between August 2000 and July 2001:

- Placement of a protective soil cover over the top and both sides of the causeway to prevent humans and wildlife from contacting waste material.
- Stabilization of both of the causeway’s banks by regrading, adding rip-rap (rocks), and planting vegetation along the sides of the causeway.
- Construction of a paved road along the top of the causeway (reducing infiltration of precipitation into waste material and reducing erosion of cover material).
- Covering four areas of contaminated sediment in the pond with 1 foot of soil, a layer of fabric, and 1 foot of rocks to prevent direct contact with contaminated sediment by aquatic organisms, wildlife, and humans (sediments on the marsh side did not present risks that warranted remedial action).

In addition, the following monitoring and land management restrictions were instituted after completion of the cleanup work:

- Sediment sampling (90 days after completion of work – October 2001).
- Annual groundwater (leachate) testing.
- No unauthorized digging or construction activities.
- No swimming or wading.
- No residential development of the site or use of the site’s groundwater for drinking water.
- No subsistence fishing from the pond.

Recreational fishing from the area was allowed following the cleanup actions because potential human health risks calculated using fish samples collected in 1991 indicated the fish were safe to eat by the occasional consumer (one meal per week). Signs were posted warning against frequent consumption of fish from the pond which typically would result from a subsistence fishing scenario.

Information gathered by MCRD Parris Island personnel in 2008 indicated there could be people eating more than one fish meal per week from 3rd Battalion Pond. As a result of the interview, the Department of the Navy, in collaboration with the U.S. Environmental Protection Agency and South Carolina Department of Health and Environmental Control, conducted another study of the fish in the 3rd Battalion Pond in 2009.

### Fish Study

Fish samples were collected throughout the 3rd Battalion Pond and from an area not affected by possible contamination from the 3rd Battalion Causeway (General's Landing Creek) from October 26 -31, 2009. U.S. EPA guidance for fish consumption advisories (U.S. EPA, November 2000) recommends studying one top predator and one bottom feeder. Red and black drum were sampled as the top predator species and mullet were studied as bottom feeders.

An attempt was made to collect fish that were of edible and legal size. Samples were collected using gill nets, cast nets, and hook and line for an extended period of time trying to meet the size limits. However, not all of the fish met legal size limits; some were larger and some were smaller than legal size limits.
A total of seven red drum, three black drum, and eight mullet were kept for analysis from 3rd Battalion Pond. A total of four red drum, one black drum, and four mullet were also kept from General’s Landing Creek for analysis. Fewer samples were taken from General’s Landing Creek because this area was being used as a comparison to show “typical” chemical contaminant levels in fish in the local area.

The fish were filleted to remove scales, skin, bones, organs, excess fat, etc. The fish meat was tested for chemicals known to be present in the landfill that formed the causeway, which included the pesticide DDT and related chemicals, members of the PCB family of chemicals, mercury, and copper.

**Risk Assessment**

The fish sampling results were evaluated as part of the July 2010 Technical Memorandum Post-Interim Construction Risk Assessment for Site 3.

The study followed U.S. EPA Guidance, and the results indicate eating fish from the pond might not be safe.

The study calculated higher potential health risks than previous studies for two main reasons:

- It is thought the local population is eating more fish from the pond the previously assumed.
- New methods were used for analyzing PCBs.

It was previously thought that the people fishing from 3rd Battalion Pond fell into the occasional consumer category (one meal per week). New information indicates that local residents might be eating much more than one meal per week from the pond. To be conservative and ensure health risks were not underestimated, the 2010 study assessed risks from various scenarios.

The recent assessment used new methods for analyzing PCBs based on research indicating that some PCB compounds have properties similar to dioxin. Dioxin is a toxic compound found throughout the world from both manmade and natural processes. There are some uncertainties regarding the toxicity of dioxin-like PCBs.

Incorporating these two conservative approaches into the assessment resulted in a higher estimate of potential health risks than were calculated previously.

**“No Fishing” Signs**

MCRD Parris Island decided to prohibit fishing in the 3rd Battalion Pond as part of the December 2010 Proposed Plan for Site 3. The MCRD decision to increase the restriction from "No Subsistence Fishing" to "No Fishing" was made as a precautionary measure to ensure protection of health for local residents.

**Mercury and PCBs in Fish**

The two primary contaminants found in the fish in 3rd Battalion Pond are mercury and PCBs. PCBs were used all over the world in electrical transformers and many other items between the 1930s and late 1970s when their production was banned in the US. Mercury is a metal that occurs naturally in the earth, but it has also been used around the world in many common items such as thermometers, electrical switches, and dental fillings and has entered the environment through the burning of fossil fuels. Because of their widespread use and disposal of wastes in years past, both PCBs and mercury are now common contaminants found in water bodies around the nation and the world. Therefore, nearly all fish contain traces of mercury and PCBs.

The risks from eating mercury and PCBs in fish depend on the amount eaten and the levels present in the fish. For most people, the risk from eating mercury or PCBs in fish is not a health concern because the quantities they consume are low and the health benefits from eating fish are high.

Health experts do not recommend eliminating all fish from your diet because they provide health benefits. They contain high-quality protein and other essential nutrients, are low in saturated fat, and contain omega-3 fatty acids. A well-balanced diet that includes a variety of fish can contribute to heart health and children's proper growth and development. These health benefits outweigh the risks of exposure to mercury and PCBs provided you do not consume too much.
See the following websites for more information on PCBs:
- http://go.usa.gov/gaF
- http://go.usa.gov/ga6

See the following websites for more information on mercury:
- http://go.usa.gov/gaL
- http://go.usa.gov/gky

FDA, EPA, and SCDHEC Fish and Shellfish Consumption Guidelines

The Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), and the South Carolina Department of Health and Environmental Control (SCDHEC) have developed the following guidelines to help you reduce your exposure to mercury and PCBs and still keep fish and shellfish part of a healthy diet:

- **Check and follow all local advisories** about the safety of fish caught by family and friends in your local lakes, rivers, and coastal areas. If no advice is available, eat up to 6 ounces (one average meal) per week of fish you catch from local waters, but don't consume any other fish during that week. See the website http://www.scdhec.gov/fish for more information.

- **Do not eat Shark, Swordfish, King Mackerel, or Tilefish because they typically contain high levels of mercury.**

- **Eat up to 12 ounces (2 average meals) a week of a variety of fish and shellfish that are lower in mercury.**
  - Five of the most commonly eaten fish that are low in mercury are shrimp, canned light tuna, salmon, pollock, and catfish.
  - Another commonly eaten fish, albacore ("white") tuna has more mercury than canned light tuna. So, when choosing your two meals of fish and shellfish, you may eat up to 6 ounces (one average meal) of albacore tuna per week.

- **You can reduce your exposure to contaminants such as PCBs by the way you prepare the fish.**
  - Before cooking or smoking, remove the head, skin, fat (found along the back, sides and belly), guts, tomalley of lobster and the mustard of crabs,
  - Don’t panfry or deep fry because this seals in contaminants. Broil, bake, poach or boil your fish so the fatty juices drip away.
  - Don’t eat or use any of the juices or cooking liquids.

For More Information

For more detailed information, please consult the Administrative Record File located in the information repository at the Beaufort County Public Library Headquarters (311 Scott Street, Beaufort, South Carolina 29902). If you have questions, please contact the MCRD Parris Island Natural Resources and Environmental Affairs Office at (843) 228-2779.