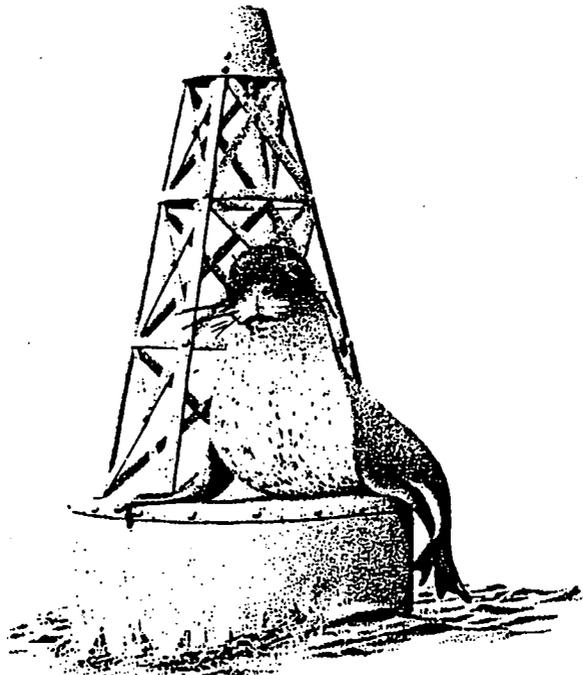


Another major area on the Shipyard under environmental investigation and consideration for corrective measures is the Defense Reutilization Marketing Office Storage Yard (DRMOSY), SWMU #6. This 2-acre site serves as a temporary storage area for excess Government property prior to recycling or disposal. Previously, lead acid batteries and other hazardous materials (by today's classification) were stored on the ground and resulted in soil contamination. A few of the other areas being investigated include SWMUs with pesticide contamination, tanks that once contained waste oil, battery acid, or rinse water, and an old fuel oil spill. More detailed information is available on all 13 of the SWMUs being studied on the Shipyard.

Results to be announced in the Near Future

Future Environmental Updates will provide the details of the ongoing estuary studies, an explanation of some of the findings that have been obtained to date, and descriptions of other IRP activities.



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ENVIRONMENTAL UPDATE

PORTSMOUTH NAVAL SHIPYARD

This is the first in a series of Environmental Updates, developed by the Portsmouth Naval Shipyard to provide brief, informative, and timely information regarding the on-going environmental studies at the Shipyard. This Update focuses on an explanation of how the estuary is being studied, and the following Update next month will explain the initial results of the estuary study. This initial Update also provides an overview of the Shipyard history and of the past hazardous waste management practices that have resulted in chemical contamination. These practices have led to the on-base investigation of 13 areas with an off-shore investigation which studies the estuary. The on-base investigation will be described in a future Update. Details from the estuary studies will provide the framework for evaluating the impact of the past Shipyard operations on the ecology of the Piscataqua River.

The ongoing studies are part of the scope of a permit issued to the Shipyard by the U.S. Environmental Protection Agency (EPA) Region I. This permit deals with how past disposal of hazardous waste by the Shipyard may have impacted the environment. Hazardous waste may be understood as a chemical substance—such as a paint solvent or lead—that exists in sufficient quantity to pose a potential threat to human health or the environment.

Navy Continues Study of Estuary

As part of a cooperative research project between the Navy and the EPA, a comprehensive study of the Piscataqua River is proceeding. This study focuses on the vicinity of the Shipyard but also probes further into Great Bay Estuary plus research in York River and Spruce Creek collecting background samples to be used for comparison. Other participants in the study include: University of New Hampshire, University of Rhode Island, EPA Environmental Research Laboratory—Narragansett, Woods Hole Oceanographic Institution, McLaren/Hart Environmental Engineering, Normandeau Associates, Science Applications International, and CEIMIC Laboratories.

The Navy-sponsored project consists of investigating and monitoring portions of the Great Bay Estuary to provide a framework for assessing the ecological impact of past Shipyard operations to the estuary. Of concern is the overall impact of industry - including the Portsmouth Naval Shipyard - on the quality of the animal and plant life, sediment and water quality in the Piscataqua River.



Details from the study will provide the framework for evaluating the impact of past Shipyard operations on the ecology of the Piscataqua River.

Geographic Setting

Portsmouth Naval Shipyard is at the mouth of the Great Bay Estuary in Portsmouth Harbor two miles from the Atlantic Ocean. The depth of Portsmouth Harbor's main channel ranges up to 78 feet and has a winding path with strong and erratic currents and sharp bends at Henderson's Point on the southern tip of the Portsmouth Naval Shipyard and at Fort Point on the northeastern tip of Newcastle Island.

Originally a series of four islands, Seavey Island, as we know it today, was developed by means of pier expansion as well as landfilling of tidal flat areas between four of the original islands. Clark Island, preserved in its natural state, is connected to the Shipyard by a rock causeway. (See Figure 1)

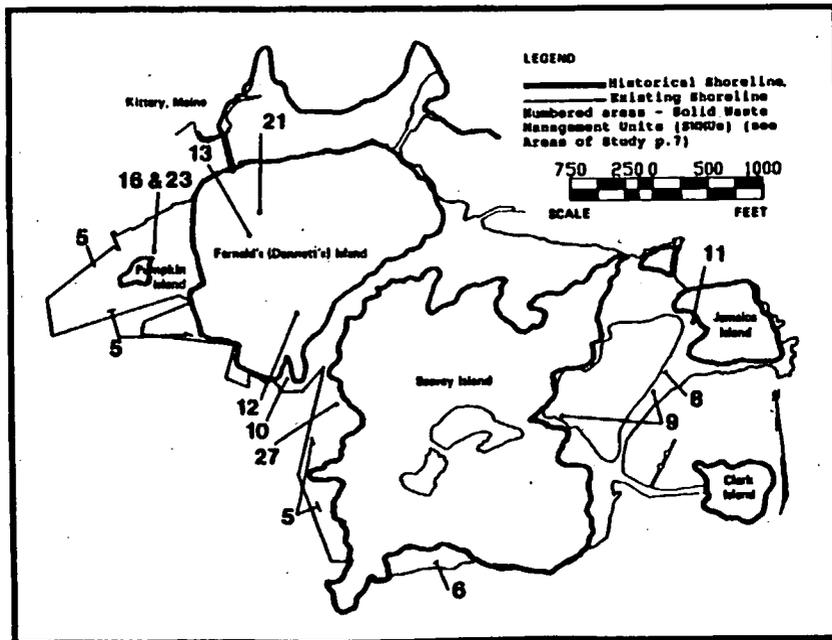


Figure 1: Map of Portsmouth Naval Shipyard showing areas of study and existing land area and previous series of islands before landfilling.

Past Hazardous and Solid Waste Management

Industry standards for hazardous waste handling during the 1940's were dramatically different than the manner in which hazardous materials and wastes are carefully managed and disposed of in the 1990's.

For a map of the Shipyard island as it is today with an overlay showing the original islands and the made land, please call Jim Tayon, Shipyard Project Engineer, (207) 438-3832.

Also, information repositories at Portsmouth Public Library, New Hampshire and Rice Public Library, Kittery, Maine both contain information for viewing related to the environmental studies of the 13 SWMUs mentioned in this Update.

Today, intertidal areas and marshlands are carefully protected. Starting in the 1940's, the landfilling of the tidal flat areas was used to both dispose of waste and to gain land space. Landfilling of the intertidal area between Seavey's Island and Jamaica Island began in 1945, including non-hazardous general refuse as well as materials not considered as being hazardous at the time. This area is currently called the "Jamaica Island Landfill". The landfill operation was permitted through the U.S. Corps of Engineers as a formal landfill for the Shipyard. While most of the material that was landfilled was solid waste and debris, today we recognize that a smaller percentage of the landfilled wastes included in the landfill is classified as "hazardous" by current standards and has resulted in contamination.

As a result, the Jamaica Island Landfill is one of the 13 areas on the Shipyard that is being investigated as part of the Corrective Measures Permit with U.S. Environmental Protection Agency (EPA) Region I. This investigation of the 13 areas is part of the Navy's Installation Restoration Program (IRP), which is designed to identify the extent and severity of contamination from past Navy operations and to institute clean-up measures. Each of these areas being studied is called a Solid Waste Management Unit (SWMU). Jamaica Island Landfill is SWMU #8.



Shipbuilders: An Abridged Saga

The Portsmouth Naval Shipyard is richly endowed with history. The first land purchase was in 1800 and laying of the keel of the 74-gun Washington in 1814 marked the beginning of ship building.

The first U.S. submarine was built on the Shipyard in 1917, and 1945 marked the end of a 6-year peak period in which 85 submarines, 3 floating cranes, 3 torpedo testing barges and 7 pier caissons were built. In addition, 74 other vessels were overhauled, including U.S. and foreign submarines and various Coast Guard and surface ships. With peak employment of over 20,000 employees, 32 submarines were built in the year 1944, and this achievement was crowned with the launching of 4 submarines on the same day--January 27, 1944.

After World War II, came the assignment for the Shipyard to develop new and improved technology. Pioneering designs to increase underwater power propulsion included streamlining, increasing battery power, adding a snorkel system, improving radar, sonar and radios. Through Portsmouth Naval Shipyard innovations, more than 24 fleet submarines were converted and launched to meet the needs of the Korean War.

Then came the ALBACORE, launched in 1953, which featured bold and dramatic advances in submarine design and was the forerunner of the modern fast attack and ballistic missile submarines of the future. The ALBACORE is now retired at the Albacore Museum in Portsmouth, New Hampshire.

Submarine construction at the Shipyard reached a milestone in 1971 with the construction of SAND LANCE which was the 134th and last submarine to be built at the Shipyard. The rapid expansion of the U.S. submarine fleet created the need for a Shipyard such as Portsmouth which was devoted to submarine overhaul and maintenance services. By 1962, Portsmouth was the first U.S. Navy shipyard to be fully capable of overhauling, repairing and refueling modern submarines.

Today, the Shipyard's official mission is to provide logistical support for assigned ships and service craft, but it is primarily concerned with the overhaul and repair of submarines.

If you would like to view interesting artifacts and memorabilia related to Portsmouth Naval Shipyard history, please call for a tour of the Portsmouth Naval Shipyard Museum and Visitor's Center, at (207) 438-3550. Museum visiting hours are through the week by appointment.



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Wetlands: A Rich Endowment of Productivity

The Great Bay Estuarine System provides nourishment to a diverse medley of plants and animals. The public has recently begun to appreciate the importance of wetlands, both saltmarsh and seagrass habitat, to water, air and land critters. You may be surprised to learn of the tremendous quantity of production that wetlands provide naturally without any intervention by man. In fact, wetlands left in their natural condition can provide twice the amount of productivity than can a carefully-cultivated and fertilized typical midwestern cropland.

The rocky shores, tidal creeks, seagrass beds, salt marshes, uplands and mud flats all contribute to the diverse ecology of the area. Plants, such as salt marsh cordgrass and subtidal eelgrass, and algae, including seaweeds and microscopic phytoplankton, provide the basis of a productive food chain that supports the nutritional requirements of a wide diversity of organisms including mussels, worms, clams, crabs, lobsters, fish and water fowl, etc.

Evaluation of Estuarine Biological Resources

A network of 34 sampling stations (See Figure 2) has been established to characterize the estuary and to develop information on the distribution and effects of contaminants from the Shipyard. In addition to studying the water and sediment quality in the estuary, the investigation includes a number of marine plants and animals. Mussels were collected by hand by using modified oyster tongs. In addition to collecting mussels already existing in the area, laboratory mussels were placed at various locations and then retrieved for analysis to evaluate their rate of contaminant exposure. Lobster and fish were obtained by trawling. Eelgrass and Furoid Algae samples were collected from stations in the Piscataqua and also in York River for comparison.



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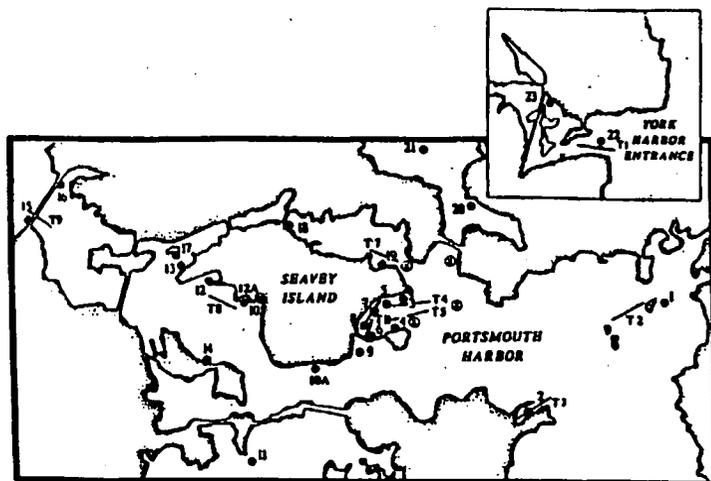
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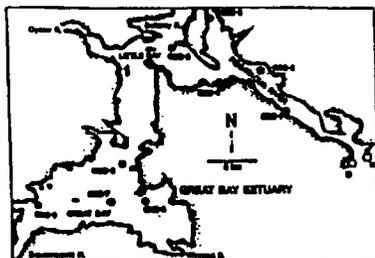
SAMPLING STATIONS

Stations

Sediment	1 - 23
Water Column (synoptic)	1 - 23
Water Column (monthly)	1, 8, 10, 15, 16, 23
Mussel	1 - 23, 10a
Lobster and flounder trawls	T1 - T9
Eelgrass	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 14 15, 16, 17, 18, 19, 22, 23, 12A
Rockweed	3, 8, 9, 10, 17, 19, 22, 10A
Benthic community	1 - 23
Mussel and eelgrass (quarterly)	1, 3, 9, 15, 16, 17, 18, 19, 23, 12A
Mussel deployment	2, 8, 10, 15, 19, 22
Current meter deployment	(X)



Sampling stations in the Piscataqua and York Rivers



Transect sampling stations in the Great Bay Estuary.

Fig 2: Sampling Stations



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For more information . . .

If you have any questions or would like more information about Portsmouth Naval Shipyard environmental programs, please call or write to:

Jim Tayon
Environmental Engineer
Environmental Affairs, Code 121.5
Portsmouth Naval Shipyard
Portsmouth, New Hampshire 03804-5000
(207) 438-3832

Sediment Conditions Characterized

Sediments provide a rich environment for supporting marine resources, including grasses, shellfish, worms, and other organisms. The main emphasis is on sampling in areas of the estuary where fine grain sediments accumulate, and where the likelihood of detecting and measuring chemical contamination is highest. In order to evaluate the health of the sediments, two types of samples were collected at the sampling stations. The first sample type is designed to capture a small portion of the river bottom. These samples are cataloged and become "snapshots" of life at the bottom of the river telling us about the health and nature of the mud, plant life, worms, snails, etc. The second type of sample (See Figure 3) is collected using a heavy steel pipe that is designed to provide a core, or vertical sample, of the deeper sediments for analysis.



Figure 3. A gravity coring tool being deployed by University of New Hampshire scientist from their research vessel, Jere A. Chase, in the Clark Island Embayment at Portsmouth Naval Shipyard.



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