



FACT SHEET

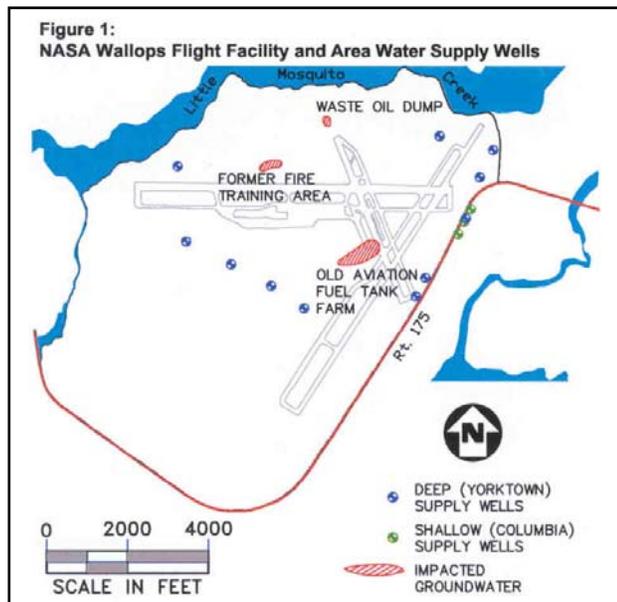
This Fact Sheet provides a summary of the groundwater conditions at NASA's Wallops Flight Facility (Wallops). NASA has completed groundwater investigations at the facility and continues to monitor groundwater quality to ensure that area water supplies are not impacted by NASA activities.

GROUNDWATER AT THE MAIN BASE

Wallops is underlain by more than 5,000 feet of alternating or mixed layers of sand, silt, clay, and gravel. In general, the coarser materials such as sand and gravel form aquifers (layers of geological materials which yield usable quantities of groundwater) and the finer materials such as silt and clay form intervening aquitards (layers of geological material through which the flow of groundwater is difficult, and that tend to separate or vertically isolate individual aquifers).

The two primary aquifers beneath the Wallops Main Base are the Columbia and Yorktown Aquifers. The Columbia Aquifer extends from the ground surface to a depth of about 60 feet, and the Yorktown Aquifer extends below a depth of about 80 feet. The Columbia and Yorktown Aquifers are separated by an aquitard that is approximately 20 feet thick and that effectively prevents groundwater from the two aquifers from mixing.

Groundwater beneath Wallops, in general, flows from areas of higher land elevation to areas of lower elevation, and typically in a direction along the shortest path toward the nearest surface water body.



CONTAMINATION AT THE MAIN BASE

The three Main Base sites which impact water quality are the Former Fire Training Area, the Waste Oil Dump, and the Old Aviation Fuel Tank Farm. At each of these sites, chemicals at the source area (the area where contaminants were released) dissolve in groundwater and travel with the flowing water to form a contaminant plume (the area over which the site chemicals have impacted the groundwater). Figure 1 illustrates the location and geographic extent for each of the three contaminant plumes that exist on the Main Base. The principal chemicals within the plumes include components of fuels and oils (in all three plumes) and solvents (chiefly in the Former Fire Training Area plume). The plumes have affected the local groundwater quality in the Columbia Aquifer, since it is the aquifer closest to the land surface where the chemicals were released. The water quality within the underlying Yorktown Aquifer is not affected due to the presence of the intervening aquitard, which prevents the flow of the impacted groundwater from the overlying Columbia Aquifer.

WHAT IS THE EXTENT OF THE CONTAMINATION?

One important feature of the plumes is their limited extent. That is, the distance that the chemicals travel with the groundwater is limited. In general, contaminant plumes constantly regenerate themselves at their source area as the chemicals dissolve into rainwater that percolates downward through the soil, or the chemicals dissolve into clean groundwater flowing through the site from other areas. As the chemicals flow with the groundwater away from the source, their concentrations decrease because the migrating plume continues to mix with clean water and because naturally-occurring microorganisms (chiefly bacteria) actually consume the chemicals (biodegradation). The size of a plume is dependent on many factors, including the chemical concentrations at the source area and the relative rates of mixing and biodegradation. A plume will continue to expand until its rate of regeneration at the source area is equal to its rate of decay along its fringe. At that point, the plume exists in steady-state (it is neither expanding nor receding). Eventually, as the volume of chemicals at the source area decreases over time (either naturally or through a remedial action such as soil removal or groundwater treatment), the rate of regeneration will be less than the rate of decay, and the plume will begin to shrink, or recede.

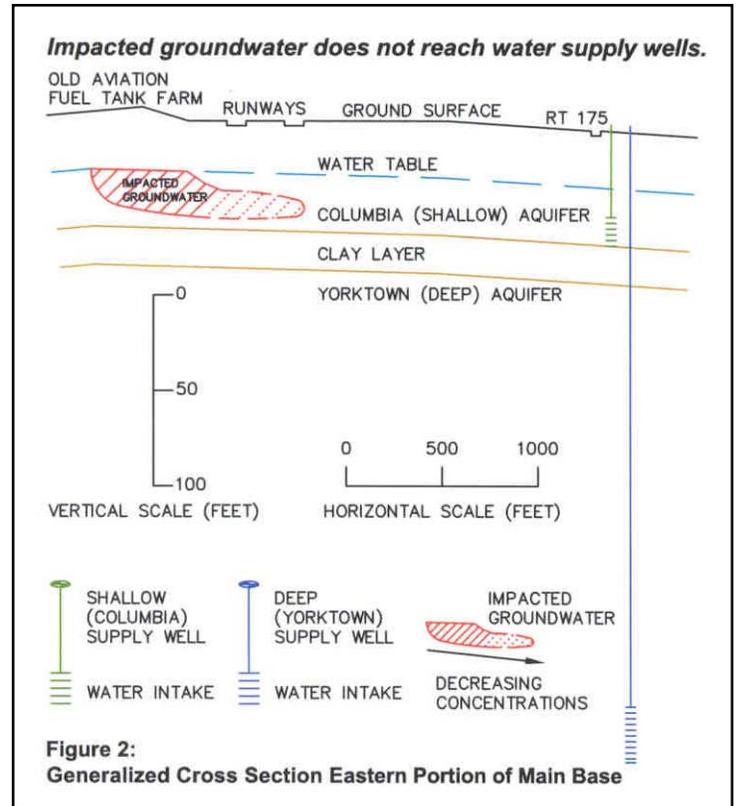
The results of comprehensive investigations indicate that each of the Main Base plumes is either at steady-state or is possibly receding, but none are continuing to expand. NASA continues to work with Federal and State environmental officials to take actions to ensure that the plumes are not expanding and to restore the impacted groundwater to natural conditions.

ARE THE DRINKING WATER SUPPLIES SAFE?

The contaminant plumes at Wallops are not impacting or affecting the area water supplies. Federal and State regulations require routine sampling of community supply wells to assure the quality of the drinking water. The results of the routine sampling of the supply wells, coupled with the periodic sampling and monitoring of the area groundwater and the contaminant plumes, continues to confirm that none of the area supply wells are impacted by NASA operations.

A total of 14 water supply wells are located on the Main Base, including five wells operated by NASA, one well operated by the National Oceanic and Atmospheric Administration (NOAA), and eight wells operated by the Town of Chincoteague. The locations of these wells are illustrated in Figure 1. Most of the supply wells are several hundred feet deep and are constructed to withdraw water from only the Yorktown Aquifer, which is protected from the overlying Columbia Aquifer by the intervening aquitard. Three Town of Chincoteague wells (shown in green on Figure 1) located near the eastern boundary of the Main Base, which are operated seasonally (May through September), are 60 feet or less in depth, and withdraw water from the Columbia Aquifer. These wells have not been impacted by the Old Aviation Fuel Tank Farm contaminant plume. NASA removed the source of contamination (leaking fuel tanks) in 1991 and implemented a groundwater remedy to prevent the migration of the impacted groundwater and restore it to natural conditions. NASA continues to operate the remediation system and regularly samples the supply wells and the area groundwater to confirm that the plume is not expanding and that there is no impact on the water supplies.

Figure 2 presents a generalized cross-section through the eastern portion of the Main Base, and includes the Old Aviation Fuel Tank Farm groundwater plume and the closest Town of Chincoteague supply wells. As shown in the figure, the supply wells have not been impacted because the plume is not large enough to reach any of the wells. In addition, the deeper wells are further protected by the presence of the Yorktown aquitard (clay layer).



WHAT ABOUT PERCHLORATE?

The chemical compound “perchlorate” (ammonium perchlorate) has been in the national news recently because it is a persistent and mobile groundwater contaminant. Although there is no evidence to suggest that perchlorate has ever been released at Wallops, NASA responded to this concern by sampling all of the water supply wells on NASA property in 2003. The testing confirmed that perchlorate does not exist in the water supply.

Our national defense and space programs use most of the perchlorate produced in this country as a major component of the propellants in solid fuel for rockets and missiles. The greatest potential for the release of perchlorate into the environment occurs during the manufacturing process. Perchlorate and solid fuels are not manufactured at Wallops, which limits the potential for an accidental release to the environment.

For further information, or to be added to the mailing list, please contact:

Mr. Keith Koehler, NASA Public Affairs Office
Wallops Flight Facility Code 130.4
Building F-6
Wallops Island, VA 23337
Telephone (757) 824-1579