Table 1--Restoration Information Need	**USGS Scientific Finding and Use in Restoration of the Bay Ecosystem**
Understand the effect of long-term changes in climate variability and man's activities on the Bay ecosystem	**Finding**: There have been wet and dry cycles over the past 500 years that have affected the salinity, dissolved oxygen, and water clarity conditions in the Bay. However, these water-quality conditions have severely degraded over the past 200 years in response to human induced changes in the watershed. Both human influence and a wet period beginning in the 1970s may be the combined cause of dissolved oxygen and water clarity being at the worst levels of the past 500 years. **Use**: The results are being used to help set new water-quality standards for the Bay. Further implications are that restoration efforts may not meet target dates because 200 years of human influence may not be reversible in 10 years and continued climate variability may overwhelm restoration activities.
Better define the sources and transport of nutrients entering the Bay	**Finding:** The USGS has completed a watershed model that identifies the location of nutrient sources and the transport of nutrients to the Bay. Ground water was found to contribute a large amount of water and nitrogen to the streams and rivers that enter the Bay. **Use:** Better targeting of locations to achieve nutrient reductions is being considered based on these model results. The CBP is working to incorporate the influence of ground water into management models.
Assess improvements in water quality.	**Finding**: Although nutrient-reduction actions have been implemented since the mid-1980s, USGS monitoring data indicate nutrient loads are not decreasing in all of the major rivers entering the Bay. Some of the factors responsible are steady or increasing trends in streamflow, lack of source reductions, and the slow movement of nitrogen through ground water. **Use**: Resource managers are working to accelerate the actions due to slow improvement in water quality and the influence of streamflow variability.
Understand the effect of the Susquehanna reservoir system on sediment delivery to the Bay.	**Finding:** A large amount of sediment is trapped by the reservoirs on the lower Susquehanna River. Two of the reservoirs have reached their sediment storage capacity and the third will reach capacity in 20-25 years. Once the capacity is reached, sediment and phosphorus loads will increase and degrade water clarity and submerged aquatic vegetation in the upper Bay. **Use:** A task force with USGS representation was formed to develop and recommend solutions to prevent the reservoir from reaching its storage capacity.
Understand changes in sedimentation in the Bay and the relation to water clarity.	**Finding:** Sedimentation rates in the Bay have increased four-to-five fold since the 1800s in response to timber harvesting and increases in agricultural and urban lands. **Use:** This information, along with future studies of the sediment sources affecting water clarity, will be used by the CBP to develop sediment-reduction strategies. These scientific findings will be integrated through a technical workgroup being chaired by the USGS.

Define the factors affecting submerged aquatic vegetation	**Finding:** Information was compiled and interpreted for CBP to set light requirements for SAV in different salinity zones of the bay. Investigations also showed that presence of SAV-generating materials (seeds, propagules) were an important factor for survival of SAV. Finally, investigations revealed SAV has returned in some areas of the Potomac River but the original species have been replaced by species that may not have the same food and habitat value to waterfowl and fishery resources. **Use:** The information is being used to set water-clarity standards and goals for expanded SAV in the Bay.
Define the occurrence of contaminants in the Bay watershed	**Finding:** Sampling indicates the presence of arsenic and antibiotics in some rivers. **Use:** Information is helping to assess effects on fish health.
Document the effect of contaminants on water birds.	**Finding:** Initial results from USGS and Fish and Wildlife Service studies suggest that pesticide concentrations are below thresholds that cause adverse reproductive effects in some water birds. **Use:** The results are being used to develop strategies for the "toxic areas of concern" in the Bay watershed (Baltimore Harbor, Anacostia River, and Elizabeth river).
Understand decline in waterfowl populations.	**Finding:** Many of the waterfowl populations have decreased in the Bay watershed due to loss of SAV and other habitat. Studies show that some species have been able to switch from SAV to clams as a primary food source resulting in more stable populations. **Use:** Results of these and other food-web studies are being used to develop multi-species management plans for the Bay's living resources.
Define the factors affecting fish health and the relation to Pfiesteria.	**Finding:** While fish kills are related to Pfiesteria, the lesions on menhaden in lower Eastern Shore waters are caused by an invasive fungus (Aphamonyces invadans). Further investigations are addressing the factors causing the fish to be susceptible to fungus and Pfiesteria. **Use:** Resource managers are using these results to help revise the management of the watersheds where Pfiesteria has been a concern and develop multi-species management plans.
Providing science for ecosystem restoration strategies.	**Finding:** The USGS has now assumed coordination of Monitoring and Quality Assurance activities at the request of CBP and has increased representation on the technical subcommittees of the CBP. **Use:** Having USGS participate in the CBP provides the direct application of science to formulate, and evaluate the effectiveness of, ecosystem restoration goals.