EXECUTIVE SUMMARY

GENERAL

The U.S. Army Corps of Engineers, Baltimore District, working in partnership with the Susquehanna River Basin Commission (SRBC), the Pennsylvania Department of Environmental Protection (PADEP), and the Capital Region Water Board (CRWB), has conducted a water supply study for the Swatara Creek Watershed. The study was performed under the Planning Assistance to States Program, as authorized by Section 22 of the Water Resources Development Act of 1974. The study, which was initiated in February, 2001, included a public process, with workshops conducted in April, 2001, March, 2003, and June 2003 that contributed feedback as the study progressed. As drought became a major concern in Pennsylvania during 2001 and 2002, the purpose of the study evolved to focus on current and projected (Year 2030) water needs within the Swatara Creek Watershed and potential alternatives to meet those needs.

WATERSHED CONDITIONS

The Swatara Creek watershed is approximately 571 square miles in size with an estimated population in 2000 of 214,000. County population projections to 2020 from the Pennsylvania State Data Center were adjusted by the study team to incorporate county planning input where available, and were extrapolated to 2030. Resultant projections suggest that the Swatara Creek Watershed's population could increase to 244,000 by 2030, bringing with such growth and accompanying development an increased demand for water.

The period of record for monitoring stream flow in the watershed extends back to 1919. Water supplies in the watershed, during average years of precipitation, are adequate to meet demand now and in the foreseeable future. Historical records, however, indicate that extensive droughts could adversely impact future supplies. The study team finds that surface water, augmented by current storage, may not be sufficient during drought to meet demands for suppliers that depend on surface water as a source.

One major public water supplier, the Lebanon Municipal Water Authority (LMWA), is identified in the study as the purveyor that could be most affected by water shortages under record drought conditions, particularly if demand increases as one projection indicates for 2030. LMWA depends on water from both Siegrist Reservoir and its intake on Swatara Creek, and currently supplies approximately 7.2 million gallons per day (MGD) to the City of Lebanon and various townships located adjacent to or nearby the City. Projected population increases from the Pennsylvania State Data Center using U.S. Census data and input from both county and LMWA sources regarding observed growth trends along highway corridors were used to estimate future water demands. These resulted in a projected demand for water supplies in the LMWA system of as much as 9.5 MGD by 2030.

The study team analyzed Siegrist Reservoir operations since 1994, when the new dam went into operation, to determine whether the reservoir has adequate capacity to meet demand when adequate natural flows from Swatara Creek are not available. A review of reservoir replenishment data and low flows of record for Swatara Creek indicates that reservoir supplies

are potentially adequate for the current LMWA demand of 7.2 MGD. Given current demand under drought conditions, however, the supply shortages range from 0 (no shortage) to 85 million gallons respectively, or 0 to 0.4 MGD over 210 days (worst drought period). For a Year 2030 demand of 9.5 MGD and drought conditions, supply shortages could range from 325 to 570 million gallons or 1.5 to 2.7 MGD over a 210-day drought period.

The study team also determined that a small shortage might occur for Pennsylvania American Water – Hershey District (PA American) in Year 2030; however, its permit allows continued withdrawals when the stream flow drops below the required flow-by level of 28.1 MGD (conservation must be imposed). This provides the flexibility to temporarily manage this shortage. Analysis suggests, however, that on several occasions in an 84-year period of record, PA American withdrawals to meet its projected demand could lower flows in Swatara Creek to levels that would prevent the United Water Company (United Water) downstream from being able to meet its demand and still meet a mandatory 20.8 MGD flow-by requirement. To the extent that United Water cannot absorb these very infrequent shortfalls within its larger system, or to the extent that watershed policy-makers wish to address PA American's need to withdraw during very low flows in Swatara Creek, solutions for potentially much greater shortages facing LMWA could incorporate PA American and United Water needs as well.

Analysis of ground-water supply and demand during normal hydrologic conditions identified six areas within the watershed that have more consumption than recharge for present or future demand, indicating a potential for a ground-water deficit in those areas. An additional six areas (a total of twelve) were found to have more consumption than recharge during drought conditions, indicating an additional potential for a deficit during drought. The analysis that identified these 12 areas with the potential for a ground-water deficit did not account for transient flows; therefore, more complex modeling would be needed to determine whether shortages would actually occur. The results do identify, however, areas more likely to experience shortages for further analysis, and also indicate where surpluses occur that might provide augmentation for any surface water shortages.

The study team did not identify other water shortages.

ASSESSMENT OF ALTERNATIVES

The study team developed and evaluated the six alternatives discussed below. The study team does not provide a recommended course of action; the alternatives and their evaluations are provided for the watershed's policy-makers, planners and other entities to reference and consider when they are ready to address the challenge of securing adequate water supplies.

Water Conservation. Aggressive water conservation measures could be implemented during drought, with evidence that such measures might reduce short-term water demand by 20 percent or more, once implemented. The use of conservation during drought would allow LMWA to meet the current demand; however, as a standalone program, it would be unlikely to compensate for estimated shortages based on projected Year 2030 demands of 9.5 MGD. Conservation can and should be a component of final plans, reducing the amount of water needed from other sources.

Infrastructure Improvements. The infrastructure improvements considered for this study are aimed at decreasing water distribution losses through the replacement and renovation of a percentage of the water distribution system to reduce water losses. Such a program alone would not provide enough water to meet projected shortages in 2030 and would significantly increase the present LMWA maintenance budget to achieve major required improvements. As with the water conservation component, this alternative could be combined with other alternatives to form a comprehensive solution.

Ground-Water Augmentation. As another alternative, ground-water could be used to augment water supplies during drought conditions, by developing multiple wells near the LMWA water treatment plant. The number of wells is dependent on the requirements to meet either the current or projected water shortages during drought. Since the aquifer recharge exceeds withdrawal rates on an annual basis throughout most of the Swatara Creek watershed, this alternative potentially provides enough water to meet any current and Year 2030 shortages.

Existing Surface Water Augmentation. Three existing water impoundments were considered for their potential to provide water in an emergency to LMWA: Memorial Lake, Sweet Arrow Lake, and the Cornwall Mine Pool. To determine the yields for both Memorial and Sweet Arrow Lake, further studies would be required; however, preliminary analyses of the water volume for both lakes concluded that neither water body would meet 2030 shortages and these alternatives do not appear feasible. The Cornwall Mine Pool, which has a large storage volume, but very low recharge rate, is owned by and already supplies Elizabethtown Borough. A large draw down for an emergency could take years for recovery even if Elizabethtown were to reduce its current usage. The conclusion is that the Cornwall Mine Pool is not a feasible source of water for the Lebanon system.

Other quarries, including the Hummelstown, Millard, and Prescott quarries, were examined to determine the possibility of using water from quarry dewatering for augmentation. Analysis suggests that yields from the Millard Quarry may satisfy the requirements for current and projected 2030 shortages; however, actual yield during drought for the Millard Quarry would require further study.

Reservoir Augmentation. The construction of a new reservoir, such as the previously proposed Swatara State Park impoundment, could provide water supplies that exceed currently projected water shortages. This alternative also has sufficient yields to potentially provide water during drought to areas outside the Swatara Creek watershed. While a reservoir could provide other benefits beyond water supply, costs and environmental impacts associated with this alternative are relatively significant, especially when compared to other alternatives. Quantifying such costs and benefits along with actual reservoir location would require further study.

Regulatory or Operational Changes. Relaxation of required permit flow-bys or releases would cause impacts and would not be favorably considered by regulatory and other water claimants. Operational changes in Siegrist Reservoir releases, such as pumping more water from Swatara Creek when available, thereby reducing water supplied by the reservoir, would add expenses and would not be sufficient as a standalone solution to meet Year 2030 shortages.